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# Multi-species Action Plan to Conserve African-Eurasian Vultures (Vulture MsAP): 1st Draft

Cover note prepared by the Coordinating Unit of the Raptors MoU

In November 2014, the 11th Meeting of the Conference of the Parties to the Convention on the Conservation of Migratory Species of Wild Animals (CMS) adopted Resolution 11.14 - *Programme of Work on Migratory Birds and Flyways*[1], which established the mandate to develop a Multi-species Action Plan to Conserve African-Eurasian Vultures (Vulture MsAP), under the auspices of the CMS Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia (Raptors MoU).

The mission is to bring together representatives of Range States, partners and interested parties, to develop a coordinated Action Plan covering 15 species of Old World vulture for submission to CMS COP12, scheduled to be held in October 2017. This 1st Draft has been produced for consideration at the Overarching Workshop, a critical step in the process to develop the Vulture MsAP.

**Action requested**

Participants are invited to:

a) Review and utilize this 1st Draft Vulture MsAP during the Overarching Workshop.

b) Contribute data, information and ideas to aid development of a refined 2nd Draft Vulture MsAP (to be compiled shortly after the Workshop).

c) Assist in in elaborating key strategic components of the Vulture MsAP, by actively contributing to discussions during the facilitated break-out sessions at the Workshop.

[1] http://www.cms.int/en/document/programme-work-migratory-birds-and-flyways-6



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# Vulture MsAP

## Convention on Migratory Species

## Multi-species Action Plan to Conserve African-Eurasian Vultures

**1st Draft, Revision 1**

**15 February 2017**

CMS

RAPTORS MOU

BirdLife INTERNATIONAL

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***Milestones in the production of the Plan***

- November 2014 – Mandate established at CMS COP11 (Resolution 11.14)
- October 2015 – Endorsed by Signatories of Raptors MoU at their 2nd meeting (MoS2)
- February 2016 - Publication of Project Charter for Vulture MsAP
- Jun-Aug 2016 - Appointment of Overarching and Regional Coordinators
- October 2016 – African Regional Workshop in Dakar, Senegal.
- October 2016 – European Regional Workshop in Monfragüe, Spain.
- November 2016 – Asian Regional Workshop in Mumbai, India.
- February 2017 – Middle East Regional Workshop in Sharjah, UAE.
- February 2017 – Overarching Workshop in Toledo, Spain.
- March 2017 – Public consultation exercise for draft Vulture MsAP.
- April 2017 – Production of final draft of Vulture MsAP.
- May 2017 – Submission of Vulture MsAP to CMS Secretariat.
- June 2017 – Review of Vulture MsAP by CMS Scientific Council.
- August 2017 – Publication on CMS website as document for COP12.
- October 2017 – 12th Meeting of the Conference of Parties to CMS (COP12).

***Geographical scope***
126 Range States, which host populations of one or more of the species that is the focus of the Multi-species Action Plan (Fig. 2).

***Species scope***
This Multi-species Action Plan covers 15 of the 16 species classified as the Old World vultures (Table 3), Palm-nut Vulture being excluded as explained in Section 1.2.

***Reviews***
This plan should be reviewed and updated every ten years (next review in 2027). An emergency review will be undertaken if there is a significant change to the species' status before the next scheduled review.

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***Updating of African Species Maps***
African species maps were updated by **Rob Davies** (HabitatInfo) and **Ralph Buij** (Wageningen University) using data from the African Raptor Databank and using current tracking data from a range of research projects across the continent.

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## Foreword

Vultures are a characteristic, distinctive and spectacular component of the biodiversity of the environments they inhabit. They also provide critically important ecosystem services by cleaning up carcasses and other organic waste in the environment: they are nature's garbage collectors and this translates into significant economic benefits. Studies have shown that in areas where there are no vultures, carcasses take up to 3-4 times longer to decompose; this has huge ramifications for the spread of diseases in both wild and domestic animals, as well as elevating pathogenic risks to humans. In addition, vultures hold special cultural value in many countries, including historically such as Nekhbet, a goddess in ancient Egyptian mythology.

The IUCN Red List status of African-Eurasian vultures has seen drastic changes for the worse in recent years: by the end of October 2015 the majority of species were listed as Critically Endangered, the highest category of threat, indicating a very high risk of extinction in the wild. Unless effective conservation action is implemented or expanded across the range of these birds, there is a significant likelihood that several of these species will indeed become extinct in the near future.

The main reason for this is major population declines driven by poisoning, both intentional and otherwise. The precipitous population decline of three species in India and elsewhere in South Asia during the 1990s was due primarily to secondary poisoning by the veterinary drug diclofenac. In Africa, the threat of poisoning has accelerated in recent years, with a range of drivers, which all lead to carcasses being laced with highly toxic substances; sometimes vultures are the targets, sometimes they are, through their scavening habits, the unintended victims. The immense scale and extent of the population declines of vultures in Africa have only recently been exposed and has led to the term 'African Vulture Crisis'.

Thanks to intensive conservation efforts, populations of some vultures have recovered in some parts of Europe, although the fact that diclofenac has recently been licensed for sale in parts of Europe remains a concern. Other threats to vultures, operating variably in all regions, include such problems as habitat loss or degradation, food availability, collisions and electrocution by electricity power lines.

Recent studies of the movement of vultures using satellite telemetry has shown the vast cyclical movements undertaken by this group of species. Accordingly, conservation actions can only be effective if implemented at the flyway level, which requires a broad approach and the engagement of all Range States. This realisation, and the wider appreciation of the seriousness of the African Vulture Crisis and increasing threats to vultures elsewhere, have been key catalysing factors that led to swift international agreement on the urgent need to develop a Multi-species Action Plan to conserve African-Eurasian Vultures under the Convention on Migratory Species.

This Multi-species Action Plan (Vulture MsAP), the result of extensive consultation with stakeholders, conservation and species experts, aims to rapidly halt current population declines in all the 15 African-Eurasian vulture species it includes; to bring the conservation status of each species back to a favourable level; and to provide conservation management guidelines applicable to all Range States.

Some outstanding work has been and continues to be done to conserve vultures. Long may this continue. However, the threats are both severe and challenging to address, and a step-change in conservation action is required, led by Governments and supported by all stakeholders including many who have so far not recognised the importance of vultures. Lessons learned and good practice

can be applied more widely but new and creative solutions need to be found to address the clear and present danger that threatens to drive this spectacular group of birds to extinction. The many stakeholders concerned with vulture conservation must work together, and not rest until all vulture species are safe from this threat so that the millions of people who benefit from them in so many ways can continue to do so.

## Executive Summary

Vultures, by cleaning up carcasses and other organic waste in the environment, provide critically important ecosystem services that also directly benefit man. This Multi-species Action Plan for the conservation of Africa-Eurasian Vultures (Vulture MsAP) aims to provide a comprehensive strategic conservation Action Plan covering the geographic ranges of all 15 migratory Old World vultures and to promote concerted, collaborative and coordinated international actions towards the recovery of these populations to acceptable levels by 2027. The species that are the focus of this plan are:

- Bearded Vulture *Gypaetus barbatus*
- Egyptian Vulture *Neophron percnopterus*
- Red-headed Vulture *Sarcogyps calvus*
- White-headed Vulture *Trigonoceps occipitalis*
- Hooded Vulture *Necrosyrtes monachus*
- Himalayan Griffon *Gyps himalayensis*
- White-rumped Vulture *Gyps bengalensis*
- White-backed Vulture *Gyps africanus*
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- Rüppell's Vulture *Gyps rueppelli*
- Griffon Vulture *Gyps fulvus*
- Cinereous Vulture *Aegypius monachus*
- Lappet-faced Vulture *Torgos tracheliotus*

With the exception of western Europe, where populations of most soecies are increasing, vulture populations in Africa, Europe and Asia are in decline and facing a range of threats from a variety of anthropogenic factors. The IUCN Red List status of vultures has seen drastic changes in recent years: by the end of October 2015 the majority of species were listed as 'Critically Endangered'. The precipitous collapse of populations of at least three species of vulture in South Asia over the last 25 years is currently mainly ascribed to the use of a single anti-inflammatory drug.

On the African continent vulture populations have also declined considerably in most areas over the last 30 years. However, the range and extent of threats facing these species are more varied compared to that of south Asia with various forms of acute poisoning currently known to be the main reason for the decline. These are driven by several factors, in paticular: conflicts with carnivores due to risks perceived by humans, including to their domestic livestock; poachers actively targeting vultures to avoid them exposing their activities to wardens by soaring above illegally killed Elephant and other game; and, deliberate collection of vultures for illegal trade and use for traditional beliefs and to fuel superstitions.

Poisoning of various forms is a concern throughout vultures' ranges. Other threats, also operating over large areas although to varying extents, include habitat loss and degredation, decreasing food availability, fragmentation of remaining populations, human disturbance, collisions with wind turbines, and electrocution by electricity power lines.

This plan is the result of extensive consultation with stakeholders, conservation and species experts and has the following aims:

- To rapidly halt current population declines in all species covered by the Vulture MsAP;
- To reverse recent population trends to bring the conservation status of each species back to a favourable level; and,

- To provide conservation management guidelines applicable to all Range States covered by the Vulture MsAP.

To achieve these aims, the plan proposes the following objectives and recommends associated results and actions towards its implementation, as well as high level indicators and targets for their achievement:

- Halt the illegal use of toxic chemicals that unintentionally kills vultures.
- Reduce vulture mortality caused by NSAIDS, limit the substance's availability for veterinary use and ensure that the threat of NSAIDs to vultures is recognised world-wide.
- Reduce and eventually halt the trade in vulture parts for belief-based use, especially through poisoning.
- Reduce or halt declines in vulture populations associated with sentinel poisoning by poachers.
- Reduce vulture mortality caused by collisions and electrocutions linked to energy generation and transmission infrastructure.
- Ensure availability of poison-free food for vultures to sustain populations.
- Ensure availability of suitable habitat for vultures to nest and forage.
- Reduce direct persecution and disturbance caused by human activities.
- Support vulture conservation through cross-cutting actions that may contribute to mitigation of most or all threats.

The many key stakeholders and their roles in achieving these objectives are identified, alongside policy opportunities and barriers to effect wide-scale changes. Finally, implementation approaches and strategies are presented.

[This latter section will need to be expanded when we have obtained more clarity on the proposed Strategic Implemention Plan, budget and resource mobilisation and communications plan]

## How to use this Action Plan

This CMS Multi-species Action Plan to Conserve African and Eurasian Vultures (Vulture MsAP) begins with an introduction on the rationale, aim, objectives, timeframe and methods that were followed to develop the Plan for consideration at the 12th Conference of the Parties to the Convention on Migratory Species (CMS) (Section 1). Section 2 explains the overall geographical and species scope of the Plan, and moves on to accounts of the 15 species (Section 3); from this, the reader can learn about each of the species, identify which occur in any given area or country of interest, and the main threats to their survival.

The threats are described in more detail (Section 4) and mapped according to their severity in each region (continent). Data are insufficient to identify threats and their severity for each country, but in most cases the severity of a threat is comparable in all countries across a given region; where this is believed not to be the case, this is stated. In this way, the reader can then identify the threats in any given area (this section). Due to the more substantial data available and feedback received from the European Region, more information on threats at a country-scale is available and has been included in Annexes 2.2–2.5.

This links through to the most appropriate objectives, results and actions needed (Section 7) to combat each threat, via further general information on those most likely to be concerned with or affected by vulture conservation actions (stakeholders: Section 5), and relevant policy and legislation (Section 6). Supplementary information and links for further information are provided in Annexes.

The Plan also contains information on, or links to, existing plans and policies focused on relevant threats, individual species or groups of species (including through links presented in Annexes). Two of these documents were developed concurrently with the development of the Vulture MsAP and were referred to extensively with regard to the two species concerned. These are:

- Flyway Action Plan for the Conservation of the Balkan and Central Asian Populations of the Egyptian Vulture (EVFAP)
- Flyway Action Plan for the Conservation of the Cinereous Vulture (CVFAP)

An established Blueprint for the Recovery of Asia's Critically Endangered *Gyps* Vultures exists. It was developed by the Saving Asia's Vultures from Extinction (SAVE) consortium and is annually updated by the SAVE members. The Blueprint provides clear guidance in terms of regional vulture conservation actions and the recommended actions in the Vulture MsAP reflects this.

## List of acronyms and abbreviations

| | |
|---|---|
| AMCEN | African Ministerial Conference on the Environment |
| AWF | African Wildlife Foundation |
| BCN | Bird Conservation Nepal |
| BirdLife | BirdLife International |
| BNHS | Bombay Natural History Society |
| CITES | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| CMS | Convention on Migratory Species |
| CoP | Conference of the Parties |
| CR | Critically Endangered |
| CU | Coordinating Unit |
| CZA | Central Zoo Authority (India) |
| DEA | Department of Environmental Affairs, South Africa |
| EAC | East African Community |
| ECOWAS | Economic Community of West African States |
| EN | Endangered |
| EWT | Endangered Wildlife Trust, South Africa |
| FAP | Flyway Action Plan |
| IGAD | Intergovernmental Authority on Development |
| IUCN | International Union for the Conservation of Nature |
| IUCN SSC VSG | IUCN Species Survival Commission: Vulture Specialist Group |
| IVRI | Indian Veterinary Research Institute |
| LC | Least Concern |
| MoU | Memorandum of Understanding |
| MsAP | Multi-species Action Plan |
| NGO | Non-governmental Organisation |
| NSAIDs | Non-steroidal Anti-inflammatory Drugs |
| NT | Near Threatened |
| OECD | Organisation for Economic Co-operation and Development |
| pVSZ | Provisional Vulture Safe Zone |
| RSC | Regional Steering Committee (of South Asian Governments) |
| RSPB | Royal Society for the Protection of Birds (UK) |
| SAVE | Saving Asia's Vultures from Extinction (consortium) |
| SEO/BirdLife | Spanish Ornithological Society |
| SsAP | Single-species Action Plan |
| TPF | The Peregrine Fund, Inc. (USA) |
| UAE | United Arab Emirates |
| UNEP | United Nations Environmental Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| USAID | United States Agency for International Development |
| VCF | Vulture Conservation Foundation |
| VICH | International Cooperation on Harmonisation of Technical Requirements for Registration of Veterinary Medicinal Products |
| VSG | Vulture Specialist Group (See IUCN SSC VSG) |
| VSZ | Vulture Safe Zone |
| VU | Vulnerable |
| Vulture MsAP | CMS Multi-species Action Plan for African-Eurasian Vultures |

| | |
|---|---|
| WCS | Wildlife Conservation Society |
| WWF | World Wildlife Fund |

# 1. Multi-species Action Planning for vultures: background and approach

## 1.1 Rationale

**Mandate**

The mandate for the development of this international Multi-species Action Plan to conserve African-Eurasian Vultures (VMsAP) was established at the 11th Conference of Parties to the Convention on the Conservation of Migratory Species of Wild Animals (CMS) in November 2014. CMS Resolution 11.14 on the Programme of Work on Migratory Birds and Flyways was adopted, and Action 9 of the Resolution, under the Species-specific Conservation Actions section, seeks to promote the development, adoption and implementation of species action plans for priority species in line with CMS priorities for concerted and cooperative action. Action 9 refers to all African-Eurasian Vultures (except Palm-nut Vulture *Gypohierax angolensis*) via the CMS Memorandum of Understanding on the Conservation of Migratory Birds of Prey (Raptors MoU). Resolution 11.14 also recognises both the IUCN SSC Vulture Specialist Group and BirdLife International as key collaborating partners.

At the Second Meeting of Signatories to the Raptors MoU held in Trondheim, Norway, in October 2015, Signatories formally recognised all Old World Vultures (except Palm-nut Vulture) as migratory species by listing them in Table 1 of Annex 3 of the Raptors MoU. In addition, the Technical Advisory Group (TAG) was tasked to support the Coordinating Unit in facilitating development of the VMsAP. In February 2016, the Coordinating Unit established an Interim Steering Group, including representatives from IUCN SSC Vulture Specialist Group, BirdLife International and other specialists, to guide the planning and preparations for the development of the Vulture MsAP.

**Mission**

To bring together representatives of Range States, partners and interested parties, to develop a coordinated Multi-species Action Plan to conserve African-Eurasian Vultures (Vulture MsAP) for submission to the 12th Meeting of the Conference of the Parties (COP12) to the CMS, scheduled to be held in October 2017.

**Aim and Objectives**

The overall aim is to develop a comprehensive strategic conservation Action Plan covering the geographic ranges of all 15 migratory Old World vultures to promote concerted, collaborative and coordinated international actions through achievement of three objectives:

1. rapidly halt current population declines in all species covered by the Vulture MsAP;
2. reverse recent population trends to bring the conservation status of each species back to a favourable level; and,
3. provide conservation management guidelines applicable to all Range States covered by the Vulture MsAP.

**Timeline and milestones**

Table 1 reflects the outline timetable that has been followed to ensure that the overall delivery deadline, established by CMS Resolution 11.14, is met.

Table 1. Outline timetable in the drafting, review and submission of the Vulture MsAP

| Date | Action |
|---|---|
| January 2016 | Interim Steering Group established |
| February 2016 | Project Charter published; Engagement with all Range States and key Stakeholders |

| | |
|---|---|
| March 2016 | Vulture Working Group Established |
| April 2016 | Critical funding support from Switzerland received |
| July 2016 | African, European and Asian Regional Coordinators appointed |
| August 2016 | Overarching Coordinator appointed |
| August, September & December 2016 | Circulation of Regional Workshop Questionnaires |
| September 2016 | Steering Group established |
| October/November 2016 | Regional Workshops held – Africa, Europe & Asia |
| January 2017 | 1st Draft of Vulture MsAP completed |
| 6-8 February 2017 | Middle Eastern Regional Workshop |
| 16-19 February 2017 | Overarching Workshop |
| Mid-March 2017 | Vulture MsAP Draft for public consultation finalised |
| March/April 2017 | Month-long public consultation process |
| April/May 2017 | Comments incorporated into final MsAP draft |
| 25 May 2017 | Submit VMsAP to CMS Secretariat (COP12 document deadline) |
| June 2017 | Review by CMS Scientific Council |
| August 2017 | Publication of VMsAP with draft resolution on CMS COP12 website |
| October 2017 | Considered by CMS Parties at COP12, Manilla, Phillipines |

## 1.2 Methods

*Background*

Species Action Plans are recovery plans aimed at the conservation of a threatened species with the goal to restore them to a favourable conservation status. A Multi-species Action Plan has the same goal, but focuses on several species with declining populations facing a range of threats within an identified geographical scale. Conservation actions for such mobile and wide-ranging species as vultures can only be effective if implemented across international political boundaries at the flyway scale, which requires a broad collaborative approach and the engagement of all Range States. These fundamentals underpin the principles for developing such plans: scientific rigour, stakeholder consultation, participation and consensus and consideration of existing efforts. The methods were developed so that these were adhered to.

*Species assessment and status review*

The 15 species of vultures agreed on and stipulated in the Vulture MsAP Project Charter were assessed by means of extensive literature review. Evidence for threats identified, and for the success or otherwise of conservation measures taken, were similarly assessed. Species conservation status is based the information provided by the IUCN Red List's delegated authority in terms of the status of threatened birds, BirdLife International.

*Questionnaires*

To acquire the most current information and feedback with regard to species population status and trends as well as existing threats and conservation actions focused on vultures within range countries, questionnaires were used. The questionnaires requested information per species from range countries and species experts on biological information, threats and conservation effort. This tool also enabled the capture of current information that was not yet necessarily accessible through peer-reviewed scientific literature and other publications. Questionnaires were drafted and distributed to stakeholders in all Range States for completion and submission at least 10 days prior to the commencement of each regional workshop. However, questionnaires completed subsequent to these deadlines and during the regional workshops were also considered and included in the overall datasets derived from these responses. A summary of the quantity of questionnaire feedback can be seen in Table 2.

*Coordination*

Overall planning, direction and oversight of the development of the Vulture MsAP was provided by the Coordinating Unit of the CMS Raptors MoU. BirdLife International and the Vulture Conservation Foundation were contracted to supervise and manage particular aspects of the process. Three Regional Coordinators and one Overarching Coordinator were appointed, primarily to take responsibility for the collection of regional information, coordination and arrangement of regional workshops and to contribute to the drafting of the Vulture MsAP. In February 2016, all Range States were invited to submit nominations for the Vulture Working Group which ultimately included over 60 individuals. A sub-set were invited to form a 20-person Steering Group which met regularly via online teleconference.

*Regional Workshops*

Four regional workshops were held between October 2016 and February 2017 within the Vulture MsAP range, each relating to a significant part of the global range of African-Eurasian vultures (Table 2). A total of 202 delegates attended these workshops, the aim of which was to gather the information necessary to develop the regional component of the Vulture MsAP, covering all vulture species that occur in the region being covered by the Plan, with special attention given to species status, threats and priority conservation actions. The workshops all followed a similar agenda and conducted by the Coordinators with facilitation support provided by a range of experienced participants who were briefed on the workshop methods and processes to be followed.

**Table 2. Regional Vulture MsAP Workshop details**

| Region | Date | Location | Number of Delegates | Questionnaire responses (total xxx) |
|---|---|---|---|---|
| Africa | 18-21 October 2016 | Dakar, Senegal | 54 | 62 |
| Europe | 26-28 October 2016 | Extremadura, Spain | 79 | 89 |
| Asia | 29-30 November 2016 | Mumbai, India | 37 | 44 |
| Middle East | 6-8 February 2017 | Sharjah, United Arab Emirates | 32 | [**] |

*Workshop processes*

To collate information on species status and biology, information from published literature, presentations at the regional workshops and questionnaire replies were used to update information on each species as reflected in the species accounts. Identified threats were categorised, based on the feedback received from additional information presented and questionnaire responses received prior to each of the regional workshops. Group discussions assessed and categorised threats in terms of the scope, severity and timeframe and also evaluated the quality of evidence that these assessments were based on. Each threat was then ranked in order of its impact at levels ranging from critical to low, and then analysed to determine demographic impacts, drivers and root causes. These allowed problem trees to be drawn up, an example of which, for unintentional poisoning (Fig. 1) is shown below. The threats are presented, along with supporting scientific evidence, in Section 3.

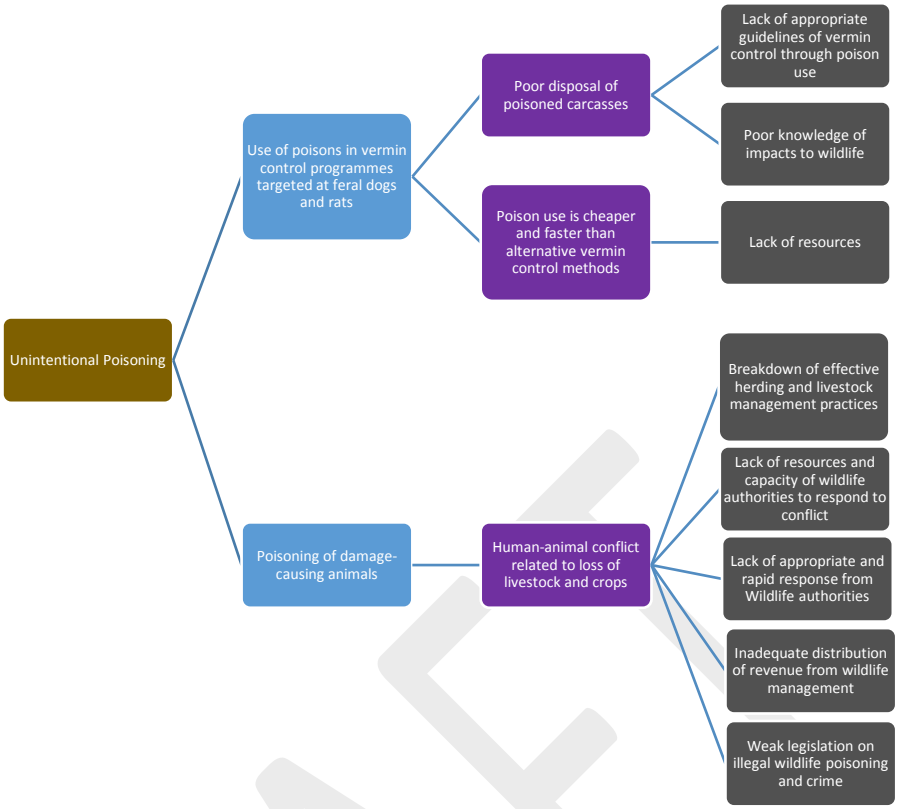



Fig. 1. An example of a problem tree for Unintentional Poisoning produced from results of threat analysis at the African Regional Workshop

Group discussions were aimed at identifying and understanding the drivers and root causes of each threat and to identify appropriate actions to reduce impact of thereof. Each action was also allocated a level of priority and timeframe for implementation within the Vulture MsAP framework. Parties responsible for implementation as well as key stakeholders for each action were also identified. The combined outcome of these processes is reflected in Section 6: the Framework for Action.

Information on Conservation Action in Place was gleaned mainly from the questionnaires that were submitted prior to the regional workshops. A complete account of this is beyond the scope of this plan, but key points are summarised in Section 7 (International Coordination of Action Plan Implementation) and in Annex 5.

*Overarching Workshop*

The main objectives of the Overarching Workshop are to:

- Review the 1st consolidated draft of the Vulture MsAP, incorporating the four regional components from Africa, Asia, Europe and the Middle East, and other inputs;
- Elaborate certain key strategic components of the Vulture MsAP which will not have been collectively considered at the four Regional Workshops; and,
- Engender and develop multi-lateral support, including identifying 'Vulture Champions'.

*External review*

Drafts of the Vulture MsAP will be reviewed initially by the Steering Group, by means of a month-long public consultation exercise, and by the CMS Scientific Council.

# 2. Scope

## 1.1 Geographic scope

The Vulture MsAP covers the combined land masses of Africa and Eurasia, an area supporting a readily defined community of vulture species, several with ranges spanning more than one continent. A total of 126 Range States (Fig. 2) host populations of one or more species of African-Eurasian vultures and are therefore included within the geographic range of the Vulture MsAP. This includes a few countries where vultures have been recorded only rarely or in very small numbers and not breeding, but no conservation actions are proposed in these countries and so their treatment as range states does not bring about any distortion of the actions proposed in the Vulture

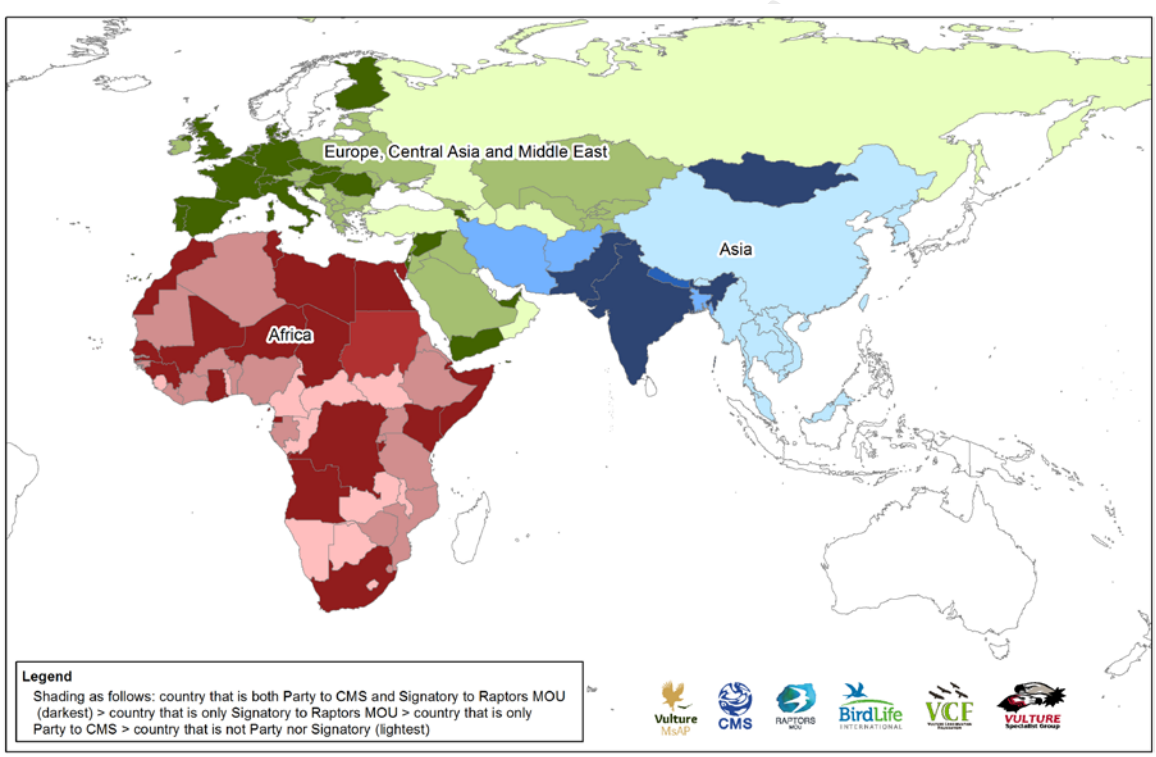



**Fig. 2**. Map showing vulture range states of Africa and Eurasia, together with Parties to CMS and Signatories to the Raptors MoU. Map to be updated, replaced and revised for public consultation phase; it is suggested not to distinguish the regions as in the map above

MsAP.

## 1.2. Taxonomic scope

The Vulture MsAP covers 15 of the 16 species classified as Old World vultures (Table 3). Taxonomy and nomenclature (del Hoyo *et al*. 2014) are as used by CMS and also the IUCN Red List, which for birds is maintained by BirdLife International. All species are included on the Annexes of the Raptors MoU.

Table 3. Species covered by the CMS Multi-species Action Plan to Conserve African-Eurasian Vultures. Nomenclature and sequence based on del Hoyo *et al*. 2014

| Species | **Range** | **Global level of threat (Red List category)**[1] |
|---|---|---|
| **Bearded Vulture *Gypaetus barbatus*** | Europe, Asia, Africa | NT |
| **Egyptian Vulture *Neophron percnopterus*** | Europe, Asia, Africa | EN |
| **Red-headed Vulture *Sarcogyps calvus*** | Asia | CR |
| **White-headed Vulture *Trigonoceps occipitalis*** | Africa | CR |
| **Hooded Vulture *Necrosyrtes monachus*** | Africa | CR |
| **Himalayan Griffon *Gyps himalayensis*** | Asia | NT |
| **White-rumped Vulture *Gyps bengalensis*** | Asia | CR |
| **White-backed Vulture *Gyps africanus*** | Africa, (Europe) [2] | CR |
| **Indian Vulture *Gyps indicus*** | Asia | CR |
| **Slender-billed Vulture *Gyps tenuirostris*** | Asia | CR |
| **Cape Vulture *Gyps coprotheres*** | Africa | EN |
| **Rüppell's Vulture *Gyps rueppelli*** | Africa, (Europe) [2] | CR |
| **Griffon Vulture *Gyps fulvus*** | Europe, Asia, Africa | LC |
| **Cinereous Vulture *Aegypius monachus*** | Europe, Asia, (Africa) [2] | NT |
| **Lappet-faced Vulture *Torgos tracheliotos*** | Africa, Asia | EN |

Notes

[1] In order of degree of threat: CR, Critically Endangered; EN, Endangered; NT, Near Threatened; LC, Least Concern

[2] Cinereous Vulture occurs irregularly and in very small numbers in Africa; Rüppell's and White-backed Vultures similarly in Europe (although perhaps more regularly)

The 16th Old World vulture species, Palm-nut Vulture *Gypohierax angolensis*, is excluded because it is not considered a migratory species; nor is it an obligate scavenger (it is primarily frugivorous), which is at the root of the threats facing the other species (especially poisoning). Consequently it is treated as Least Concern in the Red List.

Vultures are absent from the Pacific region. The seven vulture species of the Americas are not closely related to those of Africa and Eurasia and face different (and in most cases much lesser) threats; they are not considered further in this Vulture MsAP.

## 3. Biological assessment

### 3.1 Introduction

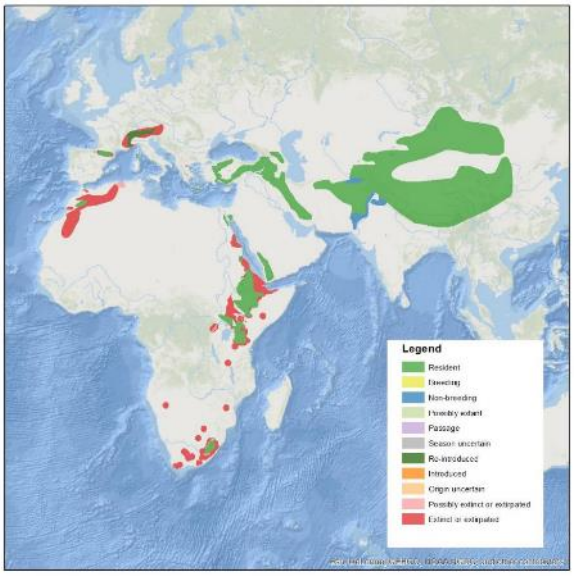
The vultures considered in this Vulture MsAP (see 1.2 regarding Palm-nut Vulture) are large-bodied (2–10 kg) birds adapted for economical soaring flight in updraughts and thermals. They feed on tissues from carcasses of large mammals located from the air, either by seeing the carcass itself or the responses of other vultures to it. They eat meat, offal, intestines and bones, typically of domestic cattle or wild ungulates, and can take sufficient food into the crop at one meal to last several days. Nests are typically on trees or cliffs; some species are colonial breeders.

Eight species are placed in a single genus, *Gyps*, while each of the other seven species are in their own genus. *Gyps* vultures are typically widespread and abundant, historically accounting for the majority of individual vulture sightings in both Africa and Asia. Five of the remaining seven species are fairly similar to *Gyps* in their size, structure and ecology (although Hooded Vulture is notably smaller), and together these 13 species form their own taxonomic group. The remaining two, Egyptian and Bearded Vultures, are relatively distinct from the others (and each other) in appearance and are not their closest relatives, but as raptors dependent on scavenging they are treated as vultures.

Note: Range maps are from the IUCN Red List, and will be updated and reformatted specifically for the Vulture MsAP before the Public Consultation Exercise scheduled in March 2017. Existing photos are place-holders. Formatting and style will be professionally revised and harmonised after the outcomes of the Overarching Workshop have been incorporated.

### 3.2 Bearded Vulture *Gypaetus barbatus*

| | |
|---|---|
| Red List Category: Near Threatened (2014); previously LC.<br><br>Population size: 2,000-10,000 (1,300-6,700 mature individuals)<br><br>Population trend: Decreasing<br><br>Distribution: Africa, Europe, Asia |  |




**Distribution:** In Europe, the distribution is patchy, following a widespread decline over the last two centuries principally because of direct or indirect human causes; it has disappeared from almost all mountains ranges across Europe. The population in the Balkans was the last to become extinct, as late as in the beginning of this century (Andevski 2013), and the species remained only in the Pyrenees, Corsica and Crete. Since the mid-1980s the species has been reintroduced to several European mountain ranges, initially in the Alps, more recently (not mapped) Andalusia, Grands Causses and Picos

de Europa. In Asia, In Asia, the main and substantial populations occur along the full length of the Himalayas, extending from central China westwards through all the montane states of northern India, and Nepal, Pakistan, Afghanistan into central Asia as well as Mongolia. Middle Eastern populations extend from SW Iran into much of Turkey, with more isolated populations in Yemen and SW Saudi Arabia. Bearded Vultures occur in Ethiopia, Kenya and Tanzania in East Africa, Lesotho and South Africa in southern Africa, and Morocco. They could conceivably survive in Algeria and Mauritania.

**Population size and trend:** The current European population estimate is 590-749 pairs, which equates to 1,200-1,600 mature individuals. Population trends in Europe vary regionally and locally. Even though the population in Western Europe (207) is increasing, the last two island populations, Crete and Corsica, are stable and near to extinction respectively. There is a lack of information for the species in Turkey and the Caucasus (VCF LIFE EuroSAP Bearded Vulture status review 2015). Asian populations are regarded as being relatively large and stable but with signs of significant but more localised declines. There are reports of declines in observations over recent decades, notably from Turkey, upper Mustang (Nepal), Uttarakhand (India) and Yemen, but birds are apparenlty survive in these areas. The higher Himalayan populations together with those in SE Kazakhstan and Armenia are all regarded as more stable. In Africa the largest known populations are found in Ethiopia where there is an estimated few hundred pairs (Angelov 2011), but this population has not been fully assessed. There is also a small population of less than 10 pairs in Kenya and northern Tanzania (BirdLife International 2016). The geographically isolated population in Lesotho and South Africa is currently estimated at 200-250 individuals and has declined by more than 80% over the last three generations (Krüger 2015). In North Africa there are an estimated 1-2 breeding pairs in Morocco but no current information elsewhere.

**Movements:** It is resident but has vast home ranges, and juveniles will wander even more widely than adults (Ferguson-Lees and Christie 2001). The home range of adult birds depends on their territorial status. Territorial individuals exploit home ranges of about 50 $km^2$, while non-territorial birds use areas of around 10,000 $km^2$ (Margalida *et al*. 2016). Although younger birds can exploit large areas moving across much of Europe before becoming territorial, the species shows philopatric behaviour, which has a negative effect in the expansion of occupied territories (Donazar 1993). Irregular movements for this species have also been recorded for this species in Europe with recent records for this species from The Netherlands, Denmark and UK. In southern Africa, tracking studies indicate that adult, breeding birds are largely sedentary and forage within close proximity of active nests while juvenile and immature birds can cover most of the species' range in the region while foraging, regularly crossing the border between Lesotho and South Africa (Krüger 2015).

**Habitat:** The species occupies remote mountainous areas, with precipitous terrain, usually above 1,000 m, and in Europe and Asia, in particular areas where large predators such as wolves, snow leopard and golden eagles are present, and there are herds of mammals such as mountain goats, ibex, and sheep (Ferguson-Lees and Christie 2001). In Africa, it is also restricted to higher altitudes such as the Ethiopian highlands and the Ukuhlamba-Drakensberg, but in southern Africa it is almost entirely dependent on livestock carcasses due to the almost complete absence of wild ungulates over much of its range. Usually they are limited to alpine habitat, with vegetation being the distribution-limiting factor (Hiraldo *et al*. 1979).

**Ecology:** As a scavenger, Bearded Vultures consume prey remains left by predators or other scavengers, and 70% of the biomass of their diet are bones. Of the remainder, 25% consists of soft tissue and 5% skin (Hiraldo *et al.* 1979). Only during the period when they are raising young do they need soft tissue. Bearded vultures preferentially consume large bones up to 25 cm in length and 3.5 cm in diameter (Llopis 1996). Bones too big to be swallowed whole are dropped on to a rocky surface from 20-70 m height, with the birds collecting the fragments and the marrow (Boudoint 1976). The species is mostly monogamous, but trios (two males and one female) are also often

documented (Razin 2015). They construct large nests (averaging 1 m diameter), composed of branches and wool, situated on remote overhanging cliff-ledges or in caves that are re-used over the years. Breeding occurs from December to September in Europe and northern Africa; October–May in Ethiopia; May-January in southern Africa; year-round in much of eastern Africa; and December-June in India (Ferguson-Lees and Christie 2001). Eggs are incubated for on average 54 days and nestlings fledge after almost 4 months in the nest (Margalida 2002). In the case of double clutches obligatory "cainism" occurs in which the older sibling kills the younger (Thaler & Pechlaner 1980), a common trait in raptors.

**Major threats:**

Unintentional poisoning
Disturbance caused by human activities
Collision with power lines/cables

**Secondary threats:**

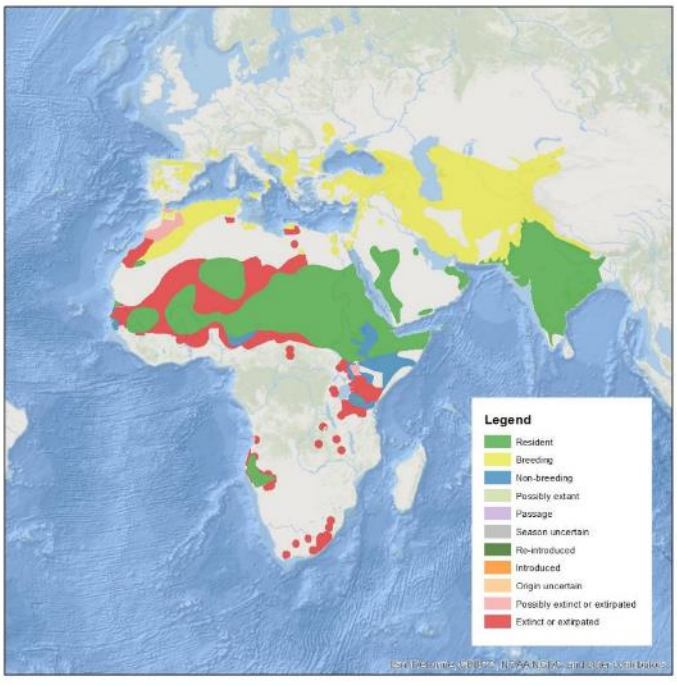
Pastoralism changes driving habitat degradation and lack of food
Genetic bottle-necks
Direct persecution

**Potential threats:**

NSAID poisoning
Wind farms
Lead intoxication (hunting with lead ammunition)

### 3.3 Egyptian Vulture *Neophron percnopterus*

| | |
|---|---|
| Red List Category: Endangered (since 2007, last update 2016)<br><br>Population size: 18,000-57,000<br><br>Population trend: Decreasing<br><br>Distribution: Africa, Europe, Asia |  |




**Distribution:** Egyptian Vulture is a Palearctic, Afrotropical and western Indohimalayan species: a breeding (summer) migrant across the northern part of the range, but with resident populations and non-breeding visitors further south. The northern breeding range includes southern Europe and North Africa eastwards through the Balkans, Turkey, Iran, Afghanistan, China, Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan, Kyrgyzstan, Georgia, Azerbaijan, Armenia, Ukraine and Moldova. The smaller Asian

subspecies (*ginginianus*) is largely sedentary, remaining within the Indian sub-continent (Pakistan, India, Nepal), although other populations (of the nominate race) are also sedentary in Oman, UAE, Saudi Arabia and Yemen as well as much of the central and East African range. The African range is huge, concentrated along a broad band of the Sahel from Sudan (Nikolaus 1987) and Ethiopia (holding the largest African breeding population: Mundy *et al*. 1992) west to Senegal (Rhondeau & Thiollay 2004, Petersen *et al*. 2007, Wacher *et al*. 2013) and south to Kenya and northern Tanzania. It also occurs in North Africa (Morocco, Tunisia, Algeria, Libya and Egypt: Levy 1996, Mundy 2000). A few resident pairs occur in Angola, but it is currently considered regionally extinct as a breeding species in South Africa (Taylor *et al.* 2015) and Namibia (Simmons *et al.* 2015).

**Population size and trend:** In Europe the largest populations are in Spain and Turkey (each estimated at 1000 – 2000 pairs). Other countries with significant populations (about 100 pairs) are: Azerbeijan, France, Georgia, Kazakhstan, Portugal, Russia and Uzbekistan. The European breeding population is estimated to number 3,000-4,700 breeding pairs, equating to 6,000-9,400 mature individuals (BirdLife International 2015). Europe forms 25-49% of the global range, so a very preliminary estimate of the global population size is 18,000-57,000 individuals, roughly equivalent to 12,000-38,000 mature individuals, although further validation of this estimate is needed (BirdLife International 2017). The population is generally decreasing all over its range (BirdLife International 2015a), except for some isolated island populations in the southwestern part of Asia, notably Socotra (Ferguson-Lees *et al*. 2001, Porter & Suleyman 2012, Angelov *et al*. 2013c). In India, it has declined by >90% in the last ten years (Cuthbert *et al*. 2006); European populations have declined by 50-79% over the last three generations. Western, eastern and southern African breeding populations also appear to have declined significantly, as do Arabian populations (Jennings 2010). Africa holds the main wintering grounds of the eastern migratory population, but the African estimate for annual wintering and migrating individuals is less than 2,000. Ethiopia holds probably the largest congregation of wintering Egyptian Vultures in Eastern Africa, with over 1,000 individuals annually, however a decline of these numbers has been reported over the last 5 years (Arkumarev *et al*. 2014). In Chad, Niger, Nigeria, Djibouti and Somali the current population status is unknown (Meyburg *et al*. 2004, Oppel *et al*. 2015).

**Movements:** The populations breeding on the Canary Islands, Balearic Islands, Cape Verde Islands, Socotra and Masira Island, on the Arabian Peninsula, and those on the Indian subcontinent are sedentary. Northern breeders conduct long-distance intercontinental migrations, flying over land and often utilising the narrowest part of the Strait of Gibraltar or the Bosphorus and Dardanelles on their way to sub-Saharan Africa (García-Ripollés *et al*. 2010, López-López *et al*. 2014, Oppel *et al*. 2015). In the Indian subcontinent, the population is increased especially in NW India by the migrant nominate race in the winter, but the exact distribution and status of the two races in the region remains unclear. Egyptian Vultures are rare and irregular visitors to southern Africa, where they used to breed; a few may still do so in northern Namibia.

**Habitat:** In most parts of its range, this species inhabits arid woodlands and semi-arid bush country, especially canyons and rocky areas, often near villages and along roads. Usually occurs singly or in pairs, less commonly in small groups, and rarely in large groups of more than 100. Soars low in search of food. Roosts on cliff faces or in dead trees and is rarely found far from nesting cliffs. Less wary and more tolerant of humans than other vultures.

**Ecology:** Typically nests on ledges or in caves on cliffs (Sarà and Di Vittorio 2003), crags and rocky outcrops, but occasionally also in large trees, buildings (mainly in India), electricity pylons (Naoroji 2006) and exceptionally on the ground (Gangoso and Palacios 2005). Forages in lowland and montane regions over open, often arid, country. Also scavenges at human settlements. Broad diet including carrion, tortoises, organic waste, insects, young vertebrates, eggs and even faeces (Margalida *et al*. 2012, Dobrev *et al*. 2015, 2016). Usually solitary, but will congregate at feeding sites, such as rubbish tips, or vulture restaurants (i.e. supplementary feeding stations), and forms

roosts of non-breeding birds (Ceballos & Donázar 1990). Pairs performs energetic display flights. The species exhibits high site fidelity, particularly in males (Elorriaga *et al*. 2009, García-Ripollés *et al*. 2010, López-López *et al*. 2014).

**Major threats:**

- Unintentional poisoning. The use of poison baits targeted at mammalian predators and feeding on carcasses poisoned by these is thought to be the most significant cause for declines in this species in Europe (Carrete *et al*. 2007, Carrete *et al*. 2009, Cortés-Avizanda *et al*. 2009, 2015 Sanz-Aguilar *et al*. 2015b, Oppel *et al*. 2016, Angelov, 2009).
- Food shortage due to declining wild and domestic ungulate populations. Improvement of slaughterhouse sanitation and declines in wild ungulate populations seems to have contributed to the decleine of this species in Africa (Mundy *et al.* 1992, Ogada *et al.* 2016).Amended management practices at refuse dumps in Europe and the Middle East (**McGrady ref?)** may also result in reduced availability of food from this source for this species.
- Electrocution and collision with energy infrastructure. Incidents of mortality involving this species has been recorded on the Canary Islands (Donazar *et al*. 2002, Donazar *et al.* 2007a) and is considered a possible risk in regions of Spain (Donazar *et al.* 2007b, 2010b) and in Africa (Nikolaus 1984, 2006), with 17 individuals found killed by electrocution in Port Sudan, over 10 days in 2010 (I. Angelov *in litt.* 2010, Angelov *et al.* 2013a).

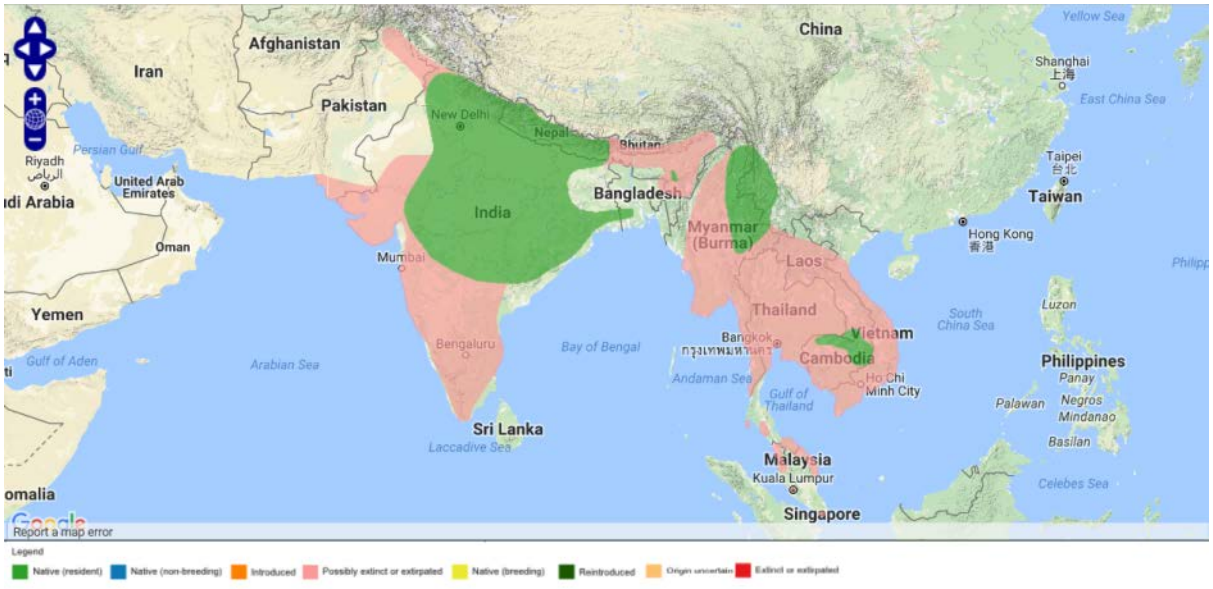
**Secondary threats:**

- Veterinary drugs (NSAIDs, etc.)
- Habitat loss and nest destruction
- Direct persecution
- Belief-based use

### 3.4 Red-headed Vulture *Sarcogyps calvus*

| | | |
|---|---|---|
| Red List Category: Critically endangered (LC in 1988, NT in 1994, CR in 2007)<br><br>Population size: 3,500-15,000 birds (2,500-9,999 mature individuals)<br><br>Population trend: Decreasing<br><br>Distribution: Asia |  | |

**Distribution:** Red-headed Vulture occurs throughout most of India, and also Nepal, Bhutan, Myanmar and Cambodia (Ferguson-Lees *et al.* 2001, Nadeem *et al.* 2007, Hla *et al.* 2011, Inskipp *et al*. 2013). There are no recent records from Bangladesh or Pakistan, where it may be extinct.




**Population size and trend:** Cuthbert *et al.* (2006) calculated a decline in excess of 90% in a 10-year period in India. More recently, Galligan *et al*. (2014) reported a decline of 94% from 1992 to 2003 in India, with the rate of decline slowing and the population stabilising.

**Movements:** The species is largely sedentary, however individuals can forage over considerable areas and there is some seasonal altitudinal movement (Ferguson-Lees & Christie 2001). Bildstein (2006) categorises it as an irruptive and local migrant. As with *Gyps* species immatures are probably more nomadic (Ferguson-Lees and Christie 2001). Little is known about movements, but new satellite-tracking data indicate that at least some birds move across international borders between India and Nepal (UNEP/CMS 2015). Range of movement patterns may also have reduced in tandem with its decline (Naoroij 2006).

**Habitat:** Red-headed Vultures occur in a wide variety of habitats, including open countryside, cultivated areas, savanna woodland and foothills usually below 2,500 m (del Hoyo *et al.* 1994, BirdLife International 2016)

**Ecology:** Red-headed vultures are primarily carrion feeders, but they are also known to kleptoparasitise other vultures (especially Egyptian Vulture) and raptors (del Hoyo *et al.* 1994). They attend carcasses with other vultures but tend to be more timid. Breeding pairs are territorial and they exclude conspecifics. Nests are usually built in tall trees, often at the top, however smaller shrubs (2-3 m in height) will be used in the absence of taller trees. Because of its territorial behaviour Red-headed Vultures tend to occur at lower densities than other Asian vulture species.

**Major threats**

- The anti-inflammatory drug diclofenac, used to treat domestic livestock, may be a major cause of mortality, as is the case in *Gyps* vultures (Oaks *et al*. 2004, Shultz *et al*. 2004). However, the toxicity of diclofenac and other veterinary NSAIDs to red-headed vultures has not been tested experimentally and there are no relevant post-mortem findings for wild to red-headed vultures indicating toxicity or lack of it. Given the similarity of recent population trends of this species to those of *Gyps bengalensis* and *G. indicus* (Galligan *et al*. 2014), it is prudent to treat diclofenac as a major threat to this species pending improved information.
- A second NSAID commonly used in India, ketoprofen, has also recently been identified to be lethal to *Gyps* vulture species (Naidoo *et al.* 2009), and measurements of residue levels in ungulate carcasses in India indicates that concentrations are sufficient to cause *Gyps* vulture mortalities (Taggart *et al.* 2007). There are risks of poisoning from other NSAIDs. Although

there is no evidence either way concerning the toxicity of NSAIDs to red-headed vultures, it is prudent to treat regard NSAIDs as a major threat to this species pending improved information.

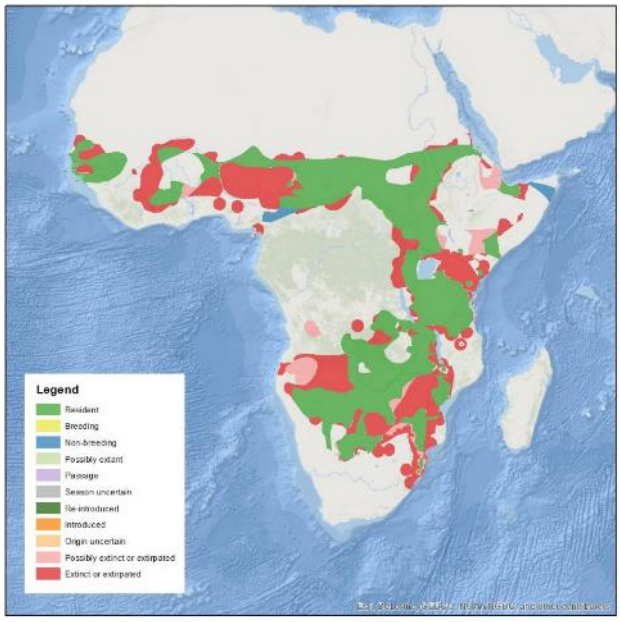
- The primary reason behind its decline in south-east Asia (Myanmar and countries to the east) is thought to be the demise of large wild ungulate populations and improvements in animal husbandry resulting in a lack of available carcasses for vultures (BirdLife International 2016).
- Accidental poisoning at carcasses deliberately laced with pesticides to kill stray dogs or wild carnivores (BirdLife International 2016); a major threat in south-east Asia and more recently in NE India (Assam).

**Secondary threats**

- Changes in the processing of dead livestock which have occurred in response to the collapse in vulture numbers (BirdLife International 2016).
- Ingestion of other poisons and pesticides (BirdLife International 2016).

### 3.5 White-headed Vulture *Trigonoceps occipitalis*

| | |
|---|---|
| Red List Category: Critically endangered (LC in 2004, VU in 2007, CR in 2015)<br><br>Population size: 5,500 birds or 3,685 (2,500-9,999) mature individuals<br><br>Population trend: Decreasing<br><br>Distribution: Africa |  |




**Distribution:** This species has an extremely large range in sub-Saharan Africa from Senegal, Gambia and Guinea-Bissau, east to Eritrea, Ethiopia and Somalia, and south to easternmost South Africa and Swaziland. Widespread declines are resulting in an increasingly fragmented distribution. In Southern Africa it is now largely confined to protected areas.

**Population size and trend:** The most recent population estimate is approximately 5,500 individuals (Murn *et al*. 2015), consisting of just 3,685 (range 2,500-9,999) mature individuals. The species has undergone a rapid population decline across its range.

**Movements:** Adults are largely sedentary, perhaps more so than any other African vulture, however, there is evidence of seasonal movements in West Africa and immatures are more nomadic (del Hoyo *et al.* 1994, Ferguson-Lees & Christie 2001). Compared to many vulture species,

there is little knowledge of the movements (Murn & Holloway 2014) but recent results from satellite-tracked individuals in South Africa (UNEP/CMS 2015) show individuals moving between South Africa and Mozambique, albeit with apparently smaller home-ranges than some of the other African vultures.

**Habitat:** White-headed Vultures prefer mixed, dry woodland at low altitudes, avoiding semi-arid thornbelt areas (Mundy *et al.* 1992). It also occurs up to 4,000 m in Ethiopia, and perhaps 3,000 m in Kenya, and ranges across the thorny *Acacia*-dominated landscape of Botswana (Mundy *et al.* 1992). It generally avoids human habitation (Mundy *et al.* 1992).

**Ecology:** Feeds mainly on carrion and bone fragments from large and small carcasses. Feeds alone or in pairs, rarely more than two pairs congregating at larger carcasses. Often snatches food from other vulture species and then consumes nearby. Is often the first vulture species to arrive at a carcass (Mundy *et al.* 1992). Known to take some small or weak prey but may also scavenge from other raptors (del Hoyo *et al*. 1994). The species is thought to be a long-lived resident that maintains a territory (del Hoyo *et al.* 1994). It nests and roosts in trees, most nests being in *Acacia* spp. or baobabs (Mundy *et al.* 1992). The species is highly sensitive to land-use and is highly concentrated in protected areas (Hancock 2008).

**Major threats**

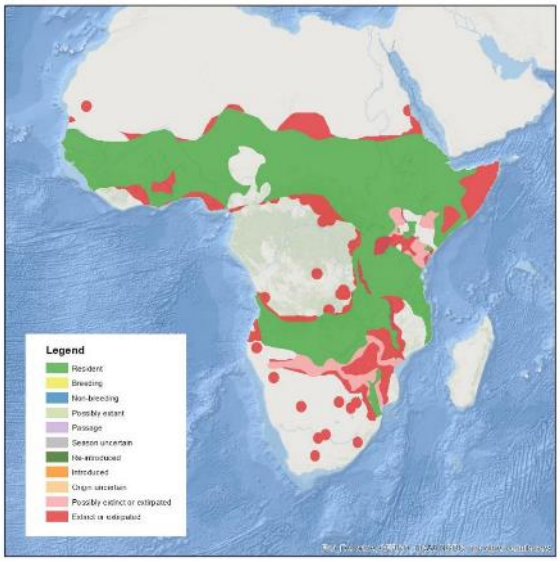
- Unintentional poisoning (especially eastern and southern Africa). Poisoned baits targeted at at mammalian carnivores causing livestock losses kills these birds when they feed on the baits theselves or the animals that were killed by them.
- Declining wild ungulate populations (East Africa) (Western *et al.* 2009).
- Habitat conversion/degradation (throughout range) (Mundy *et al.* 1992, R. Davies *in litt* 2012)
- Belief-based use (West, Central and Southern Africa) (Roxburgh & McDougall 2012, Buij *et al*. 2015)

**Secondary threats**

- Sentinel poisoning, especially in southern Africa (Roxburgh & McDougall 2012, Ogada *et al*. 2015a). This is the deliberate poisoning of the carcasses of large mammals such as elephant and buffalo after being poached to reduce vulture numbers in an areas where poachers are active due to large numbers of birds getting killed in this manner. White-headed Vultures, like most other species occurring in are where this practise is prevalent, are susceptible to this threat.

### 3.7 Hooded Vulture *Necrosyrtes monachus*

| | | |
|---|---|---|
| Red List Category: Critically endangered (LC in 2009, EN in 2011, CR in 2015)<br><br>Population size: 197,000 birds<br><br>Population trend: Decreasing<br><br>Distribution: Africa |  | |




**Distribution:** A widespread resident throughout, and endemic to, sub-Saharan Africa, except densely forested areas in Central Africa.

**Population size and trend:** Estimated at 197,000 individuals (Ogada & Buij 2011) but rapidly declining; this decline has been estimated at 83% (range 64-93%) in the last 30 years (Ogada *et al.* 2015b).

**Movements:** Generally considered sedentary, with some dispersal of non-breeders and immature birds, especially in response to rainfall (Ferguson Lees & Christie 2001). Recent satellite tracking has shown that individuals move several hundreds of kilometres from their capture sites between South Africa, Mozambique and Zimbabwe (UNEP/CMS 2015).

**Habitat:** Often associated with human settlements, but also found in open grassland, forest edge, wooded savannah, semi-desert and along coasts (Ferguson-Lees & Christie 2001). It occurs up to 4,000 m, but is most numerous below 1,800 m. It nests mainly in trees.

**Ecology:** Feeds on carrion, but in areas where it is associated with urban areas it congregates at slaughterhouse disposal sites and rubbish dumps. Gregarious at larger carcasses but because of its smaller size is often outcompeted by larger species. Generally, north of the equator it is a human commensal gathering in large numbers in urban areas (Ogada & Buij 2011). South of the equator it is generally more solitary and is largely found in conservation areas where it relies on natural food for most of its diet (Anderson 1999).

In West Africa and Kenya it breeds throughout the year, but especially from November to July. Breeding in north-east Africa occurs mainly in October-June, with birds in Southern Africa tending to breed in May-December. It is an arboreal nester and lays a clutch of one egg. Its incubation period lasts 46–54 days, followed by a fledging period of 80–130 days. Young are dependent on their parents for a further 3–4 months after fledging (Ferguson-Lees & Christie 2001).

**Major threats**

- Killing for belief-based use (especially West and Central Africa) (McKean *et al.* 2013; Saidu & Buij 2013; Buij *et al.* 2015), mainly through poisoning but locally by capture at abattoirs (e.g. Uganda: D. Pomeroy *in litt*.)
- Food and bushmeat trade (especially west and central Africa) (McKean *et al.* 2013; Rondeau & Thiollay 2004)
- Unintentional poisoning (East Africa) (Roxburgh & McDougall 2012);
- Sentinel poisoning (Ogada *et al*. 2015b). This is the deliberate poisoning of the carcasses of large mammals such as elephant and buffalo after being poached to reduce vulture numbers in an areas where poachers are active due to large numbers of birds getting killed in this manner. Hooded Vultures, like most other species occurring in areas where this practise is prevalent, are susceptible to this threat.

**Secondary threats**

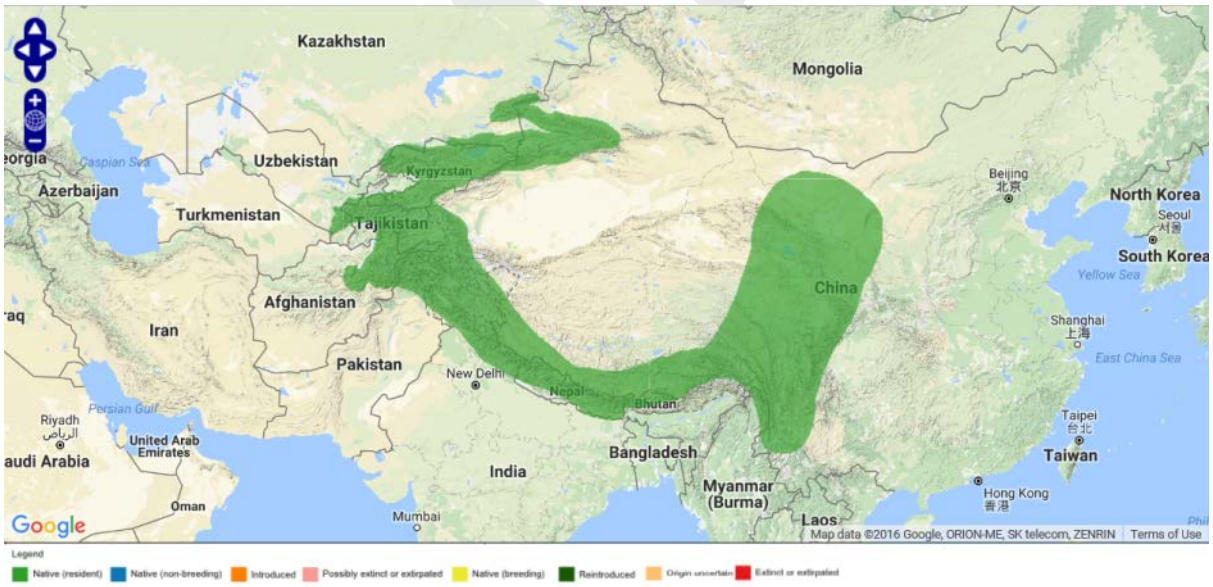
- Insenstive improvements to slaughterhouse hygiene and rubbish disposal (Ogada & Buij 2011)
- Mortality from avian influenza (Ducatez *et al*. 2007).

### 3.8 Himalayan Griffon *Gyps himalayensis*

**Alternative name:** Himalayan Vulture

| | |
|---|---|
| Red List Category: Critically endangered (LC in 2004, VU in 2007, CR in 2015)<br><br>Population size: 66,000-334,000 individuals<br><br>Population trend: Uncertain<br><br>Distribution: Asia |  |

**Distribution:** The Himalayan Griffon is present throughout the Himalayan mountain range in Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Afghanistan and Pakistan, and further east into India, Nepal and Bhutan, to central China and Mongolia. Juveniles and subadults undertake a mainly southward migration outside the breeding season into the Gangetic plain (the northern half of India, and all but the southern third of Bangladesh), also regularly passing as far East as Thailand and Cambodia in small numbers. (Map to be amended to revised breeding and non-breeding ranges)




**Population size and trend:** The current population estimate is in the region of 66,000-334,000 mature individuals (Ferguson-Lees & Christie 2001, BirdLife International 2016), although this is not based on survey data. The population trend has not been quantified but is likely to have declined given the susceptibility to diclofenac of this and other *Gyps* vultures.

**Movements:** Bildstein (2006) lists this species as a partial and rains migrant with some seasonal altitudinal movements in the winter (also Ferguson-Lees & Christie 2001, Naoroji 2006). Naoroji (2006) describes it as a common resident throughout the Himalayas 'prone to some altitudinal winter migration' where it descends into the lower foothills. Its winter movements and extent of wandering into the plains have not been fully monitored. However, immature individuals are known to wander large distances beyond Sino-Himalaya and Central Asia in the winter, into the plains of south-east Asia (over 30 records between 1979 and 2008 involving many more individual vultures) and southern India (Ding & Kasorndorkbua 2008, Praveen *et al*. 2014). A satellite-tagged individual in

India marked outside the species' breeding range was tracked to Kazakhstan (Naoroji 2006, V. Prakash and D. Pain, pers. comm.).

**Habitat:** This species inhabits mountainous areas, mostly at 1,200-4,500 m, but has been recorded up to 6,000 m (Ferguson-Lees & Christie 2001). In winter it moves lower down, with juveniles wandering into open plains and grasslands and has been observed foraging on rubbish dumps (BirdLife International 2016).

**Ecology:** The Himalayan Griffon feeds exclusively on carrion (del Hoyo *et al*. 1994). It soars and glides over large areas often with other vultures in search of carcasses. Small numbers attend carcasses which can be consumed rapidly, and are dominant over other vulture species except Black Vultures. Del Hoyo *et al.* (1994) report that the species are often associated with domestic flocks in mountainous areas. Himalayan Griffon tend to nest singularly or in small, loose colonies of up to 6 pairs, on cliffs. Little is known about its ecology and behaviour when foraging in winter on the plains and grasslands of south and south-east Asia.

**Major threats:**

- Diclofenac poisoning has been less well documented in Himalayan Griffon compared to other Asian *Gyps* vultures (Green *et al.* 2004) but the species is known to be susceptible to diclofenac (Das *et al.* 2010). Veterinary use of diclofenac is probably infrequent within the breeding range of Himalayan Griffon so adults are unlikely to be exposed, but immatures are likely to be exposed to the drug when they migrate to lowland areas of India, Nepal, Bangladesh and Pakistan. Given the high sensitivity of vulture population growth rate to additional mortality of adults (Niel & Lebreton 2005; Green *et al.* 2004), but lower sensitivity to decreased recruitment of young, the effects of diclofenac on population trends of this species are likely to be lower than for lowland *Gyps* species.
- Risk of poisoning from other non-steroidal anti-inflammatory drug (NSAIDs).

**Secondary threats:**

- Accidental poisoning at carcasses deliberately laced with pesticides to kill stray dogs or wild carnivores has been recorded for this species (R. E. Green).

### 3.9 White-rumped Vulture *Gyps bengalensis*

**Alternative name:** Oriental White-backed Vulture

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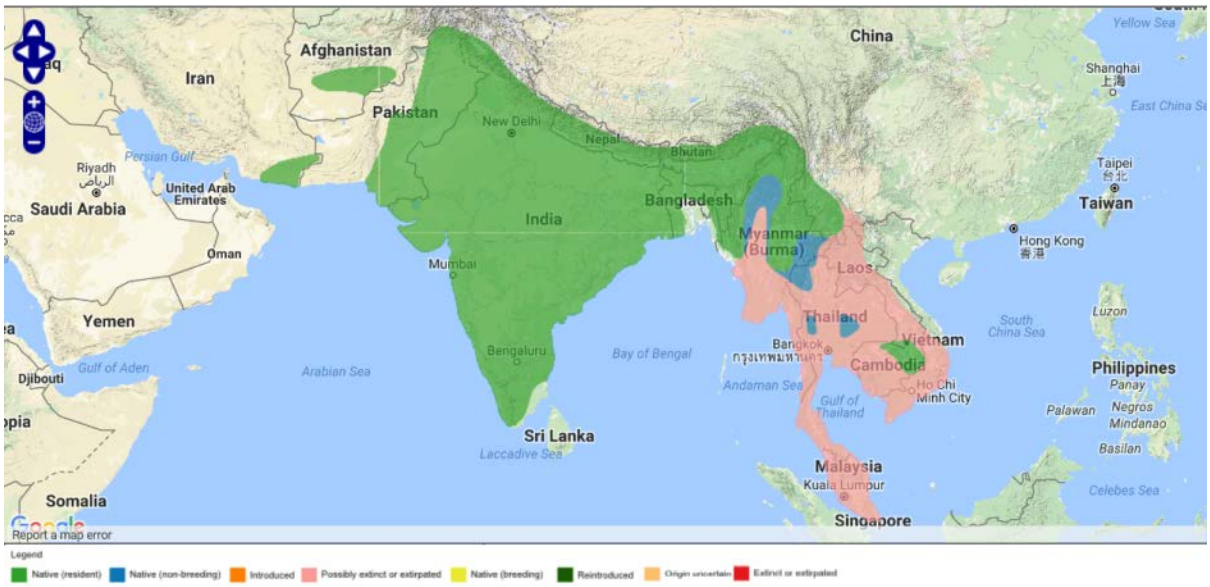
|---|---|
| Red List Category: Critically endangered (CR since 2000)<br><br>Population size: 3,500-15,000 individuals<br><br>Population trend: Not quantified<br><br>Distribution: Asia |  |

**Distribution:** The White-rumped Vulture occurs in Pakistan, India, Bangladesh, Nepal, Bhutan, Myanmar and Cambodia (del Hoyo *et al.* 1994, Eames 2007a,b, Hla *et al.* 2011). It is probably extinct in Thailand, Laos and Vietnam. There are a few records from south-east Afghanistan and Iran where

its status is currently unknown (Naoroji 2006, BirdLife International 2016); vagrants have reached Brunei and Russia.




**Population size and trend:** This species not long ago described as possibly the most abundant large bird of prey in the world, numbering several tens of millions of individuals (Houston 1985). The current population is estimated at 3,500-15,000 individuals, equating to 2,500-9,999 mature birds (BirdLife International 2016). Extremely rapid population declines by about 50% per year were documented in India and Pakistan, resulting in a decline of more than 99% in a 10-15 year period. The decline began in the mid 1990s, although the population is now thought to be stable (Prakash *et al.* 2012).

**Movements:** The species is largely sedentary; however individuals forage over large areas and immatures are thought to be nomadic (Ferguson-Lees & Christie 2001). Bildstein (2006) considers White-rumped Vulture to be a partial migrant. Birds recorded in the past in Afghanistan are thought to be a migrant population presumably from Pakistan (Naoroji 2006). Del Hoyo *et al.* (1994) mention some seasonal altitudinal movements in Nepal. Vagrants have reached Russia and, remarkably including a sea crossing, Brunei. The movements and home ranges (varying from 1,824 $km^2$ to 68,930 $km^2$) of individual birds were shown to be reduced slightly when supplementary food was provided (Gilbert *et al.* 2007). Preliminary data from movements of satellite-tracked individuals indicate that they can move over 1,000 km and cross international borders between Nepal and India, as well as between Laos, Cambodia and Vietnam (UNEP/CMS 2015).

**Habitat:** When formerly common the White-rumped Vultures occurred in a wide-range of open country habitats, as well as near villages, towns and cities. In the Himalayan foothills it occurs up to about 1500 m where it utilises light woodland, open areas and human settlements (del Hoyo *et al.* 1994).

**Ecology:** White-rumped Vultures feed exclusively on carrion and often associates with other vulture species when scavenging at rubbish dumps and slaughterhouses. Food is located by soaring with other vulture species, and considerable aggregations can form. The species adapts well to supplementary food provided at vulture restaurants. It is a highly social species and is usually found in conspecific flocks and regular communal roost sites are used. White-rumped Vultures nest in small colonies in tall trees (5-30m in height), often near human habitation, and adjacent to roads, streams or canals (del Hoyo *et al.* 1994).

**Major threats**

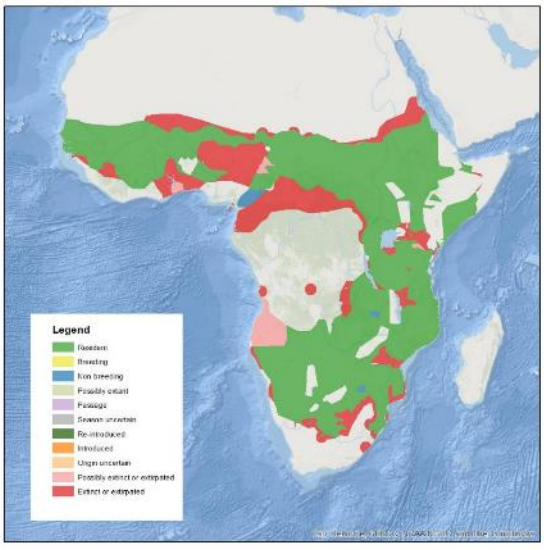
- The anti-inflammatory drug diclofenac, used to treat domestic livestock, is the major cause of mortality (Oaks *et al*. 2004, Shultz *et al*. 2004). Mortality from this cause has continued in India well after the statutory ban on veterinary use of diclofenac (Cuthbert *et al.* 2016), though the prevalence and concentration of diclofenac in dead cattle has declined (Cuthbert *et al.* 2011; Cuthbert *et al.* 2014). Aceclofenac is a pro-drug of diclofenac that is in legal veterinary use, despite the fact that it is almost all rapidly metabolised to diclofenac in the bodies of treated cattle (Galligan *et al.* 2016).
- A second NSAID commonly used in India, ketoprofen, has also recently been identified to be lethal to the species, and measurements of residue levels in ungulate carcasses in India indicates that concentrations are sufficient to cause some vulture mortalities (Naidoo *et al.* 2009, Taggart *et al.* 2007).
- Risk of poisoning from other non-steroidal anti-inflammatory drug (NSAIDs). The recent co-occurrence of extensive visceral gout in dead wild vultures of this species with high levels of the NSAID nimesulide in the liver and kidneys indicates that this drug is probably also causing vulture deaths (Cuthbert *et al.* 2016).
- Demise of large ungulate populations and improvements in animal husbandry resulting in a lack of available carcasses for vultures (BirdLife International 2016); likely to be the primary reason behind long-term decline in south-east Asia, where diclofenac is not used
- Accidental poisoning at carcasses deliberately laced with pesticides to kill stray dogs and wild carnivores (BirdLife International 2016); a major threat in south-east Asia and more recently in NE India (Assam).

**Secondary threat**

- Changes in the processing of dead livestock which have occurred in response to the collapse in vulture numbers (BirdLife International 2016).

### 3.10 White-backed Vulture *Gyps africanus*

| | | |
|---|---|---|
| Red List Category: Critically endangered (LC in 2004, NT in 2007, EN in 2012, CR in 2015)<br><br>Population size: 270,000 individuals<br><br>Population trend: Decreasing<br><br>Distribution: Africa |  | |




**Distribution:** The White-backed Vulture is the most widespread and commonest vulture species in Africa, occurring extensively throughout West, East and Southern Africa. It is normally absent from North Africa, although, having reached the Iberian Peninsula (in tiny numbers), it presumably passes through this region. The extent of declines and range contractions is complex and variable throughout the range. Range contraction is particularly marked in West Africa (Thiollay 2006), and the species may be extirpated in Nigeria, and hanging on at a few

strongholds in Ghana and Niger. Declines are also recorded in Sudan, South Sudan, Somalia and Kenya but is apparently more stable in Uganda, Tanzania and parts of Southern Africa.

**Population size and trend:** Currently estimated at 270,000 individuals and rapidly declining; a decline by 90% (range 75-95%) has been documented in the last 30 years (Ogada *et al.* 2015b).

**Movements:** The species is generally considered sedentary, but individuals will cover huge areas in search of food (BirdLife International 2016, Ferguson-Lees & Christie 2001). Juveniles, in particular, disperse over vast areas. For example, six immature birds tracked from South Africa were found to range across six countries (South Africa, Namibia, Angola, Zambia, Botswana and Zimbabwe) and three were noted to travel more than 900km from their place of capture (Oschadleus 2002, Phipps *et al.* 2013*a*) with mean foraging range of 269,103km$^2$. Some populations are thought to shift their ranges in response to food availability and seasonal rains (Bildstein 2006, Ferguson-Lees & Christie 2001). Individuals tagged in Kenya were found to have an average home range size of 50,000km$^2$, with movements between Kenya, Tanzania, Uganda and Democratic Republic of Congo (UNEP/CMS 2015). Like Rüppell's Vulture, this species has also been recorded with increasing frequency in the Iberian Peninsula over the last 10 years and these birds are assumed to accompany migrating Griffon Vultures during their northern migration.

**Habitat:** Primarily a lowland species of open wooded savannah, particularly areas of *Acacia*. They require tall trees for nesting, usually in loose colonies of 2–13 nests (Del Hoyo *et al.* 1994). The species has also been recorded nesting on electricity pylons in South Africa (de Swardt 2013).

**Ecology:** White-backed Vultures are a highly gregarious species congregating at carcasses, in thermals and at roost sites. The species feeds on carrion and bone fragments of larger carcasses, mainly soft muscle and organ tissue. They soar together with other vultures, using their behaviour to locate food. After feeding, they often bathe together with other species at favoured sites (Del Hoyo *et al.* 1994). In South Africa, Monadjem *et al.* (2013) showed that adult survival was high for vultures visiting supplementary food (a vulture restaurant).

**Major threats**

- Unintentional poisoning (especially east and southern Africa) (Ogada & Keesing 2010, Otieno *et al.* 2010, Kendall & Virani 2012, Roxburgh & McDougall 2012)
- Sentinel poisoning (southern Africa) (Roxburgh & McDougall 2012, Ogada *et al*. 2015a) This is the deliberate poisoning of the carcasses of large mammals such as elephant and buffalo after being poached to reduce vulture numbers in an areas where poachers are active due to large numbers of birds getting killed in this manner. White-backed Vultures, like most other species occurring in are where this practise is prevalent, are susceptible to this threat but the threat to this species is more severe due to the large number of birds of this species that normall congregate at carcasses.
- Belief-based use (especially West and Southern Africa) (McKean & Botha 2007, P Hall *in litt* 2011, McKean *et al.* 2013)
- Habitat loss and degradation: nest tree loss in rangelands, and rangeland conversion to crop farming (M. Gudka)

**Secondary threats**

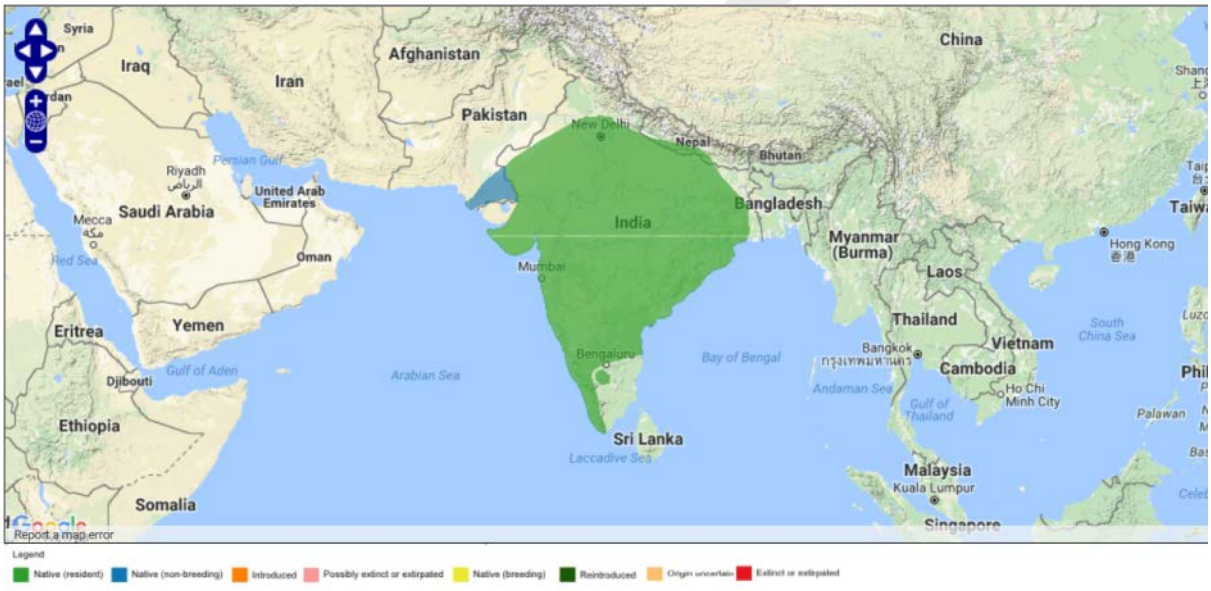
- Declining wild ungulate populations (East Africa) (Western *et al.* 2009)
- Electrocution on powerline poles (BirdLife International 2016)
- Nest harvesting or disturbance by humans (Bamford *et al.* 2009)

## 3.11 Indian Vulture *Gyps indicus*

Alternative name: Long-billed Vulture

| | |
|---|---|
| Red List Category: Critically endangered (CR since 2002)<br><br>Population size: 45,000 individuals<br><br>Population trend: Decreasing<br><br>Distribution: Asia |  |

**Distribution:** The Indian Vulture was previously widespread throughout all of India except the south-west, with small populations in south-east Pakistan, Nepal and Bangladesh (Naoroji 2006). Following the rapid declines, the population is now fragmented across its former range.




**Population size and trend:** In 2007 the population was estimated to be approximately 45,000 individuals extrapolated from a survey of 18,000 km transects (Prakash *et al*. 2007). Extremely rapid population declines by 15-20% per year occurred, resulting in an overall decline of more than 97% in a 10-15 year period beginning in the 1990s, although the population is now thought to be stable (Prakash *et al.* 2012).

**Movements:** Largely sedentary, however individuals forage over considerable areas and immatures are perhaps more nomadic (Ferguson-Lees and Christie 2001). It is categorised by Bildstein (2006) as an irruptive and local migrant and Naoroji (2006) showed a distribution map of the species where it is present across much of India, described as an uncommon to rare resident (with local migration). The range of movement patterns showed by this species may also have reduced in tandem with its disappearance (Naoroij 2006).

**Habitat:** Indian Vultures were previously found in many cities, towns and villages across its range, as well as in a wide-range of agricultural habitats and wooded areas. It nests primarily on cliffs and suitable ruined buildings; the belief that it will also nest in trees (del Hoyo *et al.* 1994) may be mistaken, referring to the similarSlender-billed Vulture (which certainly nests in trees) before the taxonomy was clarified distinguishing the two species.

**Ecology:** This species feeds almost entirely on carrion, and often associates with White-rumped Vulture when scavenging at rubbish dumps and slaughterhouses. *Gyps* vultures in India play a key role in the wider landscape as providers of ecosystem services, and were previously heavily relied

upon to help dispose of animal (especially cattle) and human remains. Indian Vultures soar in search of carrion, often with other vulture species, and are highly gregarious at carcasses. The species adapts well to supplementary food provided at vulture restaurants. They nest in small to large colonies at cliff-nesting sites and smaller colonies when nesting in trees. Large trees (7-15m in height) are used as in which to nest (del Hoyo *et al.* 1994).

**Major threats**

- The anti-inflammatory drug diclofenac, used to treat domestic livestock, is the major cause of mortality (Oaks *et al*. 2004, Shultz *et al*. 2004). Mortality from this cause has continued in India well after the statutory ban on veterinary use of diclofenac (Cuthbert *et al.* 2016), though the prevalence and concentration of diclofenac in dead cattle has declined (Cuthbert *et al.* 2011, Cuthbert *et al.* 2014). Aceclofenac is a pro-drug of diclofenac that is in legal veterinary use, despite the fact that it is almost all rapidly metabolised to diclofenac in the bodies of treated cattle (Galligan *et al.* 2016).
- A second NSAID commonly used in India, ketoprofen, has also recently been identified to be lethal to the species, and measurements of residue levels in ungulate carcasses in India indicates that concentrations are sufficient to cause vulture mortalities (Naidoo *et al.* 2009; Taggart *et al.* 2007).
- Risk of poisoning from other non-steroidal anti-inflammatory drug (NSAIDs). The recent co-occurrence of extensive visceral gout in dead wild vultures of related species with high levels of the NSAID nimesulide in the liver and kidneys indicates that this drug is probably also causing vulture deaths (Cuthbert *et al.* 2016).

**Secondary threats**

- Accidental poisoning at carcasses deliberately laced with pesticides to kill stray dogs or wild carnivores
- Changes in the processing of dead livestock which have occurred in response to the collapse in vulture numbers (BirdLife International 2016).

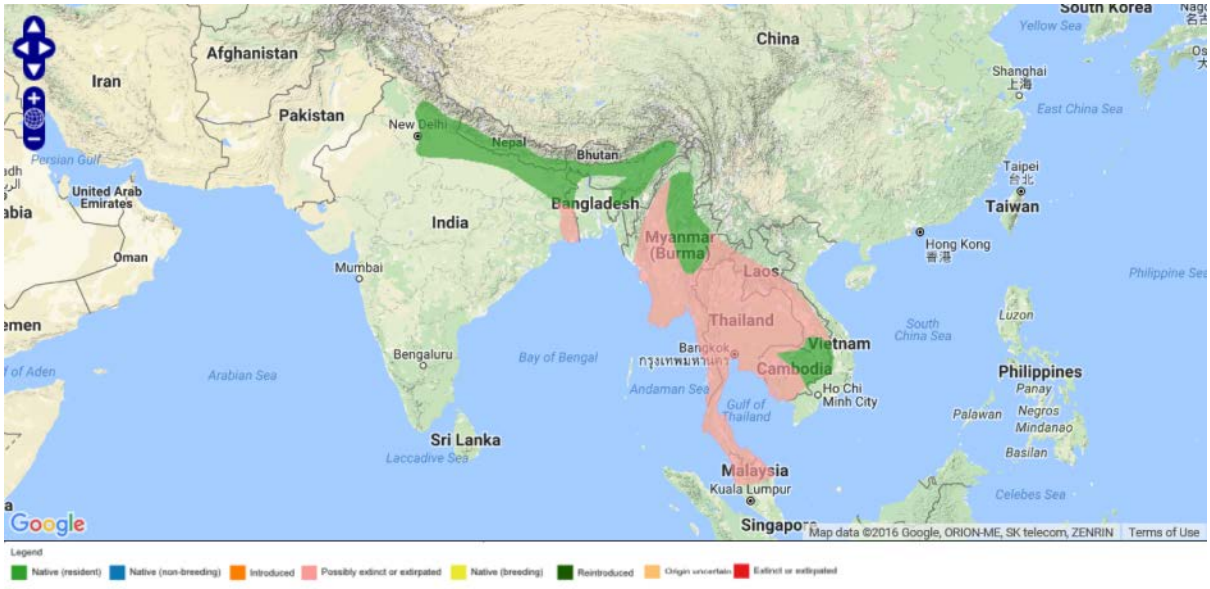
### 3.12 Slender-billed Vulture *Gyps tenuirostris*

Birds now referred to as this species were previously treated as a sub-species of *Gyps indicus*, a species formerly referred to as 'Long-billed Vulture'. 'Long-billed Vulture' has recently been split into two—the 'true' *G. indicus*, and *G. tenuirostris*, following Rasmussen & Parry (2001).

| | |
|---|---|
| Red List Category: Critically endangered (CR since 2002, species previously not recognised)<br><br>Population size: 1,500-3,750 individuals<br><br>Population trend: Currently stable<br><br>Distribution: Asia |  |

**Distribution:** The Slender-billed Vulture is found in India north of, and including, the Gangetic plain, west to at least Himachal Pradesh and Haryana, through to southern West Bengal, the plains of Assam, and through southern Nepal, with small numbers in north and central Bangladesh and Myanmar (BirdLife International 2016). A small breeding population was recently discovered in

Cambodia and a total of 51 individuals have been recorded feeding at vulture restaurants (BirdLife International 2016). It formerly occurred more widely in South-East Asia, but it is now thought to be extinct in Thailand and Malaysia. Populations, especially in the eastern part of the range, are highly fragmented.




**Population size and trend:** The population is considered to be approximately 1,000-2,499 mature individuals, equating to 1,500-3,750 individuals (BirdLife International 2016). An extremely rapid decline of more than 95% in 10-15 years has been documented (Prakash *et al.* 2003), although the rate has now slowed and the population may now be stable (Prakash *et al.* 2012). The main populations remaining are in Assam (NE India) and Cambodia.

**Movements:** The species is largely sedentary, however individuals can forage over large areas and there are some seasonal altitudinal movements (Ferguson-Lees & Christie 2001). It is categorised by Bildstein (2006) as an irruptive and local migrant. As with other *Gyps* vultures, immatures are likely to be more nomadic. Satellite tagged individuals are known to cross international borders between Laos, Cambodia and Vietnam (UNEP/CMS 2015). Naoroji (2006) reports that some southward winter movement exists, and in winter the species has been seen in India well south of the narrow range in the north where it is normally considered resident. The range of movement patterns showed by this species may also have reduced in tandem with its disappearance (Naoroij 2006).

**Habitat:** Across the range, Slender-billed Vultures are found in dry open country and forested areas, although often rely on human habitation for nesting sites and carrion. In South-East Asia it is primarily a lowland species.

**Ecology:** The species feeds almost entirely on carrion, scavenging at rubbish dumps, slaughterhouses and carcasses of wild ungulates. They often soar with other vulture species to locate food and are highly gregarious at food sources. The species adapts well to supplementary food provided at vulture restaurants. Slender-billed Vultures are solitary nesters, primarily in trees. Nesting trees tend to be large, usually at a height of 7-25 m. Outside of the breeding season they use regular communal roost sites.

**Major threats:**

- The anti-inflammatory drug diclofenac, used to treat domestic livestock, is the major cause of mortality (Oaks *et al*. 2004, Shultz *et al*. 2004). The prevalence and concentration of diclofenac in dead cattle has declined since the ban on veterinary use of diclofenac but the drug is still widely used (Cuthbert *et al.* 2011; Cuthbert *et al.* 2014). Aceclofenac is a pro-

drug of diclofenac that is in legal veterinary use, despite the fact that it is almost all rapidly metabolised to diclofenac in the bodies of treated cattle (Galligan *et al.* 2016).

- A second NSAID commonly used in India, ketoprofen, has also recently been identified to be lethal to other *Gyps* species (Naidoo *et al.* 2009), and measurements of residue levels in ungulate carcasses in India indicates that concentrations are sufficient to cause vulture mortalities (Taggart *et al.* 2007).
- Risk of poisoning from other non-steroidal anti-inflammatory drug (NSAIDs). The recent co-occurrence of extensive visceral gout in dead wild vultures of related species with high levels of the NSAID nimesulide in the liver and kidneys indicates that this drug is probably also causing vulture deaths (Cuthbert *et al.* 2016).
- The primary reason behind its decline in south-east Asia (Myanmar and countries to the east, where diclofenac is not used) is thought to be the demise of large ungulate populations and improvements in animal husbandry resulting in a lack of available carcasses for vultures (BirdLife International 2016).
- Accidental poisoning at carcasses laced with pesticides to kill stray dogs (BirdLife International 2016); a major threat in south-east Asia but also significant in Assam (NE India).

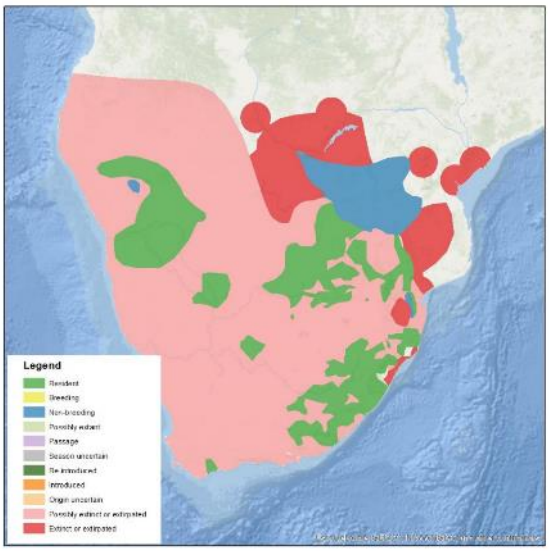
**Secondary threats:**

- Changes in the processing of dead livestock which have occurred in response to the collapse in vulture numbers (BirdLife International 2016).

### 2.12 Cape Vulture *Gyps coprotheres*

**Alternative names:** Cape Griffon

| | |
|---|---|
| Red List Category: Endangered (VU in 1994, EN in 2015)<br><br>Population size: 4,700 pairs (9,400 mature individuals)<br><br>Population trend: Stable or increasing<br><br>Distribution: Africa |  |




**Distribution:** The Cape Vulture occurs mainly in South Africa with small populations in Lesotho, Botswana and Mozambique. It formerly bred in Swaziland, Zimbabwe and Namibia, and a small number of roost sites are still used in these countries.

**Population size and trend:** In 2006, the total population was estimated at 8,000-10,000 individuals (BirdLife International 2016), roughly equivalent to 5,300-6,700 mature individuals. The global population estimate was revised in 2013 with an estimate of 4,700 pairs or 9,400 mature

individuals (Taylor *et al.* 2015). However, there have been recent population increases (Benson 2015, 2016).

**Movements:** The species is considered an irruptive and local migrant by Bildstein (2006). Recent satellite tracking projects has shown that individuals can cover large distances. Phipps *et al.* (2013b) reported home ranges of 121,655 $km^2$ for five adults and 492,300 $km^2$ for four immature birds satellite tagged in South Africa. The tagged vultures travelled more than 1,000 km from the capture site and long-distance cross-border movements were not unusual with a total of five countries (Namibia, Botswana, Zimbabwe, Lesotho and South Africa) entered by different vultures. A Cape Vulture satellite tracked in 2014 was recorded moving more than 1,000km between South Africa, Botswana, Zimbabwe and Mozambique (K. Hoogstad pers. comm. in UNEP/CMS 2015). Small numbers of Cape Vultures have been released in Namibia with satellite tags and have made cross-border movements into Angola (Diekmann & Strachan 2006), while others have reached Zambia (A. Botha).

**Habitat:** Savanna and open grassland, usually near mountains; the most significant breeding populations are in the savanna biome (A. Botha). Uses cliffs for nesting and roosting (Mundy *et al.* 1992, Del Hoyo *et al.* 1994). Trees are also used as nesting and roosting sites but the extent of this remains unclear.

**Ecology:** It is a carrion-feeder specialising on larger carcasses, mainly soft muscle and organ tissue. Cape Vultures are highly gregarious, often soaring in groups using conspecifics to help locate food. They are colonial nesters.

**Major threats**

- Decrease in the amount of carrion (particularly during chick rearing)
- Unintentional poisoning (Diekmann & Strachan 2006)
- Electrocution on pylons or collisions with cables (Boshoff *et al.* 2011)
- Belief-based use especially in *muthi* (so-called traditional medicine in southern Africa)

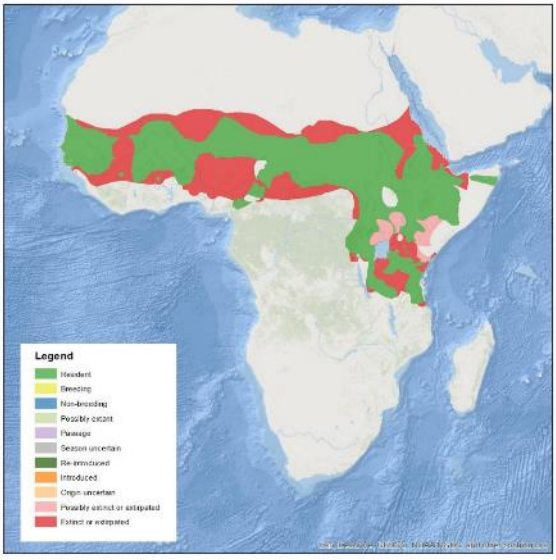
**Secondary threats**

- Disturbance at colonies (Borello & Borello 2002)
- Bush encroachment (Schultz 2007)

## 2.13 Rüppell's Vulture *Gyps rueppelli*

**Alternative name:** Rüppell's Griffon

| | |
|---|---|
| Red List Category: Critically Endangered (LC in 1994, NT in 2007, EN in 2012, CR in 2015)<br><br>Population size: 22,000 individuals<br><br>Population trend: Deccreasing<br><br>Distribution: Africa |  |




**Distribution:** Rüppell's Vultures occur throughout the Sahel region of Africa from Senegal, Gambia and Mali in the west to Sudan, South Sudan and Ethiopia in the East. Their range also extends south of the Sahel belt through the savanna regions of East Africa in Kenya, Tanzania and are reported to occur in N Mozambique. For occurrence in the Iberian peninsula, see Movements below.

**Population size and trend:** Formerly abundant, the species has experienced extremely rapid declines in much of its range, particularly West Africa. Although estimated at 22,000 individuals in the early 1990s (Mundy *et al.* 1992), based on recent rapid declines of 97% (94–99%) over 30 years estimated by Ogada *et al.* 2015b) the population is now certainly much lower.

**Movements:** The species is considered an irruptive and local migrant by Bildstein (2006). Daily foraging movements of up to 150–200 km have been recorded (Ferguson-Lees & Christie 2001) and in West Africa they regularly disperse several hundred kilometres north and south in response to seasonal rains (del Hoyo *et al.* 1994). Recent satellite tracking studies has shown that the species can cover huge areas. Ogada (2014) found that the home range size of a satellite tagged adult was 55,144 km$^2$, while that of an immature bird was 174,680 km$^2$. Kendall (pers. comm.) has found the average home range of this species to be 100,000 km$^2$ with individuals moving between Kenya and Tanzania. In the last 15 years, the species has been recorded far away from its breeding colonies reaching the Iberian Peninsula and north-eastern regions of South Africa (Ferguson-Lees & Christie 2001, De Juana 2006, A. J. Botha). It has been suggested that the movement of Rüppell's Vulture across the Strait of Gibraltar into Europe in company with migrant Griffon Vultures may be a regular, annual and considerably under-recorded phenomenon (De Juana 2006, Ramírez *et al.* 2011, Gutiérrez 2003).

**Habitat:** Rüppell's Vultures frequent open areas of *Acacia* woodland, grassland and montane regions.

**Ecology:** A highly gregarious species that congregates at carrion, soaring in flocks and locating food by sight. Feeds on carrion and bone fragments of larger carcasses, mainly soft muscle and organ tissue. Rarely comes down to small carrion. Follows other vultures and migrant game or stock herds to locate much of its food (Del Hoyo *et al.* 1994). Breeds on cliff faces and escarpments at a broad range of elevations, in colonies of 10 to (at least formerly) 1,000 pairs, building a platform of sticks on rock ledges; tree nesting occurs occasionally, at least in West and Central Africa (Rondeau *et al*. 2006).

**Major threats:**

- Unintentional poisoning (especially east Africa) (Ogada & Keesing 2010, Otieno *et al.* 2010, Kendall & Virani 2012)
- Belief-based use (especially West and Central Africa) (Rondeau & Thiollay 2004, Nikolaus 2006, Buij *et al*. 2015)

**Secondary threats:**

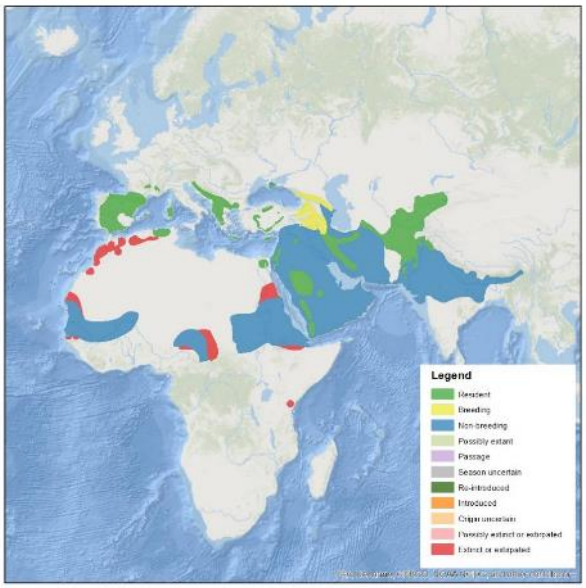
- Declining wild ungulate populations (East Africa) (Western *et al.* 2009)
- Nest harvesting or disturbance by humans (Rondeau & Thiollay 2004, Bamford *et al.* 2009)

## 2.14 Griffon Vulture *Gyps fulvus*

**Alternative names:** Eurasian Griffon

| | | |
|---|---|---|
| Red List Category: Least Concern (since 1988, last update in 2015)<br><br>Population size: 80,000-120,000 individuals<br><br>Population trend: Increasing<br><br>Distribution: Europe, Asia, Africa |  | |

**Distribution:** The Griffon Vulture has a large breeding range, extending over Europe, the Middle East and at least formerly North Africa; some migrate to spend the non-breeding season further south in Africa, passing through the latter region. It occurs from India west to Portugal and Spain, including some island populations in the Mediterranean (Sardinia, Crete, Naxos, Cyprus and recently established in Mallorca). The range also includes Turkey, the Crimean Peninsula and the Caucasus, and then from there to the Middle East and into Central Asia. In North Africa it is probably extinct as a breeding species, even though it occurs in large numbers during migration in Morocco. The species has been successfully reintroduced to France, Italy and central Bulgaria (Revise map?).




**Population size and trend:** The European population was estimated at 32,400–34,400 breeding pairs (BirdLife International 2017), according to the recently collected data from the European Region range countries (including Central Asia and the Middle East) can be estimated 31,986–32,644 pairs. Spain alone holds an estimated 25,000 pairs. The population in Europe is significantly increasing (c. 200% in the last 12 years), mainly thanks to implementation of conservation measures, notably campaigns to minimise poisoning and provide safe food at 'vulture restaurants'. Its range has also expanded thanks to reintroduction projects in France, Italy and the Balkans.

**Movements:** Some birds are migratory, overwintering in Africa, although many others are resident or nomadic (del Hoyo *et al.* 1994). Breeding adults are largely sedentary, but most juveniles are migratory or nomadic. Donázar (1993) found that 30% of juvenile griffons in Spain migrate for long distances after fledging. There are concentrations of migrating birds in some specific locations, e.g., Gibraltar and Suez (Bijlsma 1987), and Terrasse (2006) found that large numbers move through the eastern Pyrenees in spring northward into France and other countries in western Europe. In southwestern Europe, some French birds join the autumn migration of Spanish birds to northern Spain and western Africa (Terrasse op cit.), and these birds return to France in late winter at early

spring, often accompanied by Spanish birds. In recent years, more Griffon Vultures have been seen in central and northern Europe (including Belgium, The Netherlands, Germany, Finland, Estonia and Latvia). This may be linked to the large population increase in Spain and France.

**Habitat:** Roosts and rests on large cliffs and soars over surrounding open countryside in search of food. Avoids woodlands. The landscape should support the formation of thermals (Mebs & Schmidt 2006) as the large vultures prefer the energy-saving gliding and soaring over active flight. Generally occurs from sea level up to an elevation of 1,500 m and occasionally as high as 2,500 m (Slotta-Bachmayr *et al.* 2006).

**Ecology:** Needs cliffs for nesting, the nest is usually built on a rocky outcrop, with sheltered ledges or small caves preferred (del Hoyo *et al.* 1994). Nests in colonies of up to 100 pairs on large cliffs, walls of ravines, and precipices. Feeds almost exclusively on carrion of medium-sized and large domestic and wild animals, often in large numbers, although there are a few records in Spain of birds approaching injured or weak sheep or cattle.

**Major threats:**

- Unintentional poisoning
- Food shortage due to declining wild and domestic ungulate populations (Asia and Eastern Europe)
- Electrocution and collision

**Secondary threats:**

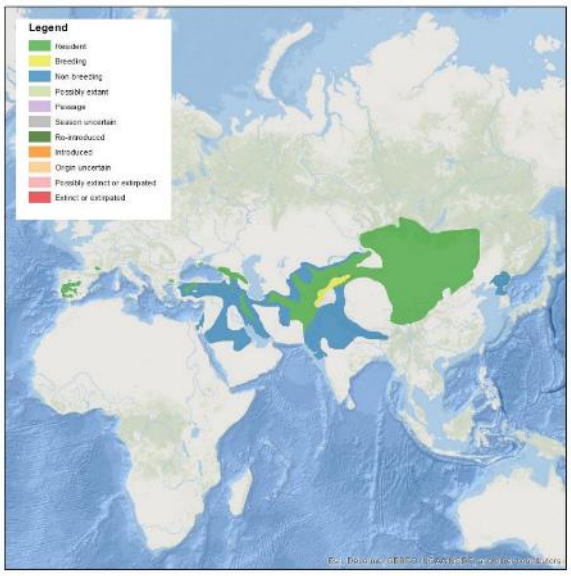
- Direct persecution
- Habitat loss and nest destruction
- Veterinary drugs (NSAIDs, etc.)

### 2.15 Cinereous Vulture *Aegypius monachus*

**Alternative names:** (Eurasian) Black Vulture, Monk Vulture

| | | |
|---|---|---|
| Red List Category: Near Threatened (since 2004)<br><br>Population size: 15,600-21,000 individuals<br><br>Population trend: Stable to slightly increasing<br><br>Distribution: Europe, Asia |  | |

**Distribution:** This species breeds in Spain, Greece, Turkey, Armenia, Azerbaijan, Georgia, Ukraine, Russia, Uzbekistan, Kazakhstan, Tajikistan, Turkmenistan, Kyrgyztan, Iran, Afghanistan, northern Pakistan (A. Khan, A. Parveen and R. Yasmeen *in litt*. 2005), Mongolia and mainland China, with a reintroduced population in France (Heredia 1996b, V. Galushin *in litt*. 1999, Heredia *et al.* 1997, WWF Greece 1999). The wintering range includes additional states to the south of the breeding range, in Saudi Arabia, Israel, Jordan, Iran, northern India, Nepal, Bhutan, Bangladesh, DPR Korea and Republic of Korea (North and South Korea, respectively). It appears to be very rare and of irregular occurrence in Africa (e.g. Egypt: Goodman and Meininger 1989), with no reliable records in Sudan (Nikolaus 1987).




**Population size and trend:** The most recent global population estimate for Cinereous Vulture is 7,800-10,500 pairs which equals to 15,600-21,000 mature individuals. This consists of 2,300-2,500 pairs in Europe (BirdLife International 2004, Anon. 2004) and 5,500-8,000 pairs in Asia (Anon. 2004). Although quantified information is not available, the trend across Asia is believed to be an ongoing moderate decline. The population in Korea has been estimated at *c.* 50-10,000 wintering individuals (Brazil 2009). In Europe, the species occurs in Spain (2,068 breeding pairs in 2012–15 and increasing), Portugal (up to 18 pairs) and France (30 pairs in 2016). In Greece, the population is located at a single colony (21-35 breeding pairs, slowly increasing). Recently collected data from Europe, Central Asia and the Middle East suggest a population estimate of 7,617–10,245 breeding pairs, with a stable or slightly increasing population trend.

**Movements:** Partial migrant (Bildstein 2006). Sedentary in some areas, but many individuals winter south of the breeding range, and there is also a good deal of nomadism. Gavashelishvili and McGrady (2006) recorded long range movements by a bird which fledged in Georgia, travelled south to Saudi Arabia, and then headed north into Russia. Many adults and juveniles in Mongolia apparently migrate in autumn to wintering areas in the Republic of Korea (South Korea) (Batbayar 2004, Batbayar *et al.* 2006. Kenny *et al.* 2008), while birds from central Asia migrate to the Indian subcontinent, southern China, Russian Far East, and the Republic of Korea (Batbayar 2006). In Europe the adults are mostly sedentary while the juvenile birds disperse over larger areas. In Spain, the movements of the juveniles are mostly limited to the western part of the Iberian Peninsula and in the surroundings of the breeding colonies (Moreno-Opo 2009). Reports of Cinereous Vultures as regular winter visitors to Africa (Egypt and Sudan) appear to be unfounded, at least at the present time, although very small numbers have been recorded (less than annually) in Egypt.

**Habitat:** Prefers arid hilly and montane habitat, including wooded areas and semi-desert, areas above treeline, and agricultural habitats with patches of forest. Spends much time soaring overhead in search of food. Perches more often on trees than on cliff faces or on the ground. Not numerous, but in places of abundant food, may congregate in large flocks (Flint 1984).

**Ecology:** The species inhabits forested areas in hills and mountains at 300-1,400 m in Spain, but occurs at higher altitudes in Asia, where it also occupies scrub and arid and semi-arid alpine steppe and grasslands up to 4,500 m (Thiollay 1994). It forages over many kinds of open terrain, including forest, bare mountains, steppe and open grasslands. Nests are built in trees or on rocks (the latter extremely rarely in Europe but more frequently in parts of Asia), often aggregated in very loose colonies or nuclei. Its diet consists mainly of carrion from medium-sized or large mammal carcasses, although snakes and insects have been recorded as food items. Live prey is rarely taken. In Mongolia, at least, the species is reliant on livestock numbers for successful nesting (Batbayar *et al.* 2006).

**Major threats:**

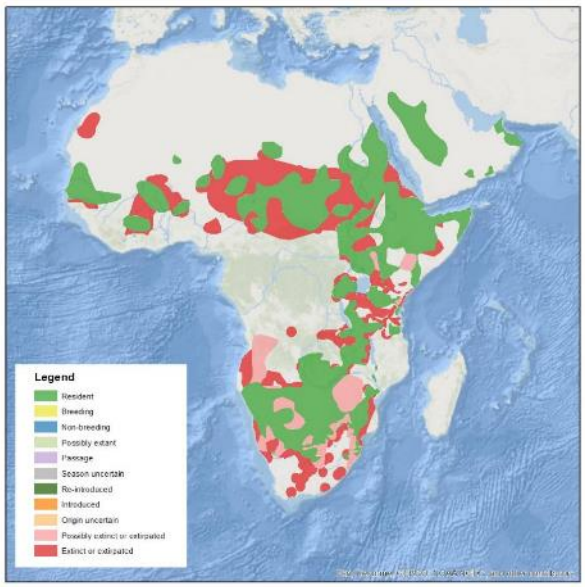
- Unintentional poisoning
- Food shortage due to declining wild and domestic ungulate populations (Asia and Eastern Europe)
- Electrocution and collision

**Secondary threats:**

- Direct persecution
- Habitat lost and nest destruction
- Secondary poisoning by veterinary NSAIDs

### 2.16 Lappet-faced Vulture *Torgos tracheliotos*

| | | |
|---|---|---|
| Red List Category: Endangered (LC in 1988, VU in 2000, EN in 2015)<br><br>Population size: 8,500 individuals<br><br>Population trend: Decreasing<br><br>Distribution: Africa, Middle East |  | |




**Distribution:** The species has a wide distribution across Africa, from the West, across the Sahel into East Africa and further south. Compared to many other African vulture species it has a rather fragmented distribution. There is a small breeding population in the Arabian Peninsula (Saudi Arabia, Oman, Yemen and UAE).

**Population size and trend:** The African population has been estimated to be at least 8,000 individuals (Mundy 1992), and there maybe 500 in the Middle East. This gives a total population of at least 8,500 individuals, roughly equivalent to 5,700 mature individuals (BirdLife International 2016). This may prove to be an overestimate given current trends for this species (80% projected population changes over three generations: Ogada *et al*. 2015b), as for other African vultures.

**Movements:** Lappet-faced Vultures are regarded as a partial migrant that makes significant movements in response to rainfall (Bildstein 2006). Recent satellite tracking studies have shown that immature birds can cover large areas, and this is consistent across the species' range. Tagged birds had an average home range size of 22,000 km$^2$ and moved between Kenya and Tanzania (UNEP/CMS 2015). Murn & Botha (in UNEP/CMS 2015) satellite tagged an individual which moved more than 200 km from the capture site in South Africa and travelled into Mozambique. Two immature individuals satellite tagged in Saudi Arabia (Shobrak 2014) had a mean home range size of 283,380 km$^2$ and moved about 400 km before returning in the autumn. Vagrants reported in Morocco, southern Libya, Jordan and Spain (Ferguson-Lees & Christie 2001).

**Habitat:** The species inhabits dry savannah, arid plains, deserts and open mountain slopes (Shimelis *et al.* 2005), up to 3,500 m (A. Shimelis *in litt.* 2007). In Ethiopia, it is also found at the edge of

forests, having been recorded at Bonga forest and forest in Bale Mountains National Park in 2007, as well as the Afro-alpine habitats of the national park in 2005 (A. Shimelis *in litt.* 2007).

**Ecology:** Lappet-faced Vultures range widely when foraging and whilst they take a broad range of carrion, they are also known to hunt, probably taking a variety of small reptiles, fish, birds and mammals (Mundy *et al.* 1992). Although usually a more solitary species, up to 50 birds may gather with other vultures at larger carcasses. Lappet-faced Vultures usually build solitary nests often in *Acacia* but also in *Balanites* and *Terminalia* (Shimelis *et al.* 2005). They don't usually breed until at least six years old and fledge on average 0.4 young/pair/year (Mundy *et al.* 1992). Timing of breeding can vary significantly across its range, for example in Mozambique, egg-laying occurs from late April until mid-August, with a peak in May and June (Parker 2005). A nest found in Oman contained a small chick in early March, and thought to have fledged in mid-June (Wernery 2009).

**Major threats:**

- Unintentional poisoning (especially in eastern and southern Africa) (Komen 2009, Otieno *et al.* 2010, Groom *et al*. 2012)
- Nest disturbance (especially in Arabian Peninsula) (Shimelis *et al*. 2005, Shobrak 2011)
- Traditional medicine (especially western and southern Africa) (Rondeau & Thiollay 2004, McKean *et al*. 2013, Buij *et al*. 2015)
- Sentinel poisoning in southern Africa (Ogada *et al*. 2015b). This is the deliberate poisoning of the carcasses of large mammals such as elephant and buffalo after being poached to reduce vulture numbers in an areas where poachers are active due to large numbers of birds getting killed in this manner. Lappet-faced Vultures, like most other species occurring in are where this practise is prevalent, are susceptible to this threat.

**Secondary threats:**

- Declining wild ungulate populations
- Electrocution on powerline poles (Shimelis *et al.* 2005)

# 4. Threats

In this section, the threats to vultures are described in narrative form, and a summary of their overall impact is presented (Table 4).

Not every factor that kills a vulture is a threat to the entire population of that vulture species. No suggested threats or causes of mortality are ignored in this Vulture MsAP, but some are considered local or of limited impact, with evidence suggesting that they cause individual mortality rather than population decline. Where this is believed to be the case, it is explained, and the focus maintained on the major factors limiting populations or causing declines.

Figure 3 reflects the most significant threats per region identified from feedback provided via the questionnaires and regional workshops. Data are insufficient to identify threats and their severity for every country, but in most cases the severity of a threat is comparable in all countries across a given subregion; where this is believed not to be the case and differences are material to conservation responses, this is stated in the legend to the threat maps. In this way, the reader, having identified which species occur in their country (Section 3; Annex 2) can then identify the threats which impact on this species (Table 4; Annex 3), and then the most appropriate action to conserve the species within their country or region (Section 7).

Conservation actions generally focus on addressing one or more threats and/or their root causes. In this way, the information in this section of the Vulture MsAP links to and determine the Objectives and Results, which, along with the detailed Actions to achieve them, are set out in Section 7.


**Fig. 3**. Map indicating priority threats for the Vulture MsAP range. The Russian Federation is a range state, but vultures are restricted to the North Causasus and Altai-Sayan regions (the latter being near the borders of Mongolia and Kazakhstan. More northerly parts of the Federation are not shown.

## 4.1 Poisoning

Poisoning, in its various forms, is by far the most significant threat that impacts the vulture species that are the focus of this Action Plan. In the context of vultures there are two broad types of poisoning: unintentional (secondary) poisoning, where vultures are not the intended target; and targeted poisoning, where vultures are the intended target.

The use of poisons to intentionally kill wildlife has a long history worldwide. The main types of poisoning for migratory species, including those that affect vultures, are discussed in the CMS *Guidelines to Prevent the Risk of Poisoning to Migratory Birds* (2015). Both natural plant and animal based toxins and synthetic pesticides have been used to kill wildlife, a method that is silent, cheap, easy and effective (Ogada 2014). Many classes of pesticides have been used to poison wildlife, including organochlorines, organophosphates, carbamates and pyrethroids.

Populations of scavengers have been decimated by poisoning by feeding on baited carcasses (Virani *et al.* 2011, Ogada *et al.* 2012). Vultures, whose primary food source is meat, soft tissue and organs from naturally occurring carcasses are obviously at risk. All the vulture species that are covered by this Action Plan are affected to varying degrees by unintentional (secondary) and intentional poisoning. Both south Asia and Africa have seen precipitous declines in vulture populations over the last 30 years due to poisoning. This has directly contributed to 8 species in these regions currently being listed as Critically Endangered.

It is only in Asia (so far) that poisoning with veterinary Non-steroidal Anti-inflammatory Drugs (NSAIDs) has caused massive, catastrophic declines to vultures. In this case, wildlife poisoning was not the intention. The effects of poisoning with NSAIDs, and particularly diclofenac, has been quantified using a variety of approaches and shown to be the main impact on *Gyps* vulture populations in India, Pakistan and Nepal and has caused the largest population declines over the shortest timeframe of any known group of birds in history.

### 4.1.1 Unintentional (secondary) poisoning

Unintentional poisoning happens when an animal is poisoned by a toxic substance that was not intentionally used to kill it was used in the treatment or hunting of other animals; in other words, the poison was intended for another species of animal but proves to be toxic to the secondary victim when consuming bait that contains the poison or its residues. Pollution of the environment by a range of chemicals due to spills, dumping of chemical waste and other substances that can affect their food or water source can also have an unintended impact on vultures.

*Human-wildlife conflict*

Farmers who experience frequent crop-raiding by elephants, buffalo and other herbivores and herders who lose livestock fall prey to predators will occasionally resort to poisoning those animals to ‘take care’ of the problem. Synthetic pesticides are widely used as the poison of choice for killing these ‘problem’ animals such as lions, tigers, leopards, hyenas and jackal. Such use of pesticides is illegal in the vast majority of countries but enforcement of regulations is often weak; consequently, poisoning has become the most widely used means of killing wildlife. Poisoning using baited carcasses is inevitably indiscriminate and affects a wide-range of non-target species. Poisoning is also ineffective in targeting the individual responsible for the damage: it is likely that it rarely kills the intended victim and instead kills a multitude of unintended species, including vultures.

In Europe, poison is almost never used to kill vultures deliberately; they are normally secondary or tertiary victims of poison used against wild predators (usually carnivorous mammals: wolves and

foxes) impacting on human activities (mainly livestock-farming and hunting). This practice is illegal in all European countries, but is still carried out in places by local people as a quick "solution" for resolving the conflicts with the predators. The main driver for such an intensive use of the poison is the concern of livestock breeders concerning predators, and of hunters protecting small game animals. Its widespread use has, as in Africa, been facilitated by poor enforcement of legislation and the free availability of legal and illegal poisoning substances on the markets. Poisoning of wildlife in Europe reached its peak in the 1940s and the 1950s, when it was legally used by the authorities as a tool to control wild predators. In this period many vulture populations vanished from their original distribution range in Europe. These were dark decades for wildlife and especially for vulture species across the Mediterranean.

In Spain alone (a country holding about 90% of Europe's vultures) it is estimated that every year about 9,000 wildlife poisoning incidents, with use of poison baits, are detected. In the period 1992–2013, about 185,000 animals were found poisoned, from which 34% were raptors (SEO/BirdLife and WWF/Adena 2016). In Spain, most of the poisoning cases or the use of poison baits to kill wildlife are related to the hunting activities. A total of 211 poisoning incidents were registered over the period 1990–2007 which killed 294 **Egyptian Vultures** in Spain (Hernández *et al*. 2009).

*Vermin control, or uncertain reasons*

Vulture populations that are more associated with human settlements may also be susceptible to unintentional poisoning to control vermin such as stray dogs. Poisons used to kill stray dogs include strychnine and warfarin and, in Ethiopia at least, have resulted in the killing of two species of vultures (Abebe 2013). Although data on incidental poisonings in urban environments are difficult to acquire, it is likely that poisoning of stray dogs and other pest species, such as rodents, may have a significant effect in Africa. In Europe and Asia this threat is potentially most relevant to **Egyptian** and **Cinereous Vultures**.

Mass poisoning events have recently become a serious concern in Assam, NE India (S. Ranade pers. comm.); in 2014 alone, 179 vultures were killed in seven separate incidents. Targets have typically been dogs which may kill livestock, spread disease including rabies, or have other negative impacts on people. Livestock owners may respond by attempting to kill the dogs with poisoned baits, on which vultures may also feed. Such poisoning events have probably been occurring for a long time (in Assam and elsewhere), but may have increased in frequency as vultures have declined, mammalian scavengers (especially feral dogs) have increased, and expanding human populations have reached wilder areas.

In Cambodia, incidental (non-target) poisoning is the biggest threat to vultures (Loveridge *et al.* in prep.). Fifteen recorded vulture poisoning events between January 2005 and 2016 resulted in the known deaths of nine **Red-headed Vultures**, 32 **White-rumped Vultures** and ten **Slender-billed Vultures**, including a single poisoned cow carcass leading to deaths of 2, 11 and 3 (respectively) individuals of these species (Sum and Loveridge 2016, Loveridge *et al*. in prep.). Poisons are used for a variety of reasons including hunting, pest control and crime (killing guard dogs to allow burglary), but in several cases the exact reason is unclear.

*NSAIDS and other veterinary medicines*

Unintentional poisoning of *Gyps* vultures in Asia due to the ingestion of NSAIDs has caused rapid and severe declines in three formerly common and widespread species (Indian, Slender-billed and White-rumped Vultures), with serious consequences for the ecosystem and knock-on economic, sanitary, human health and cultural effects. The main or sole factor causing the declines has been

shown to be the use of the common NSAID, diclofenac. Diclofenac was the most widely used drug to treat domestic livestock that were likely to die within a day or two of treatment before the drug is metabolised and thus is available for vultures to feed on (*i.e.* left in the open after death) (Oaks *et al.* 2004, Shultz *et al.* 2004, Green *et al.* 2004, Green *et al.* 2006). Many *Gyps* vulture species worldwide rely on carrion from dead domestic ungulates as their traditional wild ungulate food sources have disappeared (Pain *et al.* 2008). This was the case over much of South Asia; after ingestion of livestock carcasses treated with diclofenac near to their death, vultures die as a result of visceral gout that is caused by kidney failure. Death of the vulture usually occurs within a two days of exposure.

Diclofenac remains in widespread illegal veterinary use in India after the ban on veterinary use, though its concentration and prevalence in dead cattle available to vultures declined markedly after the statutory ban on its veterinary use (Cuthbert *et al.* 2011, Cuthbert *et al.* 2014). Vulture mortality from diclofenac has continued at a high, though somewhat lower, level in India well after the ban on veterinary use of diclofenac (Cuthbert *et al.* 2016).

Evidence is mounting that other NSAIDs in legal veterinary use are toxic to vultures, as well as possibly to other scavenging raptors. The most clear case concerns aceclofenac, which is a pro-drug of diclofenac, most of which is converted to diclofenac in treated cattle soon after it is administered (Galligan *et al.* 2016). Hence, aceclofenac is expected to be about as toxic to *Gyps* vultures as diclofenac is. Other NSAIDs thought to be toxic to vultures include nimesulide (Cuthbert *et al.* 2016), carprofen (Cuthbert *et al.* 2007), ketoprofen (Naidoo *et al.* 2010) and flunixin (Zorrilla *et al.* 2015). Wild White-rumped Vultures were recently found dead in India with high levels of nimesulide associated with extensive visceral gout, suggesting that this drug is damaging or destructive to the kidneys in *Gyps* vultures in a similar way to diclofenac (Cuthbert *et al.* 2016). Evidence suggests that a wild Griffon Vulture found dead in Spain may have been killed through ingestion of flunixin (Zorrilla *et al.* 2015), supporting concern raised by Cuthbert *et al.* (2007) that this drug may be toxic to vultures. Ketoprofen was identified as lethal to *Gyps* vulture species in 2009 (Naidoo *et al.* 2010), and residues of this drug are found in ungulate carcasses in India at sufficient concentrations to cause mortality (Taggart *et al.* 2007). The availability of other NSAIDs is increasing (Khan 2013) and all are untested as regards their toxicity to vultures.

In 2007, diclofenac was found to be on sale at a veterinary practice in Tanzania (BirdLife International 2016a), and more recently an increase in its availability has been noted in Ghana (J. Deikumah pers. comm.). It was also reported that in Tanzania, a Brazilian manufacturer has been aggressively marketing the drug for veterinary purposes (C. Bowden *in litt.* 2007) and exporting it to 15 African countries (BirdLife International 2016a). Three of the African endemic vultures are of the *Gyps* genus and are likely to be susceptible to diclofenac poisoning (and possibly other NSAIDs), although further research on all African species is required, also taking into account differences in carcass disposal systems in most African countries (compared to Asia), which may affect the exposure of vultures to this threat.

Diclofenac has been approved for veterinary use in several European countries. It is manufactured by an Italian company (FATRO), where its use was authorised in 1993. Since 2009, it has been exported and approved in Estonia, the Czech Republic, Latvia and Turkey. Despite the overwhelming evidence of the threat posed by this drug to vultures in Asia and real concerns about the impact that it may have on European vulture populations the drug was also authorized for veterinary use in Spain in 2013. It is now becoming widely available on the EU market.

*Lead poisoning*

The impacts of lead poisoning through the ingestion of spent lead ammunition used by hunters to kill game is well known for a wide-range of bird species (Watson *et al*. 2009; Delahay & Spray 2015),

contributing to population declines as well as creating extensive avoidable deaths and sickness amongst waterbirds and scavengers. However, there are few studies on Old World Vultures. However, substantial work on the impact of lead poisoning on the recovery of the **California Condor** *Gymnogyps californianus* has been done and this threat is considered the most significant in terms of its successful reintroduction in the wild with a number of released bird having been killed after feeding from carrion containing lead fragments and residues (Finkelstein et al, 2012*)*. Elevated Blood Lead Levels (BLL) have been recently found in **White-backed** and **Cape Vultures** in South Africa, Namibia and Botswana (Kenny *et al*. 2015; Naidoo *et al.* 2017). In areas where game-hunting is a significant activity the ingestion of lead fragments by vultures could have both lethal and sub-lethal effects. Naidoo *et al*. (2017) suggest that elevated BLL could have a detrimental impact on breeding productivity, especially important for slow-reproducing species, and the effects compounded by small and rapidly declining populations.

Lead poisoning is a well-known threat to vultures and other scavengers, which in critical cases can result in death, but often causes sub-lethal poisoning that has a number of other secondary effects (such as reduced mobility or increased risk of collision). Lead poisoning may be the most significant threat to **Bearded Vultures** in Europe (Margalida *et al*. 2008). There is also evidence of negative effects of accidental lead intoxication to **Cinereous** and **Egyptian Vultures** in captivity (Pikula *et al.* 2013).

*Bioaccumulation*

Whilst direct mortality from poisoning is highly visible and newsworthy, all species of African Vultures are long-lived and at a high trophic level (high up the food chain), which increases their vulnerability to bioaccumulation. Whilst most attention has been given to the lethal impacts of toxins on vultures, bioaccumulation may have sub-lethal but significant negative effects on reproductive success, immune response and behaviour.

### 4.1.2 Targeted vulture poisoning

*Belief-based use and the bushmeat trade*

Pesticides are increasingly used to acquire wild animals or their body parts for commercial trade. Where vultures are concerned, a major driver of this trade is here referred to as belief-based use, in which wildlife items are used to treat of a range of physical and mental diseases, or to bring good fortune. Vultures are sold alongside other species of birds, mammals, reptiles and other taxa at markets specialising in supplying belief-based uses. The term ‘traditional medicine’ is used, although no evidence of medicinal benefits is known; other terms (some used in specific subregions) include juju, muthi and fetish. The trade has existed for many years in some areas (especially parts of West, Central and Southern Africa) and is widely accepted and part of long-standing cultural practice. However, not all of the uses for vultures have such a history, for example those supposedly increasing the user’s chances of winning in newly introduced national lotteries and sport betting practices. With the rapid growth of human populations and more effective harvesting methods (through highly toxic poisons) the impact on vulture populations is becoming more apparent.

The other main driver of this trade is bushmeat. Many species are sold for belief-based uses alongside those sold for their meat in the same markets, or are sold for either purpose. This suggests that belief-based use and bushmeat trades are probably integrated and to some extent interdependent (Saidu & Buij 2013, Williams *et al*. 2014, Buij *et al*. 2015). These practices are not well documented, and may be unusual, in East Africa, but poisoning incidents have also been

recorded from Tanzania where vulture carcasses without heads have been discovered, following the pattern of mutilation frequently seen for belief-based use.

Across west and central Africa the **Hooded Vulture** is one of the most heavily affected species, with an estimated 5,850–8,772 individuals traded over a six-year period in West Africa alone (Buij *et al*. 2015). In Nigeria, a survey of medicinal traders found this to be the most commonly traded species of vulture, accounting for 90% of all vulture parts traded (Saidu & Buij 2013). **Hooded Vultures** are also killed for belief-based uses in South Africa but not as commonly as other species (McKean *et al.* 2013), perhaps simply because of thier relatively small population in the country (A. Botha).

**White-backed Vultures** are regularly traded in West Africa, with an estimated 924–1,386 individuals traded over a six-year period, which most likely represents a significant proportion of the regional population (Buij *et al*. 2015). The decline and possible extirpation of **White-backed Vulture** in Nigeria has been attributed to the trade in parts for traditional juju practices (P. Hall *in litt.* 2011, BirdLife International 2016a). In South Africa, **White-backed Vulture** is one of the preferred vulture species in trade, according to a survey of traditional healers and traders (McKean *et al*. 2013). As a result of this and environmental pressures, it is predicted that the population in Zululand could become locally extinct in 26 years (from 2007), unless harvest rates have been underestimated, in which case local extinction could have been be 10-11 years away (McKean & Botha 2007).

McKean & Botha (2007) also predicted that with current harvesting levels**, Cape Vulture** populations in the Eastern Cape, KwaZulu-Natal and Lesotho could become locally extinct within 44 to 53 years. However, should the numbers of **White-backed Vultures** continue to decline, a larger proportion of the current harvesting pressure would fall on the **Cape Vulture** population. In this instance, the **Cape Vulture** populations in Lesotho, KwaZulu-Natal and the Eastern Cape could be exhausted within 12 years.

The less numerous **Rüppell's Vulture** has been heavily exploited for trade in West Africa (Nikolaus 2006) and the estimated numbers traded of 1,128-1692 individuals over a six-year period represents a significant proportion of the regional population (Buij *et al*. 2015). **Lappet-faced Vultures** have been traded in substantial numbers in West and Central African markets, with a known offtake per year of 143–214 individuals (Buij *et al.* 2015); considering the relatively small population size and fragmented distribution this must be having serious consequences for regional populations. The species has also been recorded in small numbers being used in traditional medicine in South Africa (McKean *et al*. 2013). **White-headed Vultures** have also been recorded being traded in small numbers in West and Central African (Buij *et al*. 2015), which given the small population size is likely to be significant. In South Africa, this species is killed for use in belief-based use (Simmons & Brown *in litt.* 2006, BirdLife International 2016a), and in Zambia **White-headed Vultures** are known to be poisoned for use in witchcraft (Roxburgh & McDougall 2012).

Belief-based use of vultures (and their body parts) for 'traditional medicine' in South Asia is localised and not intense enough to be responsible for observed nationwide declines. In South-East Asia, some persecution may take place to supply the trade but under current conditions this does not appear to be sufficient to constitute a threat. Belief-based use is known in Cambodia, but appears to be exceptional and this threat was treated as 'low priority' in the national vulture action plan (Sum and Loveridge 2016).

*Sentinel poisoning*

The recent increase in poaching of elephants has resulted in an increase in mass poisoning of vultures. Vultures are deliberately poisoned by poachers who may use large quantities of toxic

pesticides on carcasses because circling vultures attract those combatting poaching (Ogada 2014, Ogada *et al*. 2015b); vultures are killed because they play the role of sentinels. Between 2012 and 2014, Ogada *et al*. (2015a) recorded 11 poaching-related incidents in seven (largely Southern) African countries, in which 155 elephants and 2,044 vultures were killed. In at least two incidents the harvesting of vulture body parts (for 'fetish') may have provided an additional motive. Vulture mortality associated with ivory poaching has increased more rapidly than that associated with other poisoning incidents, accounting for one-third of all vulture poisonings recorded since 1970.

The scale of deaths at a single carcass can be significant, regularly exceeding 100 individuals, for example, at least 144 **White-backed Vultures** killed after feeding on an elephant carcass in Gonarezhou National Park, Zimbabwe, in 2012 (Groom *et al*. 2013) and over 500 vultures killed in Bwabwata National Park, Namibia, in 2013 after feeding on a single poisoned elephant carcass (Ogada *et al*. 2015a).

## 4.2 Mortality caused by power grid infrastructure

### 4.2.1 Electrocution

Bird mortality by electrocution is a global problem that has become more prevalent in recent years as energy demand increases, resulting in infrastructure growth often in previously undeveloped areas. Electrocution associated with powerlines occurs when a bird comes into contact with two wires or when it perches on a conductive pylon (for example, a metal structure) and comes into simultaneous contact with a live wire. Large species such as vultures, eagles and storks are particularly vulnerable. Electrocution risk can be very significant in old, badly insulated and sited power lines. Effective planning and mitigating measures can dramatically reduce the impact of energy infrastructure on avian populations (see BirdLife International 2016b).

Electrocution from powerlines is one of the key threats for **Cape Vultures** in South Africa (van Rooyen 2000, Boshoff & Anderson 2006, K. Hoogstad and L. Leeuwner), with data suggesting that mortality from electrocution makes a significant contribution to low juvenile and immature survival rates. Despite this, vultures might have derived some benefits from the presence of power lines in relation to increased nesting, roosting sites and nursery areas (Phipps *et al*. 2013), which may allow them to expand their range, especially if suitable mitigation measures can be taken to lessen the risk of electrocution. Shimelis (2005) highlights the threat of electrocution and collisions from powerlines for the **Lappet-faced Vulture** with 49 individuals killed in South Africa between 1996 and 2003.

Certain individual power lines can have disproportionate impacts. One from Port Sudan to the Red Sea coast was estimated to have, since its construction in the 1950s, electrocuted hundreds and perhaps thousands of **Egyptian Vultures**; it was switched off in 2014 and work begun on a new, fully-insulated distribution line running parallel to the existing line. In Morocco, a fairly short line in the SW has killed a significant number of raptors including threatened species, but no vultures to date (Godino *et al*. 2016). However, the impact of powerlines on vultures in the rest of Africa is poorly known in the absence of monitoring.

Electrocution by power lines is among the main causes of vulture decline in Europe, significantly affecting the **Egyptian Vulture** population in Canary Islands (Donazár *et al.* 2002) and the **Griffon Vulture** population in Israel (Leshem *et al.* 1985).

Feedback and discussions during the Asian and Middle East Regional Workshops indicate that the threat posed by electrocution on power grids to vultures and other soaring birds is not extensively monitored in within the region and its impact could therefore be underestimated. Harness *et al*. (2013) confirmed that power lines in Rajasthan, India, were responsible for bird electrocutions, but

found no vultures among those killed. These studies are, however, so limited, and the threats from similar infrastructure elsewhere, well enough known, that these threats must be taken seriously in view of increasing density of power grids.

### 4.2.2 Collisions

Each year millions of birds die worldwide as a result of collisions with above ground power lines, and the impact on populations is likely to increase as energy infrastructure continues to grow, especially in developing countries. As for electrocution, the risks can be very significant in old, poorly sited power lines. Under the current commitments to reduce carbon emissions, signatories to the United Nations Framework Convention on Climate Change (UNFCCC) are increasing their investments in renewable energy, particularly large wind farms. However, any other renewable energy installations, e.g. solar- and geothermal generation facilities, within the range will inevitably lead to an expansion in the power-line network which could increase the risk of collisions for vultures in areas where these are developed. Despite their acute vision, vultures' field of vision and normal head position when foraging make them often blind in the direction of travel, so they may be vulnerable to collisions with vertical infrastructure such as wind turbines (Martin *et al.* 2012). The proliferation of renewable energy initiatives such as wind farms can therefore be detrimental to vultures if the location of turbines and associated infrastructure are in areas favoured by the birds (Jenkins *et al.* 2010).

Whilst energy infrastructure will affect vultures across Africa, much of what is understood about its impact on vultures comes from southern Africa. For **Cape Vultures** in the Magaliesberg a large number of fatalities are associated with powerline collisions and electrocutions, and this is probably one of the main factors that have caused declines of the species in South Africa (BirdLife International 2016a). An estimated minimum of 80 vultures (**Cape and White-backed**) are killed annually by collision with powerlines in Eastern Cape Province (Boshoff *et al*. 2011). A controversial wind farm development in Maluti-Drakensberg, Lesotho, an important site for **Cape Vulture**, was given approval in 2014 (Anon. 2014), and is likely to result in significant vulture mortality if substantial mitigation measures are not implemented. Even relatively small-scale wind energy developments in the Lesotho Highlands pose a threat to local vulture populations (Rushworth & Krüger 2014) and could lead to local extinctions. Shimelis (2005) highlights the threat of collisions with, as well as electrocution by, powerlines for the **Lappet-faced Vulture** with 49 individuals killed in South Africa between 1996 and 2003.

The **Griffon Vulture** most frequently-killed species by the wind turbines in Spain: between 1993 and 2003, 151 collisions were detected in two wind farms located in Tarifa (southern Spain), 73% of which were **Griffon Vultures** (De Lucas *et al.* 2008). **Egyptian Vulture** mortally caused by wind turbines is also recorded in Spain, where on average 2.5 individuals are killed per year (Hernandez *et al.* 2009).

Very little scientific information is available on these threats in Asia and the Middle East. Kumar *et al*. (2012) monitored bird mortality for one year at a wind farm in Gujarat, India, confirming that collisions of birds with turbines occur although no vultures were recorded in the study area. Collisions with wires has been reported to be a threat to **Cinereous Vultures** wintering in the Republic of Korea (South Korea). These studies are, however, so limited, and the threats from similar infrastructure elsewhere, well enough known, that these threats must be taken seriously in view of increasing density of power grids.

## 4.3 Decline of food availability

As obligate scavengers, usually of medium to large carcasses, vultures are susceptible to declines in the availability of such carcasses, especially of ungulates, to scavenge on. Three main factors could reduce food (carcass) availability for vultures. First, a reduction in the numbers of dead livestock could result from carcasses being buried or burned, or dumping sites for carcasses being closed entirely; these measures could be prompted by concerns over smell or public health campaigns to reduce the number of rotting carcasses. Second, competition for food with feral dogs and other scavengers may reduce food available to vultures; this is in line with known increases in feral dog populations in India (Cunningham *et al.* 2001, Markandya *et al.* 2008), which may in turn contribute to the closure of dumping sites for carcasses, heavily used by dogs. Third, reduced wild ungulate populations would diminish food availability for vultures where these are more important than livestock.

Declines in large mammal populations have been recorded across Africa since the 1970s (59%) with the largest declines in West Africa (85%: Craigie *et al*. 2010). In East Africa, Western *et al.* (2009) showed that wildlife declines in National Parks and Protected Areas have declined at similar rates to the wider countryside. BirdLife International (2016a) cite declining ungulate populations as a threat for five of the African endemic vultures, although there is little research that makes the link between changes in food availability and declining vulture populations. In contrast, livestock populations have more than doubled since the 1960s, and vultures will almost certainly feed on livestock carcasses where they are available. However, changes in livestock management and improved sanitation at slaughterhouses may at least partly offset the increased availability of livestock as a food source. Improved sanitation is likely to have impacted **Hooded Vultures** more than other African species due their strong association with human settlement in at least part of their range (Thiollay 2006, Ogada & Buij 2011). **Hooded Vultures** at five slaughterhouses visited in northern Cameroon were competing for scraps with domestic dogs.

Based on expert opinion, Boshoff & Anderson (2006) rank a lack of carrion as the most significant threat to the **Cape Vulture**, although acknowledge there is no substantial research to back up this hypothesis. The increasing use of supplementary feeding sites ('vulture restaurants') by a population of **Cape Vultures** in the Magaliesberg Mountains may suggest a reliance of supplementary food due to declining natural food (Wolter *et al.* in BirdLife International 2016a). Provision of food at vulture restaurants also has the potential to guarantee poison-free food (but this must be demonstrated), and can modify the birds' behaviour, encouraging them to forage only in safe areas and minimising their foraging movements to areas where poisoned baits may be used.

One of the main reasons for the decrease or even extinction of several vulture species in Europe was and still is a significant reduction in food resources (Donázar *et al.* 2009, Ogada *et al*. 2012). A lack of natural food was the result of strong restrictive veterinary sanitary regulations in most of the European countries, a decline in the extensive keeping of domestic animals, and sometimes a reduction or even extinction of wild mammals (ungulates and lagomorphs). By contrast, in some countries, notably Spain, vultures persisted or increased partly because of food management and legal protection (Donázar *et al*. 2009). In the Middle East, more stringent sanitary measures at rubbish dumps, which provide an important source of food for **Egyptian Vultures** could potentially reduce the amount of available food from this source for this species and other scavenging birds.

Different methods of supplementary feeding for vultures and other endangered birds have been developed with the aims to rescue and restore endangered vulture populations suffering food shortages or to manage their populations (Ewen *et al*. 2015, Fielding *et al.* 2014). Ewen *et al.* (2015) emphasise the need for a better evaluation of positive and negative effects before implementing supplementary feeding and a method to determine whether supplementary feeding is necessary among other alternative actions for conservation.

Evidence does not suggest that food shortage accounts for the vulture population crash across the Indian sub-continent, although a gradual reduction in available food is taking place; however, this does appear to be a threat in other parts of Asia. Across the Indian sub-continent, evidence suggests that food availability for vultures has remained high. A study in India (V. Prakash, in prep.) combining vulture survey data with information from bone and hide collectors about carcass dumps and cattle mortality suggested that enough meat was available to sustain a vulture population far in excess of (around 20 times) the actual number present, suggesting that other factors were the cause of the low population.

In the South-East Asian range of vultures, given the continued presence of large areas of suitable habitat for vultures, food shortage in the latter part of the 20th century has almost certainly played a major part in vulture declines (Pain *et al.* 2003): wild ungulate populations crashed in the region because of uncontrolled hunting and habitat loss (Srikosamatara & Suteethorn 1995, Duckworth *et al.* 1999, IUCN 2000) and this has been accompanied by a reduction in the number of free-ranging livestock and improvements in animal husbandry with increased mechanisation.

## 4.4 Habitat loss, degradation and fragmentation

The impact of habitat change on vulture populations is complex although it is often cited as a contributing factor to vulture declines. This may concern large-scale modification affecting food supply (considered above) or other ecological factors. More specifically, cliff or tree-nesting vultures have specific breeding site requirements, which are easily affected by human activities such as: quarrying; building of tourist or leisure facilities near breeding cliffs; widening of roads and highways; logging, other forms of deforestation and clearance of large trees in agricultural areas.

Habitat loss and degradation are suspected to have played roles in the dramatic declines of large vultures (**Hooded, Rüppell's, White-backed, White-headed** and **Lappet-faced**) outside protected areas in West Africa (Thiollay 2006, Ogada *et al.* 2011), with the root cause being the rapid increase, and associated development, in the human population and loss of suitable habitat as a result of settlement expansion. Thiollay (2006) highlights the complexity of habitat degradation with dramatic changes in natural resource management changing large tracts of woodland to shrubland, increased desertification and the decline in large game outside of protected areas. All of these factors must have an impact on vulture populations, albeit not quantified. In East Africa, specifically in and around the Masai Mara National Reserve, Virani *et al.* (2011) show that declines in large vultures (**Rüppell's, White-backed, White-headed and Lappet-faced**) were linked to changes in land-use and tenure systems (grazed, buffer, reserve) with declines largest outside the reserve area. Virani *et al.* (2011) also acknowledge that the magnitude of the declines can't be explained wholly by land-use change and that poisoning is a more significant threat. Land-use changes in southern Africa are varied and include degradation by intensive agriculture, cultivation, urbanization, roads, dams, mines, desertification, bush encroachment, afforestation and alien vegetation. Which are most important for the **Cape Vulture**, or indeed any of the African vulture species, needs further quantitative research.

In South Asia, there is anecdotal evidence of disturbance at cliff nesting sites of vultures caused by quarrying activities. Nesting sites of **White-rumped Vultures** are threatened by logging at some sites in Nepal (Baral 2003). However, in India, most of the nesting habitat, both within and outside protected areas is not currently threatened or affected by disturbance. In South-East Asia, there is too little information about nesting sites for vultures to infer that they are under threat. There should be no shortage of nesting sites in intact habitat (T. Clements pers. comm.), but known nesting trees of vultures have been cut along the Sesan River, Cambodia, after which new nests were not observed; this suggests that selective logging may force vultures to relocate and impact vulture nesting success (Sum and Loveridge 2016).

## 4.5 Disturbance from human activities

A wide range of activities can cause disturbance, such as construction infrastructure, agriculture, research, aviation, mining and blasting; examples documented in the literature are presented below.

Generally, **White-backed Vultures** are vulnerable to nest harvesting or disturbance by humans, especially outside protected areas (Bamford *et al.* 2009) perhaps more so than other species because of their preference for nesting in trees. It has been documented that **Rüppell's Vulture** suffer from disturbance, especially from climbers; for example, in Mali, the Hombori and Dyounde massifs are dotted with at least 47 climbing routes, on which expeditions take place every year, mainly during the species's breeding season. However, the precise impact of these activities is not known (Rondeau & Thiollay 2004).

**Lappet-faced Vultures** are especially sensitive to nest disturbance (Steyn 1982). The impact may be growing with an increase in forest settlements (for example in Ethiopia: BirdLife International 2016a) and the increasing recreational use of off-road vehicles which is reported in Africa (Mundy *et al.* 1992) and Tayma, Saudi Arabia (Shimelis *et al.* 2005). Also in Saudi Arabia, suitable nesting trees may be subject to the most intense human disturbance as shepherds also use the same large trees for shelter for themselves and their livestock (Shobrak 2011).

Aviation may cause disturbance, which may be a significant problem for already rare species. The South African Air Force maintains a policy of keeping a flight-restricted 2 km buffer from **Cape Vulture** colonies to avoid disturbance but as far as is known such measures are not widespread elsewhere. Recreational aviation has also been noted as causing disturbance, but control measures have been more difficult to introduce.

There have been reports of birds being chased away from or prevented from nesting on buildings or monuments of historical significance in parts of South Asia, but no further details are known.

## 4.6 Disease

Infectious diseases were considered as a possible explanation for the South Asian vulture declines, before diclofenac was found to be the cause. Analyses found no evidence of avian influenza or West Nile virus in **White-rumped Vultures** found dead in Pakistan, nor were viruses isolated from the kidney, spleen, lung and intestine of these birds (Oaks *et al.* 2004). Assessments of herpes and other viruses has produced no indication that any are associated with serious pathology (L. Oaks, South Asian Vulture Recovery Plan 2004). Avian malaria parasites have been found in vultures in India (Poharkar *et al.* 2009), but such parasites are widespread and this finding does not imply that these parasites are pathogenic to the vultures (Ishtiaq 2009). No information on the prevalence of disease in wild vultures in other parts of Asia is known. However, across the vultures' range, introduction of or exposure to new pathogens, such as poultry disease (e.g. influenza/NDV), is a potential risk.

It has been suggested that **Hooded Vultures** in West Africa may be threatened by avian influenza, from which they appear to suffer some mortality and which they may acquire from feeding on discarded dead poultry (Ducatez *et al.* 2007).

In Europe, a threat assessment for **Egyptian Vultures** in the Balkans produced 182 samples from 49 individuals from Bulgaria and Greece. A wide range of microorganisms was tested for, all known as potential pathogens for vultures, but none affected any of the sampled individuals; only very low concentrations of Newcastle Disease were detected in most samples and in some a low concentrations of Avian adenovirus and Avian circovirus were detected. This indicates contact with

these viruses (which are probably very common), but without symptoms (Andevski & Zorrilla Delgado 2015).

## 4.7 Climate change

Climate change affects birds in different ways, altering distribution, abundance, behaviour, genetic composition, and timing of events like migration or breeding. Direct effects of climate change such as changes in temperature and rainfall patterns can also impact birds due to increased pressure from competitors, predators, parasites, diseases and disturbances like fires or storms.

Very little work has been done or published to illustrate the impact of climate change on vultures. It is however speculated that the species breeding at higher-altitudes (**Bearded** and **Cape Vulture**) in southern Africa may experience range contractions due to increased temperatures (Simmons 2007). The overall impact of climate change can be more severe when it occurs with other major threats such as habitat loss and reduction in available food sources.

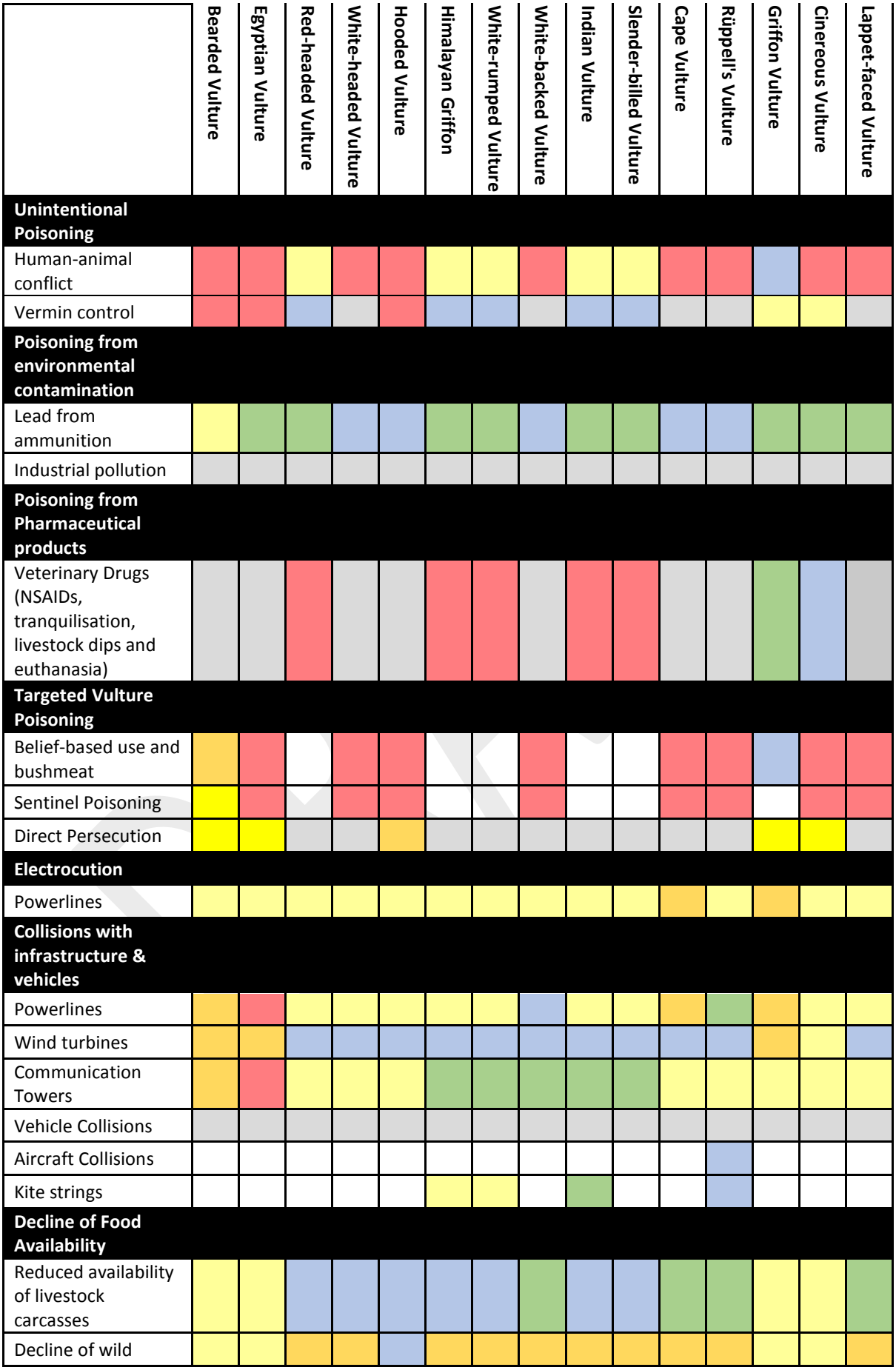
## 4.8 Other threats

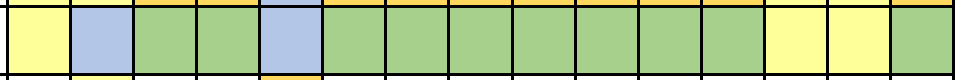
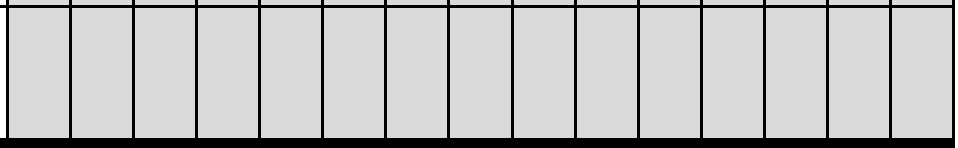
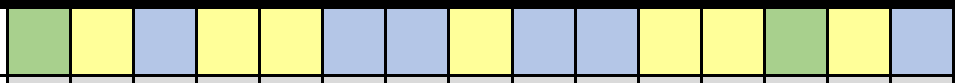
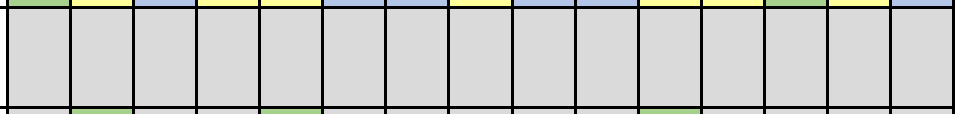
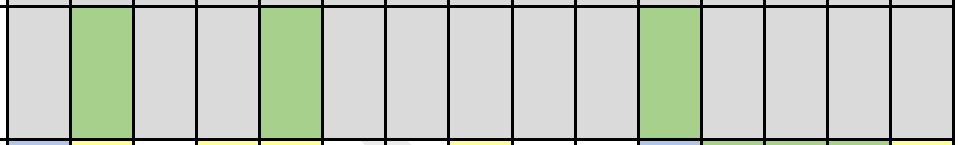
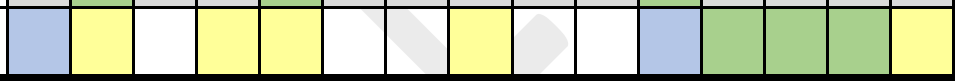
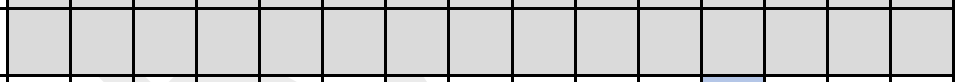
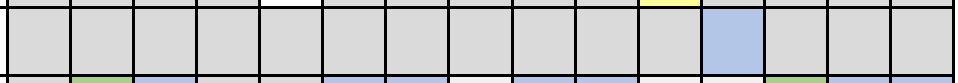
A range of additional threats affect vulture populations throughout their African and Eurasian ranges, but these are often more species-specific with more localised effects than the threats discussed above. However, particularly at breeding sites, these can have locally significant impacts on productivity, and impacts are likely to increase as vultures continue to decline and populations become more fragmented.

- *Drowning* Historically **Cape Vultures** were susceptible to drowning with records of at least 120 individuals (21 incidents) being killed in small farm reservoirs in southern Africa between the early 1970s and late 1990s (Anderson *et al*. 1999). Modifications to many reservoirs have now been made (Boshoff *et al*. 2009) and it is not clear if this remains a significant threat.
- *Illegal killing, taking and trade* Various forms of direct targeting of vultures not covered above, in some cases purely because of a dislike of or superstition against vultures; may use poison, shooting or capture. In South-East Asia, wild vultures are sometimes caught and held as pets or display animals; this is certainly known in Cambodia, but appears to be exceptional and this threat was treated as 'low priority' in the national vulture action plan (Sum and Loveridge 2016).
- *Sport hunting* shooters may occasionally use vultures as novel targets. In parts of central Asia vultures are known to be hunted for trophies and taxidermy.
- *Other collisions (in addition to those with energy infrastructure)*
    - Before vulture numbers were significantly reduced in South Asia, vulture collisions with aircraft were a serious concern. The number of fatalities caused directly by these crashes may not have affected population levels, but shooting and poisoning to reduce vulture numbers near airfields, although unquantified, could have had a negative impact in the 1970s and 80s.
    - *Trains* (N India) kill numbers of vultures and are very visible sources of mortality at least on a local scale.
    - *Kite strings* (NW India) also kills and injures locally significant numbers of vultures annually during kite festivals.

**Table 4**. Threats affecting each species of vulture, and their overall severity across their range

| Threats | Species and Levels of Threat* |
|---|---|


Bearded Vulture
Egyptian Vulture
Red-headed Vulture
White-headed Vulture
Hooded Vulture
Himalayan Griffon
White-rumped Vulture
White-backed Vulture
Indian Vulture
Slender-billed Vulture
Cape Vulture
Rüppell's Vulture
Griffon Vulture
Cinereous Vulture
Lappet-faced Vulture
Unintentional Poisoning
Human-animal conflict
Vermin control
Poisoning from environmental contamination
Lead from ammunition
Industrial pollution
Poisoning from Pharmaceutical products
Veterinary Drugs (NSAIDs, tranquilisation, livestock dips and euthanasia)
Targeted Vulture Poisoning
Belief-based use and bushmeat
Sentinel Poisoning
Direct Persecution
Electrocution
Powerlines
Collisions with infrastructure & vehicles
Powerlines
Wind turbines
Communication Towers
Vehicle Collisions
Aircraft Collisions
Kite strings
Decline of Food Availability
Reduced availability of livestock carcasses
Decline of wild

| | |
|---|---|
| ungulates |  |
| Improved carcass disposal |  |
| Improved sanitation |  |
| Change in cultural practices |  |
| Change in foraging patterns due to different spatial availability of food |  |
| **Habitat Loss** | |
| Loss of trees and cliffs |  |
| Bush encroachment/ reforestation |  |
| Human settlement expansion within historical foraging range |  |
| Degradation of rangelands |  |
| **Disturbance from human activities** | |
| Recreation |  |
| Construction of infrastructure |  |
| Agricultural/Forestry |  |
| Research & Monitoring |  |
| Aviation |  |
| Mining & Blasting |  |
| **Diseases** | |
| Diseases |  |
| **Climate Change** | |
| Climate Change |  |
| **Other threats:** | |
| Drowning |  |
| Illegal Killing, Taking & Trade |  |
| Sport Hunting |  |
| **Other collisions** | |
| Vehicle Collisions |  |
| Aircraft Collisions |  |
| Kite strings |  |
| **Indirect threat - missing or ineffective policies, laws and** | |

| enforcement | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lack of appropriate legislation | | | | | | | | | | | | | | | |
| Lack of or limitations to enforcement | | | | | | | | | | | | | | | |

*Threats are colour-coded as follows:

| Critical | Very high | High | Medium | Low | Unknown | Not a threat |
|---|---|---|---|---|---|---|

Ranking of threats is based on scope, severity and irreversibility. Based on outcomes from Regional Workshops and Questionnaires.

## 5. Stakeholders and potential collaborators

A very wide range of stakeholders are involved with or influence vulture conservation action (Table 5), mainly as a result of the birds' wide distribution across Africa and Eurasia, their very great ecological significance making them relevant across many sectors, and the range of threats that they face. With so many range states, space does not permit a catalogue of stakeholders separately for each country. However, the main categories of stakeholder have been identified, and based on generic descriptions of these and commonalities between countries, it should be possible to identify most if not all relevant stakeholders in any given range state.

In particular, many conservation and non-conservation stakeholders who may not concern themselves directly with vultures have priorities that are affected by the same threats as vultures. An example is health authorities dealing with belief-based use of vultures by people for various reasons which is at best medically ineffective and at worst potentially lethal if the body parts used were taken from poisoned birds; another is big cat or elephant conservationists dealing with poisoning and/or poaching which also kills many vultures.

Vulture conservationists cannot solve the birds' human-caused problems on their own, and so it is vital that they engage with the stakeholders identified here and continue to develop strategic alliances to achieve shared goals.

**Table 5**. Stakeholders in vulture conservation, and the activity types and threats of most relevance to each.

| Stakeholder | Activity type addressed | | | | Threat (and hence MSAP Objective) addressed | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Research and Monitoring | Conservation action | Policy & Legislation | Education & Awareness | 1 Human –Wildlife Conflict Poisoning | 2 Vermin control | 3 Poisoning by NSAIDS | 4 Belief-based use and bushmeat | 5 Sentinel poaching | 6 Electrocution | 7 Collisions with energy infrastructure | 8 Reduced food availability | 9 Habitat loss & degradation | 10 Loss of nest trees | 11 Disturbance |
| Parties to Convention on Migratory Species (including Raptors MoU, Preventing Poisoning Working Group and Energy Task Force) | | | X | | X | X | X | X | X | X | X | | | | |
| Parties to Convention on Biological Diversity | | | X | | | X | X | X | X | X | X | X | X | X | X |
| Parties to CITES | | | X | | | | | X | X | | | | | | |
| Parties to UNCCD | | | x | | | | | | | | | | X | | |
| Parties to Rotterdam and Stockholm Conventions (relating to importation of hazardous chemicals, and persistent organic pollutants) | | | X | | X | X | X | X | X | | | | | | |
| IUCN SCC Vulture Specialist Group | X | X | X | X | X | X | X | X | X | X | | X | X | X | X |
| International Conservation NGOs e.g. IUCN, WWF, WCS, Peregrine Fund, AWF, EWT, | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BirdLife International | | | | | | | | | | | | | | | |
| National Conservation NGOs, e.g. BirdLife Partner NGOs, others especially large mammal conservation and rangeland management | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Research institutions, universities and academics | X | | | | X | X | X | X | X | X | X | X | X | X | X |
| Regional and subregional economic commissions, e.g. EAC, SADC, IGAD, ECOWAS, AMCEN, UN, African Union | | | X | | X | X | X | X | X | X | | X | X | X | X |
| Donors, Banks and Supporters (World Bank, USAID, ADF, etc.) | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Private Sector e.g. (agro)chemical, pharmaceutical, energy, agriculture, tourism, mining, abattoirs | | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Govt (national and local) ministries or authorities: wildlife | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Govt (national and local) ministries or authorities: agriculture | | | X | | X | X | | | | | | | | | |
| Govt (national and local) ministries or authorities: livestock and veterinary services/animal health | | | X | | | X | X | | | | | X | X | | |
| Govt (national and local) ministries or authorities: health | | | X | | X | X | | X | | | | | | | |
| Govt (national and local) ministries or authorities: tourism | | | X | X | | | | | | | | | X | | X |
| Govt (national and local) ministries or authorities: energy | | | X | | | | | | | X | X | | | | |
| Other national authorities, e.g. heads of state, embassies | | | X | X | X | X | X | X | X | X | | X | X | X | X |
| Customs and Border controls | | | X | | | | | X | | | | | | | |
| Local government: urban authorities, local municipalities or districts | | X | X | | X | X | X | X | X | X | X | X | X | X | X |
| Local communities: grassroots groups and individuals | | X | | X | X | X | | X | X | X | | X | X | X | X |
| Judiciary and law enforcement agencies | | | X | | X | X | X | X | X | | | | | | |
| Religious leaders | | X | | X | | | | X | X | | | | | | |
| Traditional healers/medicine practitioners | | X | | X | | | X | X | X | | | | | | |
| Media | | | | X | X | X | | X | X | X | | X | X | X | X |
| Celebrities | | | | X | X | X | X | X | X | X | | X | X | X | X |
| Military | | X | X | | X | X | X | X | X | X | | X | X | X | X |
| Hunters | | X | X | X | | | | X | X | | | | | | |

# 6. Policies, legislation and Action Plans relevant for management

A number of international conventions and other intergovernmental policy frameworks exist that provide a framework for tackling the main threats to vulture populations as set out in Section 4, for example poisoning, mortality caused by power grid infrastructure, decline of food availability, habitat loss, degradation and fragmentation and human disturbance. Yet these conventions, with the exception of work through the Convention on Migratory Species (CMS) and the associated agreements and task forces on poisoning, grid collision and infrastructure, provide little or no reference to vultures, even in the national plans of Parties (e.g. the Convention on Biological Diversity (CBD) and the International Union for the Conservation of Nature (IUCN)). This section will briefly outline the obligations that international conventions and goals of relevance place on countries, before looking in more detail at the frameworks (and often substantial gaps) that exist in international policies to deal with two of the greatest threats to vultures, i.e. poisoning (through its different pathways) and impacts from power grid infrastructure (with specific reference to wind energy collision risk, transmission line electrocution and collision risk, both from existing and planned developments).

A country-by-country or region-by-region analysis of policy and legislation is beyond the scope of this Vulture MsAP, although range states are encouraged to undertake such reviews. However, a summary of country involvement in international processes and forums is presented at the end of this section (Table 6).

### 6.1 Multilateral Environmental Agreements (MEAs) and Goals

6.1.1 Convention on Biological Diversity and the Aichi Targets

In 2010, *the Convention on Biological Diversity (CBD)* produced the 20 Aichi Biodiversity Targets, framed under 5 strategic goals to be translated into action through national biodiversity strategies and action plans (NBSAPs) with the mission of halting biodiversity loss and enhancing the benefits it provides to people. While necessarily broad, these targets cover areas of specific relevance to the existence and conservation of vultures, notably Target 8[1] and Target 12[2] which adopts IUCN classifications as it's metric. Indeed Target 12 explicitly states: "Though some extinctions are the result of natural processes, human action have greatly increased current extinction rates. Reducing the threat of human-induced extinction requires action to address the direct and indirect drivers of change..... However, imminent extinctions of known threatened species can in many cases be prevented by protecting important habitats (such as Alliance for Zero Extinction sites) or by addressing the specific direct causes of the decline of these species (such as overexploitation, invasive alien species, pollution and disease)."

Specific reference to vultures in National Action Plans is, however, unusual (though, for example, Myanmar's final draft of their National Biodiversity Action Plan (2015) includes the following wording: *"Regulate use of organochlorines and ban the veterinary use of diclofenac and other non-steroidal anti-inflammatory drugs known to kill vultures[3]")* but the CBD is increasingly promoting the mainstreaming of biodiversity into areas such as agriculture. The Cancun Declaration[4] from COP13 in December 2016 specifically calls for:

- The prevention of agricultural pollution, and the efficient, safe and sustainable use of agrochemicals, fertilizers and other agricultural inputs.

[1] https://www.cbd.int/doc/strategic-plan/targets/T8-quick-guide-en.pdf
[2] https://www.cbd.int/doc/strategic-plan/targets/T12-quick-guide-en.pdf
[3] https://www.cbd.int/doc/world/mm/mm-nbsap-v2-en.pdf - page 62
[4] https://www.cbd.int/cop/cop-13/hls/cancun%20declaration-en.pdf

- The promotion of the use of biodiversity in agricultural systems to control or reduce pests and diseases.

CBD also strongly supports and requires that Parties apply thorough assessment procedures Strategic Environmental Assessments (SEA) and Environmental Impact Assessments (EIA) when it comes to the planning of activities with an impact on biodiversity[5]; this is crucial in respect of the planning of energy installations and specifically renewable energy and associated transmission grids, and is discussed in Section 3).

6.1.2 United Nations Sustainable Development Goals

The *United Nations Sustainable Development Goals (SDGs)* were adopted in September 2015 by 193 member states as part of the wider global development framework, "Transforming our World: the 2030 Agenda for Sustainable Development". The 2030 Agenda adopts sustainable development as the organizing principle for global cooperation through the 17 Goals. These Goals reflect the Agendas five key themes of: people, planet, prosperity, peace, and partnerships. The 17 goals are further refined into 169 targets. SDG 14 and SDG 15 are derived directly from the Aichi Target, but it is the cross cutting nature of the SDGs that provides the opportunity to engage across sectors and to highlight the role of that vultures play in the broader environment and how their conservation can contribute to the achievement of wider aims such as improvements in human health and development.

The SDGs are, however, not legally binding; there is an emphasis on "national ownership" of the goals, and to be as effective as possible, they need to be translated into nationally owned sustainable development strategies and integrated national financing frameworks. This process is only just underway in many countries, if at all.

6.1.3 Convention on Migratory Species

*The Convention on Migratory Species (CMS)* provides a number of resolutions, Memorandum of Understanding (MoUs), agreements and task forces that have the most direct relevance to vulture conservation. These can be summarised as follows:

MoU on the Conservation of Migratory Birds of Prey in Africa and Eurasia: concluded in October 2008, the Action Plan for this MoU contains activities with specific references to poisoning and power lines and their impact on birds of prey. The Action Plan mentions the following activities that are of relevance in relation to power lines and are quoted below in full:

- 1.4 Review relevant legislation and take steps where possible to make sure that it requires all new power lines to be designed to avoid bird of prey electrocution.
- 2.3 Conduct risk analysis at important sites (including those listed in Table 3) to identify and address actual or potential causes of significant incidental mortality from human causes (including fire, laying poisons, pesticide use, power lines, wind turbines).
- 2.4 Conduct Strategic Environmental Assessments of planned significant infrastructure developments within major flyways to identify key risk areas.
- 3.2 Where feasible, take necessary actions to ensure that existing power lines that pose the greatest risk to birds of prey are modified to avoid bird of prey electrocution.

Resolution 11.15 on Preventing Poisoning of Migratory Birds (2014): see Section 2 and available here

[5] https://www.cbd.int/doc/publications/cbd-ts-26-en.pdf

Resolution 11.16 The Prevention of Illegal Killing, Taking and Trade of Migratory Species (2014): see Section 2.1 available at here

AEWA Conservation Guidelines No. 14 (2014): *Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the African-Eurasian Region*. See Section 3.3 and available here

CMS, AEWA, International Renewable Energy Agency and Birdlife International (2014): *Renewable Energy Technologies and Migratory Species: Guidelines for sustainable deployment*. See Section 3.3 and available here

A UNEP/GEF funded flyway project is in place which started in 2009 and is implemented by BirdLife International. This BirdLife project on the conservation of migratory soaring birds pays attention to the problems of electrocution by, and collision with power line transects, as well as poisoning.

6.1.4 Convention on the International Trade of Endangered Species of Wild Fauna and Flora

CITES regulates the international trade in wild animals and plants to ensure that this practice does not threaten their survival.

Birdlife International is working with the Wildlife Conservation Society to inform a potential future proposal to transfer African vulture species from CITES Appendix II (species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival) to Appendix I (species threatened with extinction: trade in specimens of these species is permitted only in exceptional circumstances). The intention is to get this transfer onto the agenda of the CITES Animals Committee in 2017, as a precursor to a listing proposal for the next COP in 2018. More detail to be added

**6.2 Poisoning and chemical use**

Two international conventions exist that have relevance to the problems of vulture poisoning from chemical use but there is no systematic requirement for chemical or pharmaceutical companies to conduct pre-authorisation research and testing of products to assure that they do not have unintended consequences for non-target pest control, or wider damage to the environment.

The *Rotterdam Convention* entered into force in 2004 and in January 2017 had 156 parties. The objectives of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade are:

- To promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm;
- To contribute to the environmentally sound use of those hazardous chemicals, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties.

The Convention regulates the international trade of chemicals and currently regulates 43 chemicals, including 32 pesticides and applies to:

- Banned or severely restricted chemicals; and
- Severely hazardous pesticide formulations.

Annex II of the CMS Resolution 11.15 on Preventing Poisoning of Migratory Birds outlines key legislative recommendations developed by the CMS Preventing Poisoning Working Group in Tunis, Tunisia on the 27-31 May 2013 for the Rotterdam Convention as follows (and available here):

> "i. *Substitute (remove and replace) insecticides with a high risk to birds with safe alternatives, and inclusion of criteria in the Rotterdam Convention to reduce risks of imports toxic to birds, promotion of Integrated Pest Management, and identification of areas of significant risk of poisoning of migratory birds and mitigation of impacts through working with stakeholders;"*

However, the Rotterdam Convention does not apply *inter alia* to pharmaceuticals, including human and veterinary drugs, and thus does not have application to the need to promote wildlife/vulture-friendly testing on non-steroidal anti-inflammatory drugs (NSAIDs).

*The Stockholm Convention* on Persistent Organic Pollutants is an international environmental treaty, signed in 2001 and effective from May 2004, that aims to eliminate or restrict the production and use of persistent organic pollutants (POPs).

6.2.1 Unintentional (secondary) poisoning

*Agrochemicals*

The CMS Preventing Poisoning Working Group in Tunisia (2013) recommendation incorporated in Annex II of CMS Resolution 11.15 on Preventing Poisoning of Migratory Birds urges Parties to:

> *"Restrict/ban the use of second-generation anticoagulant rodenticides in open field agriculture (excluding best practice use for invasive species management); use best practice for the treatment of rodent irruptions minimising use of second-generation anticoagulants; and stop permanent baiting, with preventive rodent measures used instead".*

6.2.2 NSAIDS and other veterinary medicines

The CMS 'Guidelines to prevent the risk of poisoning of migratory birds', adopted by CMS Parties at COP 11 in 2014 through resolution 11.15 on 'Preventing poisoning of migratory birds' contains clear recommendations in relation to the issue of diclofenac, as set out in Annex II, clauses 3.1.and 3.2:

> *"3.1. Prohibit the use of veterinary diclofenac for the treatment of livestock and substitute with readily available safe alternatives, such as meloxicam.*
> *3.2. Introduce mandatory safety-testing of NSAIDs that pose a risk to scavenging birds, '…including multi-species testing with burden of proof on applicant; VICH/OECD to evaluate and provide guidance on wider risks of veterinary pharmaceuticals to scavenging birds".*

The Resolution goes on to state:

- Safety-testing of all veterinary NSAIDs that could be used to treat animals that may become food for scavenger bird species should be introduced as mandatory.
- This includes safety testing of substances that are currently on the market as well new substances.
- Mandatory safety-testing of risks to these species will reduce the likelihood of exposure to substances that are highly toxic to birds.

Safety-testing of new and existing NSAIDs for veterinary treatment of cattle should be revised to include multiple species testing by the applicant. Currently, however, no specific policy instrument

exists to ensure that the development of future NSAIDs, nor the retrospective assessment of existing products, is wildlife-friendly. General guidance only references the broader environment.

The regulatory approval given by the governments in South Asia of diclofenac was a result of an assessment error – arising from the fact that the assessments relied on acute, single species testing (Enick & Moore, 2007). In Europe, much concern has been raised about the licensing of veterinary diclofenac. The drug does not have a central marketing approval for veterinary use from the European Medicines Agency (EMA); it is authorized independently in each Member State, and despite the toxicity tests needed, it is clear that environmental risks, in particular the risk to necrophagous species had not been properly considered in, at least, Spain and Italy.

In response to pressure, in August 2014, the European Commission opened a public consultation and asked the European Medicines Agency's (EMA) Committee for Medicinal Products for Veterinary Use (CVMP) to issue advice as to whether or not veterinary medicines containing diclofenac present a risk for vultures and other necrophagous birds in Europe. In December 2014 the CVMP issued the advice that veterinary diclofenac does represent a real risk to European vultures, and they therefore suggested that a number of risk management measures should be taken to avoid the poisoning of vultures, including more regulation, veterinary controls, better labelling and information and/or a ban of the drug. However the CVMP fell short of recommending one or more of the possible solutions listed as they did not have sufficient information or remit to evaluate their effectiveness, although they recognised that only a ban would reduce the risks to zero.

### 6.2.3 Lead poisoning

The African-Eurasian Migratory Waterbird Agreement (AEWA) has helped to lead the way in tackling lead poisoning of waterbirds since the 1990s. While overall progress has been slow, significant work by the CMS Preventing Poisoning Working Group has brought together the evidence on lead poisoning leading to Resolution 11.15 "Preventing Poisoning of Migratory Birds" with its substantive guidelines which request the phasing out of lead ammunition across all habitats.

Annex II of CMS Resolution 11.15 on Preventing Poisoning of Migratory Birds urges the need to:

> *"Phase-out the use of lead ammunition across all habitats (wetland and terrestrial) with non-toxic alternatives within the next three years with Parties reporting to Conference of the Parties (CoP12) in 2017, working with stakeholders on implementation; promotion of leadership from ammunition-users on safe alternatives, and remediation of lead-polluted sites where appropriate."*

Building on CMS Resolution 11.15, in 2016, the IUCN World Conservation Congress adopted Resolution 82 calling for action from the IUCN Director General and Commissions as well as governments and all the IUCN member organisations to work towards the phase out of lead ammunition. A specific focus was placed on reducing risks to waterbirds (which consume lead shot directly from the environment left behind following shooting activities) and scavengers exposed to lead shot and bullets in carrion.

Importantly the motion brought together hunting, wildlife management and conservation stakeholders and resulted in an almost entirely consensus text (voted for by 92% of 134 governments and 94% of 621 NGOs), illustrative of the progress that has been made. The motion encourages governments to phase-out, where feasible, lead shot used for hunting over wetlands and lead ammunition used for hunting in areas where scavengers are at particular risk from the use of lead ammunition, based on scientific evidence, and the replacement of it with suitable alternatives.

### 6.3 Mortality caused by power grid infrastructure

Almost all countries have legislation that brings the construction of power lines and new energy installations under a regime of an Environmental Impact Assessment (EIA), which should take into account existing habitat and wildlife conservation legislation, including for birds. Specific mention of the problems of electrocution or collision is rare.

SEAs and EIAs are mandatory in most countries, are required by many project donors and are recommended actions under the principal biodiversity conventions. But despite this they are sometimes ignored and their effectiveness is often limited. A common constraint on both EIAs and SEAs is the adequacy of reliable baseline information on the biodiversity importance of sites (such as a site's flyway importance for a migratory species). Environmental Statements submitted by development proponents seeking consent for their proposals have also highlighted a failure to consider impacts on ecological functions and processes, impacts beyond site boundaries and cumulative impacts. Furthermore, even when EIAs have been carried out effectively and have identified necessary mitigation and compensation measures, such measures may be ineffectively implemented and long-term management and monitoring is often inadequate. Such problems may be exacerbated by limited capacities and resources within governmental organisations to manage and review EIAs and for non-governmental conservation organisations and other stakeholders to scrutinise and contribute to them.

The CBD and CMS recognise impact assessment as an important tool to ensure that development is planned and implemented taking biodiversity considerations into account. The CBD requires parties to apply impact assessment to projects, programmes, plans and policies with a potential negative impact on biodiversity. CBD strongly supports and requires that Parties apply thorough assessment procedures (SEA and EIA) if it comes to the planning of activities with an impact on biodiversity[6]; These SEA and EIA procedures may also include guidance on alternatives such as energy sources for which power lines may not be needed or which reduces it to a minimum.

#### 6.3.1 Renewable energy (primarily wind-energy)

Wind energy is an important source of energy that can significantly cut greenhouse gas emissions, yet such renewable energy technology deployments can have a range of potentially significant impacts on soaring birds of prey, including vultures. Specifically, wind farm developments have the potential to cause fatalities and injury.

The most effective way to detect and avoid severe environmental impacts of wind energy developments is to perform Strategic Environmental Assessments (SEAs) on large spatial scales. SEAs enable strategic planning and siting of wind energy developments in areas with least environmental and social impact and largest economic benefit.

The SEA is a means, by which environmental considerations are incorporated into policies, plans and programmes in order to achieve the best possible outcome for all involved. This is particularly effective with respect to power line routing and grouping, as appropriate corridors for lines can be identified proactively, well before reaching the individual project stage. The EIA process allows for the assessment of impacts at the project level. Although project-based and fairly late in the power line planning process this still provides a useful and essential mechanism for minimising the collision risk for birds.

[6] see CoP Decision VIII/28 (March 2006; see also CBD Technical Series number 26: http://www.cbd.int/doc/publications/cbd-ts-26-en.pdf)

Wind farm developments need to consider

- Environmental assessments and in particular avifaunal specialist studies need to be carried out;
- Threatened bird species (and other bird species considered to be of conservation importance for various reasons) and/or the impact on habitat where regional populations of birds and/or their habitat will not be negatively impacted on;
- The location of turbines/blades so that they are not located on major migration routes and especially migration bottlenecks where large numbers of birds are highly concentrated, inside protected areas (nature reserves, national parks, Ramsar sites) and Important Bird Areas (IBAs), inside buffer zones (the range of which is determined by the relevant species) around IBAs, nature reserves, national parks and Ramsar sites, in habitats where wind farms are known to pose high collision risks to birds (mountain ridges and cliff breeding and roosting sites would be examples of such critical locations).
- A greater emphasis on the development of alternative technology, such as bladeless turbines, is needed and should be promoted to prevent or reduce the known negative impact of current wind turbine designs on vultures and other soaring birds.

Comprehensive Environmental Impact Assessments (EIAs) and avifaunal specialist studies undertaken for all proposed wind farm developments should include the effects of the associated infrastructure such as power lines and roads on birds.

More urgent emphasis must be placed on the development of alternative technology to replace current wind turbines that pose a threat to vultures and other soaring birds. Designs such as bladeless turbines that produce energy equally or more effectively, compared to current wind-turbine technology, should be a priority.

6.3.2 Transmission lines

The most significant intervention to reduce the risk of electrocution energy infrastructure is proper planning and routing of networks and the use of infrastucture designs that minimise the risk of this threat. This applies to exisiting and future networks and is the most effective over the long term. Where appropriate, re-routing or retrofitting of existing networks should be implemented.

*Electrocution*

Electrocution mitigation can be far more controlled than collision mitigation. Since the problem is a physical one, whereby a bird bridges certain clearances on a pole structure, large birds of prey such as vultures and storks, particularly in habitats where perches and nest sites are limited, are at most risk. Most incidences occur during the breeding season and in the immediate subsequent months when young birds are most affected. The solution is relatively straightforward, and involves ensuring that a bird cannot touch the relevant components.

Specific mitigation measures can include:

- Erecting power poles that are specifically designed to be ‘bird safe’
- Add-on mitigation or retrofitting
- Insulation
- Perch management techniques

*Collision*

As for electrocution, the most significant intervention to reduce the risk of collisions with energy infrastructure is proper planning and routing of networks and the use of infrastucture designs that minimise the risk of this threat. This applies to exisiting and future networks and is the most effective over the long term. Where appropriate, re-routing of existing networks should be implemented.

Once infrastructure exists, line modification in various forms is the most widely used approach. Line modification can take several forms, which can be broadly divided into those measures that make power lines present less of an 'obstacle' for birds to collide with, those that keep birds away from the power line and those that make the power line more visible.

Several options exist to minimize collision risk. Wind energy and power line technologies vary in size and design which presents different types of threats to birds and other biodiversity. There are tailored mitigation measures developed to address these that are based on the mitigation hierarchy, such as installing nests on power lines or shut down on demand for wind turbines. The success of mitigation measures is largely dependent on the adequacy of baselines and monitoring approaches. Some mitigation measures may only be specific to a type of landscape feature or species. The effectiveness of a mitigation measures may also depend on the level of environmental protection a government provides in the form of legislative framework and transparency of information.

6.3.3 Guidelines

A number of guidelines addressing the issues surrounding new energy developments, transmission risk of electrocution (mainly from older installations) and transmission line collision risk (both existing, planned and cumulative).

- AEWA Conservation Guidelines No. 11 (2008): *Guidelines on how to avoid, minimise or mitigate impact of infrastructural developments and related disturbance affecting waterbirds*.[7]
- AEWA Conservation Guidelines No. 14 (2014): *Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the African-Eurasian Region*[8]
- CMS, AEWA, International Renewable Energy Agency and Birdlife International (2014): *Renewable Energy Technologies and Migratory Species: Guidelines for sustainable deployment*.[9]
- Birdlife International (2016): *Mitigating the effects of Wind Farms and Power Lines*[10]

There also a number of regional agreements, guidelines and initiatives such as:

- The Convention on the Conservation of European Wildlife and Natural Habitats or Bern Convention (2003): In 2003 the Bern Convention published the report "Protecting Birds from Powerlines: a practical guide on the risks to birds from electricity transmission facilities and how to minimise any such adverse effects."[11](BirdLife International with support from NABU). In 2010, The Bern Convention published a report (T-PVS/Files (2010) 11) with the title: "Implementation of Recommendation No 110/2004 on minimising adverse effects of above ground electricity transmission facilities (power lines) on birds. Report by the

[7] http://www.unep-aewa.org/sites/default/files/publication/cg_11_0.pdf
[8] http://www.unep-aewa.org/sites/default/files/publication/ts50_electr_guidelines_03122014.pdf
[9] http://www.cms.int/sites/default/files/document/Doc_10_2_2_Guidelines_Renewable_Energy_E.pdf
[10] http://www.birdlife.org/worldwide/policy/mitigating-effects-wind-farms-and-power-lines
[11] https://wcd.coe.int/com.instranet.InstraServlet?command=com.instranet.CmdBlobGet&InstranetImage=1300705&SecMode=1&DocId=1441752&Usage=2

Governments". This contained a total of 14 reports from Bern Convention Parties on how they have dealt with the recommendations as requested for in 2004, less than half of the Bern Convention Parties reacted in time.

- EU Directives: The EU has a number of legislative instruments to deal with migratory birds and power lines. At the species level it concerns the Birds Directive (79/409/EEC) and the Habitats Directives (92/43/EEC) with its articles on preventive measures and assessments of plans and projects in the light of the aims of both Directives.
- EU has agreed on a number of Directives dealing with EIA and SEA procedures and when and how to implement these; these are also directly relevant for power line construction. The EIA Directive includes a specific obligation for overhead electric power lines of 220 KV (or more) and longer than 15 kilometres. Both EU assessment procedures ask for special attention if power line construction would affect Natura 2000 sites and areas of special conservation concern (SPAs).
- Budapest Declaration, adopted in 2011 after a special European Conference on power lines and bird mortality. The declaration refers to the resolutions as adopted by the Bern Convention (2004) and CMS (2002) and, for the EU Member States, to the regulations within the framework of the EU Bird Directive. It is also highlighted to strictly apply the SEA and EIA procedures if it comes to the planning of new power lines. The conference called on all interested parties to undertake all possible actions which can lead to minimise the effect of power lines on bird mortality.
- Renewable Grid Initiative: Through RGIs "European Grid Declaration", 24 inaugural signatories (including TSOs, NGOs and citizen groups) committed to supporting grid expansion to integrate renewables in line with nature conservation objectives.
- BirdLife South Africa / Endangered Wildlife Trust: best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa

### 6.4 Conservation (captive) breeding and reintroduction

IUCN, through the Species Survival Commission, has published guidelines to assist in determining when *ex situ* management may contribute to species recovery; the most recent guidance (2014) proposes a five-step process:

1. conduct a review of the species's status;
2. define the role(s) that *ex situ* management might play;
3. assess the precise nature of the *ex situ* population and how it can contribute to the proposed initiative;
4. determine resources and expertise required, and appraise the feasibility and risks; and
5. make an informed, transparent decision based on the above.

Further IUCN guidance is available on reintroductions and other conservation translocations, which often go hand-in-hand with conservation breeding or related forms of *ex situ* management. Several programmes have achieved the successful reintroduction of vultures to parts of Europe from which they had been extirpated, for example Bearded and Griffon Vultures. The source of birds for reintroduction may be from conservation breeding (captive breeding) networks, although reintroduction may also be achieved by other methods such as using clutches from unsuccessful breeding pairs in the wild. The SAVE consortium is engaged in the conservation breeding of three species of *Gyps* vultures in South Asia following the declines of vulture populations due to poisoning by diclofenac and other NSAIDs.

Conservation breeding and reintroduction can play a significant role in the conservation of vulture species as long as IUCN criteria and guidelines are met. However, this type of intervention is typically

seen as a last resort, considered when all other measures to maintain viable vulture populations in the wild have been exhausted. Reintroduction of vultures into their historical range should only be considered when the threats that lead to their initial demise have been effectively addressed.

**Table 6**. Country involvement in international processes and forums. Fields are left blank when no information is available.

| Country | Region | Convention on Biological Diversity | Convention on Migratory Species | Raptors MoU | CITES | Rotterdam Convention | European Union | African Convention (ACCNNR) | African Union | Africa Ministerial Conference on | All vultures protected | IUCN state membership | AMU member (North Africa) | ECCAS member (Central Africa) | ECOWAS member (West Africa) | SADC member (southern Africa) | EAC member (East Africa) | ASEAN member |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Afghanistan** | **AS** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | ✓ | ✓ | | | | | | ✗ |
| **Albania** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Algeria** | **AF** | ✓ | ✓ | ✗ | ✓ | ✗ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | |
| **Andorra** | **EU** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Angola** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✓ | ✗ | ✓ | ✗ | |
| **Armenia** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Austria** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | ✓ |
| **Azerbaijan** | **EU** | ✓ | ✓ | ✗ | ✓ | ✗ | | | | | ✓ | | | | | | | ✗ |
| **Bahrain** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | | | | | | | | ✗ |
| **Bangladesh** | **AS** | ✓ | ✓ | ✗ | ✓ | ✗ | | | | | ✓ | ✓ | | | | | | ✗ |
| **Benin** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Bhutan** | **AS** | ✓ | ✗ | ✗ | ✓ | ✗ | | | | | | ✓ | | | | | | ✗ |
| **Bosnia and Herzegovina** | **EU** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Botswana** | **AF** | ✓ | ✗ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | |
| **Brunei Darussalam** | **AS** | ✓ | ✗ | ✗ | ✓ | ✗ | | | | | | ✓ | | | | | | ✓ |
| **Bulgaria** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | ✓ |
| **Burkina Faso** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Burundi** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✓ | ✗ | ✗ | ✓ | |
| **Cape Verde** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✗ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Cambodia** | **AS** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | ✓ | ✓ | | | | | | ✓ |
| **Central African Republic** | **AF** | ✓ | ✗ | ✗ | ✓ | ✗ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ | |
| **Chad** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✗ | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ | |
| **Croatia** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | ✓ |
| **Cyprus** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | ✓ |
| **Djibouti** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | |
| **DR of the Congo** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✓ | ✗ | ✓ | ✗ | |
| **DPR China** | **AS** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | ✓ | ✓ | | | | | | ✗ |
| **DPR Korea** | **AS** | ✗ | ✗ | ✗ | ✗ | ✓ | | | | | | ✓ | | | | | | ✗ |
| **Egypt** | **AF** | ✓ | ✓ | ✓ | ✓ | ✗ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | |

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| **Equatorial Guinea** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ | |
| **Eritrea** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✗ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | |
| **Ethiopia** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | |
| **France** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | ✓ |
| **Gabon** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ | |
| **Gambia** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Georgia** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | ✗ | | | | | | | ✗ |
| **Ghana** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Greece** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | ✓ |
| **Guinea** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Guinea-Bissau** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Hungary** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | ✓ |
| **India** | **AS** | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | | | | | | ✗ |
| **Islamic Republic of Iran** | **AS** | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | | | | | | ✓ |
| **Iraq** | **EU** | ✓ | ✓ | ✗ | ✓ | ✗ | | | | | | | | | | | | ✗ |
| **Ireland** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ | | | | | | | | | | | ✓ |
| **Israel** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Italy** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | ✓ |
| **Ivory Coast** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Jordan** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Kazakhstan** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | | | | | | | | ✗ |
| **Kenya** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | ✓ | |
| **Kuwait** | **EU** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | | | | | | | | ✗ |
| **Kyrgyzstan** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | | | | | | | | ✗ |
| **Lao PDR** | **AS** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | | ✓ | | | | | | ✓ |
| **Lebanon** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | | | | | | ✗ |
| **Lesotho** | **AF** | ✓ | ✗ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | |
| **Liberia** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Libya** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | |
| **Malawi** | **AF** | ✓ | ✗ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | |
| **Malaysia** | **AS** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | | ✓ | | | | | | ✓ |
| **Mali** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Malta** | **EU** | ✓ | ✓ | ✗ | ✓ | ✗ | ✓ | | | | | | | | | | | ✓ |
| **Mauritania** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | |
| **Mongolia** | **AS** | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ | | | | | | ✗ |
| **Montenegro** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Morocco** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✗ | ✗ | ✓ | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | |
| **Mozambique** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | |
| **Myanmar** | **AS** | ✓ | ✗ | ✗ | ✓ | ✗ | | | | | ✓ | ✓ | | | | | | ✓ |
| **Namibia** | **AF** | ✓ | ✗ | ✗ | ✓ | ✓ | | | ✓ | ✓ | | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | |
| **Nepal** | **AS** | ✓ | ✗ | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | | | | | | ✗ |
| **Niger** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Nigeria** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Oman** | **EU** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | | | | | | | | ✗ |
| **Pakistan** | **AS** | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | | | | | | ✗ |
| **Poland** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ | | | | | | | | | | | ✓ |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Portugal** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | ✓ |
| **Qatar** | **EU** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | | | | | | | ✗ |
| **Republic of the Congo** | **AF** | ✓ | ✗ | ✗ | ✗ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ | |
| **Republic of Korea** | **AS** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | | ✓ | | | | | | ✗ |
| **Romania** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | ✓ |
| **Russia** | **EU** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Rwanda** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ | ✓ | ✗ | ✗ | ✓ | |
| **Saudi Arabia** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | ✗ | | | | | | | ✗ |
| **Senegal** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Serbia** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Sierra Leone** | **AF** | ✓ | ✗ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Singapore** | **AS** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | | ✓ | | | | | | ✓ |
| **Slovenia** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | ✓ |
| **Somalia** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | |
| **South Africa** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | |
| **South Sudan** | **AF** | ✓ | ✗ | ✗ | ✗ | ✗ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✗ | ✗ | ✓ | |
| **Spain** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | ✓ |
| **Sudan** | **AF** | ✗ | ✗ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | |
| **Swaziland** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | |
| **Switzerland** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Syrian Arab Republic** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Tajikistan** | **EU** | ✓ | ✓ | ✗ | ✓ | ✗ | | | | | ✓ | | | | | | | ✗ |
| **Tanzania** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✗ | ✓ | ✓ | |
| **Thailand** | **AS** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | | ✓ | | | | | | ✓ |
| **FYR of Macedonia** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Togo** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ | |
| **Tunisia** | **AF** | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | |
| **Turkey** | **EU** | ✓ | ✗ | ✗ | ✓ | ✗ | | | | | ✓ | | | | | | | ✗ |
| **Turkmenistan** | **EU** | ✓ | ✗ | ✗ | ✓ | ✗ | | | | | | | | | | | | ✗ |
| **Uganda** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✗ | ✗ | ✓ | |
| **Ukraine** | **EU** | ✓ | ✓ | ✗ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **United Arab Emirates** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | | | | | | | ✗ |
| **Uzbekistan** | **EU** | ✓ | ✓ | ✗ | ✓ | ✗ | | | | | ✗ | | | | | | | ✗ |
| **Vietnam** | **AS** | ✓ | ✗ | ✗ | ✓ | ✓ | | | | | | ✓ | | | | | | ✓ |
| **Western Sahara** | **AF** | | | | | | | | | | | | | | | | | |
| **Yemen** | **EU** | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | | | | | | ✗ |
| **Zambia** | **AF** | ✓ | ✗ | ✗ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | |
| **Zimbabwe** | **AF** | ✓ | ✓ | ✗ | ✓ | ✓ | | ✗ | ✓ | ✓ | | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | |

# 7. Framework for action

## 7.1. Goal

To halt declines in all 15 migratory vulture species of Africa and Eurasia, and where possible restore them to favourable conservation status, by 2027

## 7.2. Purpose

To undertake concerted, collaborative and coordinated international actions to:

a. rapidly halt current population declines in all species covered by the Vulture MsAP;
b. reverse recent population trends to bring the conservation status of each species back to a favourable level; and,
c. provide conservation management guidelines applicable to all Range States covered by the Vulture MsAP.

## 7.3. Objectives, Indicators and Means of verification

***Objective 1.*** Halt the illegal use of toxic chemicals and substances in animal poisoning which unintentionally kills vultures
**Indicator:** Use of toxic chemicals to poison animals is effectively prevented through effective control, enforcement and education by 2027
**Means of verification:** Legislation and effective regulations in place and enforced across the range.

***Objective 2.*** Reduce mortality of vultures by NSAIDS, reduce occurrence of toxic NSAIDS, and ensure recognition of the threat of NSAIDS across Asia and world-wide
**Indicator:** By 2027, potentially harmful NSAIDS no longer available for veterinary use, safe alternatives introduced and widely used
**Means of verification:** Reduction in carcasses containing harmful NSAIDS available to vultures, increasing vulture populations in previously affected areas

***Objective 3.*** Reduce and eventually halt the trade in vulture parts for belief-based use
**Indicator:** Reduction in demand for vulture parts in trade and its use by 2027; understanding of the human health risks associated with the use thereof
**Means of verification:** Decline of targeted poisoning events motivated by trade; reduced availability of vulture parts in markets

***Objective 4.*** Reduce declines in vulture populations associated with sentinel poisoning by poachers
**Indicator:** Intentional killing of vultures associated with poaching of other wildlife is halted by 2027
**Means of verification:** Number of intentional vulture poisoning incidents in association with wildlife poaching

***Objective 5.*** Reduce vulture mortality caused by energy infrastructure through electrocution
**Indicator:** Mortalities through electrocution on electricity infrastructure is reduced to acceptable levels by 2027
**Means of verification:** Mortality databases; extent of safe infrastructure and retro-fitted structures; appropriate policies in place

***Objective 6.*** Reduce vulture mortality caused by energy infrastructure through collisions
**Indicator:** Mortalities through collisions on energy infrastructure is reduced to acceptable levels by 2027

**Means of verification:** Mortality databases; proper planning and routing of new networks; appropriate policies in place

***Objective 7.*** Ensure availability of poison-free food for vultures
**Indicator:** By 2027, no measurable negative impact on productivity and vulture populations due to lack of food
**Means of verification:** Breeding success and overall survival within vulture populations of all species within the range

***Objective 8.*** Ensure availability of suitable habitat for vultures to nest and forage
**Indicator:** All known breeding sites for vultures are known and appropriately protected by 2027; rangeland provide adequate foraging habitat for vultures
**Means of verification:** Breeding success and overall survival within vulture populations of all species within the range

***Objective 9:*** Reduce direct persecution and disturbance of vultures caused by human activities
**Indicator:** Incidents of direct persecution is halted and disturbance of vultures is reduced to reduce impact to acceptable levels in 2027
**Means of verification:** Effective measures in place and enforced, improved breeding success at previously affected sites

***Objective 10:*** Support vulture conservation through cross-cutting actions enabling mitigation of most or all threats
**Indicator:** Ten Endangered and Critically Endangered Old World Vultures listed on CMS Appendix I; Need for the conservation of vultures is acknowledged and reflected in legislation and policies by all Parties within the MsAP range by 2027
**Means of verification:** Legislation and policies in place and resources made available in MsAP range countries to ensure that these are enforced

### 7.4. Actions, priorities, timescale and responsibilities

Table 8 reflects the results and actions per objective discussed and agreed on during the regional workshops and is also supported by a range of documents such as the SAVE Blueprint, Species and Flyway Action Plans and others listed in Annex 4. The table also provides an overall priority for each action, a suggested timeframe for the implementation thereof as well as an indication of the various sub-regions according to the overarching threats map (Fig. 3) for which the suggested actions are approprate.

**Table 8**. Conservation actions for African-Eurasian vultures, according to each objective.

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Objective 1. Halt the illegal use of toxic chemicals and substances which unintentionally kill vultures** | | | | | | | | | | | | | |
| **Result 1.1: Improved understanding and awareness of human-wildlife conflict and its impacts on vultures informs more effective mitigation approaches** | Conduct overall situation analysis of wildlife poisoning associated with human-wildlife conflict, with special attention to vulture mortality: state of knowledge, poisons used (actually or potentially), hotspots, knowledge gaps and best practice on reducing conflict and related poisoning | Research & Monitoring | 1-3 yr | High | NGOs, Universities, Research Institutions, Government | x | x | x | x | | x | x | x |
| | Identify key drivers behind human-wildlife conflict affecting vultures through socio-economic study | Research & Monitoring | 1-3 yr | High | NGOs, Universities, Research Institutions | | | x | x | | X | x | x |
| | Implement awareness campaigns on (1) negative impacts on vultures and other non-target species, (2) likely ineffectiveness of poisoning as a problem animal control technique, (3) human and livestock health impact of poisoning, and (4) legal alternative options for mitigation of human-wildlife conflict. Targets: general public, pastoral and farming communities | Education & Awareness | 1-5 yr | High | Government and NGOs, PPWG | x | x | x | x | x | X | | x |
| **Result 1.2 Conservation** | Promote improved livestock management techniques, | Action | 1-3 yr | Medium | National and | | x | x | x | | x | | x |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **authorities, local communities and others take collaborative action to tackle human-animal conflict that causes vulture mortality** | and legal, poison-free alternatives to problem animal control and mitigating human-wildlife conflict e.g. improved livestock corralling and crop protection | | | | local authorities, Ministries concerned with livestock | | | | | | | | |
| | Train and support conservation staff to rapidly respond to poisoning incidents | Action | 1-5 yr | High | Government and NGOs | | x | x | x | | x | | x |
| | Improve Protected Area management to prevent poisoning incidents in and around the park boundaries (buffers around protected areas and better enforcement of park boundary integrity), encouraging local communities to form or join local wildlife stewardship programmes | Action | 7-10 yr | High | National and local authorities | | x | x | x | | x | | x |
| | Use supplementary feeding sites ('vulture restaurants') to provide poison-free food in safe areas | Action | 1-10 yr | Medium | NGO, national and local authorities | | | x | x | | | | x |
| | Review, improve and, where needed, implement and compensation schemes for vulnerable local communities in response to depredation of livestock by wildlife | Action | 1-5 yr | Medium | Park or Protected Area Management Authorities | | x | x | x | x | x | | x |
| | Improve benefit-sharing of conservation revenue from protected areas with local communities to increase the benefits derived from wildlife | Action | 1-5 yr | Medium | Park or Protected Area Management Authorities | | x | x | x | | | | x |
| | Increase capacity and resources of local wildlife and law enforcement authorities to respond to human-wildlife conflict incidents rapidly and effectively | Action | 1-3 yr | High | National government, local wildlife | | x | x | x | x | x | | x |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | authorities | | | | | | | | |
| | Secure adequate toxicological screening (protocols, etc) | Research & Monitoring | 1-3 years | High | Governments (with NGO support) | x | x | x | x | x | x | | x |
| | Engage agrochemical producers to investigate methods to repel non-target species from consuming poisons | Action | 1-5 yr | Medium | NGO, national and local authorities | | x | x | x | | | | |
| | Collect data by of poisoning incidents in national, regional and overall database | Research & Monitoring | 1-3 years | High | Governments | x | x | x | x | x | x | x | x |
| **Result 1.3 Legal and policy measures respond to causes and impact of human-animal conflict on vultures, and are enforced** | Review, develop and enforce appropriate legislation to control, ban or restrict the sale, storage, distribution, use and disposal of toxic chemicals used in the indiscriminate killing of wildlife | Policy & Legislation | 1-10 yr | Medium | National and local authorities, PPWG | x | x | x | x | x | x | | x |
| | Review, introduce and enforce strict penalties for illegal wildlife poisoning acts, sufficient to deter future poisoning | Policy & Legislation | 1-5 yr | High | National and local authorities, PPWG | x | x | x | x | x | x | | x |
| | Use conventions (CMS + Bern-Tunis Action Plan) to pressure governments to follow/implement the guidelines | Policy & Legislation | 1-3 years | High | Governments | x | x | x | x | x | x | x | x |
| **Result 1.4 Mortality of vultures from vermin (e.g. rats and feral dogs) control operations is eliminated** | Investigate safe alternatives to using poisons for vermin control | Research & Monitoring | 1-5 yr | High | Government | x | x | x | x | x | x | | |
| | Based on Preventing Poisoning guidelines, develop protocols for vermin control to avoid secondary poisoning at all stages including carcass disposal, using lessons from other regions | Research & Monitoring | 1-5 yr | Medium | Government, PPWG | x | x | x | x | x | x | | x |
| | Promote poison-free methods of vermin control e.g. sterilisation and vaccination programmes for feral dog | Education & Awareness | 10-Jan | Medium | Government and NGOs, | x | x | x | x | x | x | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | control | | | | PPWG | | | | | | | | |
| | Conduct awareness raising activities on secondary poisoning (including public health) from vermin control: risks and their avoidance or mitigation | Education & Awareness | 1-10 yr | High | Government and NGOs, PPWG | x | x | x | x | x | x | x | x |
| | Improve waste management to benefit vultures | Action | 7-10 years | High | Municipalities, local government | | | | | x | x | | |
| | Ensure that vermin control follows guidelines | Action | 1-10 yr | Medium | Government and NGOs | x | x | x | x | x | x | | x |
| **Result 1.5. Investigate and where appropriate develop mitigation measures for other forms of poisoning affecting vultures** | Identify sources of lead and impacts of lead poisoning and other heavy metal contamination on vulture populations, and identify mitigation measures | Research & Monitoring | 1-5 yr | Medium | NGOs, Universities, Research Institutions, Government | | | x | x | | | | x |
| | Regular heavy metal/biocide screening in vultures | Research & Monitoring | 1-3 years | High | NGOs | | | | | x | | | |
| | Advocate for policy, legislation and action to reduce known risks of lead poisoning to humans and wildlife | Policy & Legislation | 1-10 yr | Medium | NGOs, Universities, Research Institutions, Government | | | x | x | | | | |
| | Develop and implement strategies dependent on research and monitoring on heavy metals | Action | 1-5 yr | Medium | NGOs, Universities, Research Institutions, Government | | | x | x | | | | |
| | Adequate screening of lead ammunition | Research & Monitoring | 1-3 years | High | Researchers/Universities/NG | | | | | | | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | O/Governments | | | | | | | | |
| | Awareness raising among hunters - campaign | Education & Awareness | 1-3 years | High | NGO/Hunters | | | | | | | | |
| | Ban lead ammunition in the EU | Policy & Legislation | 1-3 years | High | European commision/Governements | | | | | x | x | | |
| | Promote voluntary bans across the MsAP | Action | 1-3 years | High | NGO/Hunters | x | x | x | x | x | x | x | x |
| **Objective 2. Reduce mortality of vultures by NSAIDS, reduce occurrence of toxic NSAIDS, and ensure recognition of the threat of NSAIDS across Asia and world-wide** | | | | | | | | | | | | | |
| **Result 2.1 Advocacy, awareness raising and regulation of veterinary NSAID use at national levels** | Limit future use of Diclofenac as a veterinary drug in all vulture Range States | Policy & Legislation | 1-3 yrs | High | Government (Health & Env Ministries) | x | x | x | x | x | | x | X |
| | Uphold existing ban (achieve removal from markets) of multi-dose vials of diclofenac intended for human medicine in India | Policy & Legislation | 1-5 yr | High | Govt (Health & Envt Ministries), NGOs, RSC, SAVE. | | | | | | | x | |
| | Secure bans on veterinary use of ketoprofen and aceclofenac across S Asia | Policy & Legislation | 1-2 yr | High | Govt (Health & Envt Ministries), NGOs, RSC, SAVE. | | | | | | | x | |
| | Establish procedures in India, Nepal, Bangadesh and Pakistan to identify and ban veterinary drugs hazardous to vultures | Action | 1-5 yr | High | NGOs, Govt, SAVE | | | | | | | x | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Establish procedures to withold approval for veterinary use of drugs with unknown effects on vultures | Action | 1-5 yr | High | NGOs, Govt, SAVE | | | | | | | x | x |
| | Carry out robust safety testing and approval process to identify NSAIDs that are safe for vultures (currently meloxicam is the only such drug) | Action | 1-10 yr | High | NGOs, Govt (IVRI), SAVE | | | | | x | | x | |
| | Prevent negative effects of veterinary drugs on wild vultures through pharmacovigilance and regulation | Policy & Legislation | 1-10 yr | High | NGOs, Govt (IVRI), SAVE | | | | | x | | x | |
| | Establish alert system to identify potentially dangerous veterinary drugs, based on use levels from pharmacy surveys, cattle carcass analysis and drug safety testing results | Action | 1-2 yr | High | NGOs, Govt (IVRI), SAVE | x | x | x | x | x | | x | x |
| | Improve availability of more effective meloxicam formulations to facilitate uptake by veterinary practioners | Action | 1-10 yr | Medium | Pharma Industry, NGOs, Govt (Livestock) | | | | | | | x | |
| **Result 2.2 Restore vulture populations in Vulture Safe Zones** | Maintain and review VSZs in India, Nepal and Pakistan | Action | 1-5 yr | Medium | NGOs, regional Govts, SAVE | | | | | | | x | |
| | Promote development and implemenation of new VSZs through identification, selection of provisional Vulture Safe Zones (pVSZs) , with a view to conversion to 'full' VSZs | Education & Awareness | 1-5 yr | Medium | SAVE | | | | | | | x | |
| | Undertake capacity-building and local advocacy for pVSZs and VSZs | Education & Awareness | 1-5 yr | Medium | NGOs, SAVE | | | | | | | x | |
| | Continue conservation breeding of *Gyps* vultures at recognised breeding stations in S Asia | Action | 1-10 yr | High | Govt, (Federal & State, CZA) NGOs, SAVE | | | | | | | x | |
| | Release captive-bred, and where appropriate (Nepal) | Action | 1-10 yr | High | Govt, (Federal | | | | | | | x | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | wild-taken, vultures in VSZs | | | | & State, CZA) NGOs, SAVE | | | | | | | | |
| | Carry out livestock management and husbandry training and offer free veterinary camps in pVSZs and VSZs | Action | 1-5 yr | Medium | NGO, Provincial Govt. | | | | | | | x | |
| | Support or develop community-led vulture-based tourism in pVSZs and VSZs in Nepal (and in Pakistan local tourists only) | Education & Awareness | 1-5 yr | Medium | NGOs, Private tourism enterprise | | | | | | | x | x |
| **Result 2.3 Monitor Vulture Safe Zones** | Monitor wild vulture populations and breeding success in pVSZs and VSZs across S Asia | Research & Monitoring | 1-10 yr | High | NGO, state Govt, SAVE | | | | | | | x | |
| | Monitor survival and causes of death of wild and released vultures with satellite tags (GPS PTTs) in pVSZs and VSZs across S Asia | Research & Monitoring | 1-10 yr | High | NGO, State Govt, SAVE | | | | | | | x | |
| | Monitor availability of NSAIDs for veterinary use in pVSZs and VSZs across S Asia | Research & Monitoring | 1-10 yr | High | NGO, State Govt, SAVE | | | | | | | x | |
| | Develop method for satellite tracking of vultures and corpse recovery | Research & Monitoring | 1-2 yr | High | NGOs, SAVE | | | | | | | x | |
| **Result 2.4 Monitor national efforts to reduce NSAID impacts, and investigate issues identified** | Continue vulture population monitoring in S Asia through road transect surveys and other approaches | Research & Monitoring | 1-10 yr | High | NGOs, Govt, SAVE | | | | | | | x | |
| | Monitor of causes of death and NSAID contamination of ungulate carcasses | Research & Monitoring | 1-10 yr | High | NGOs, Govt, SAVE | | | | | | | x | |
| | Monitor availability of NSAIDs for veterinary use in pharmacies and other outlets outside VSZs | Research & Monitoring | 1-10 yr | High | NGOs, Govt, SAVE | | | | | | | x | |
| | Monitor sales of veterinary drugs at key sites | Research & Monitoring | 1-10 yr | High | NGOs, Govt, SAVE | | | | | | | x | |
| | Investigate factors affecting use of vulture-safe NSAIDs | Action | 1-5 yr | High | NGOs, SAVE | | | | | | | x | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | by veterinarians, paravets and livestock owners | | | | | | | | | | | | |
| | Assess use of veterinary NSAIDs in the livestock industry and any impacts on vultures | Research & Monitoring | 1-3 yr | High | NGOs, Universities, Research Institutions, Government | x | x | x | x | | x | x | |
| | Develop a Rapid-reaction Kit to be used in responding to suspected cases | Action | 4-6 years | High | Researchers/Universities | | | | | x | | | |
| | Develop guidelines for and adoption of good risk assessment | Action | 1-6 years | High | Industry/NGO/Governments | | | | | x | x | | |
| | Ban Diclofenac and other eventual toxic substances MsAP range | Action | 1-3 years | High | European commision/Governements | x | x | x | x | x | x | | x |
| | Awareness raising - veterinarians and potential consumers across the range | Education & Awareness | 1-3 years | High | NGOs | x | x | x | x | x | x | | x |
| **Objective 3. Reduce and eventually halt the trade in vulture parts for belief-based use, especially through poisoning** | | | | | | | | | | | | | |
| **Result 3.1: Improved understanding of the trade in vultures and their parts informs improved conservation approaches** | Conduct overall situation analysis on belief-based use of vultures and their body parts, to include: current state of knowledge, best practices for tackling the trade, body parts used, market turnover rates, how vultures are acquired, key markets, socio-economic drivers of the trade | Research & Monitoring | 1-5 yr | High | NGOs, Universities, Research Institutions | | x | x | x | | | | x |
| | Assess policies, laws and regulations governing the use, sale, distribution and disposal of poisons and illegal use of agro-chemicals used to poison wildlife, especially vultures, for belief-based use | Research & Monitoring | 1-3 yr | High | NGOs, Universities, Research Institutions, governments | | x | x | x | | | | |
| | Investigate and test best practices to eliminate the trade | Research & | 1-5 yr | High | CITES, CMS | | x | x | x | | | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | in vulture parts for belief-based uses | Monitoring | | | | | | | | | | | |
| | Identify poisons used to kill vultures for belief-based use, through lab analysis of residues | Research & Monitoring | 1-3 yr | Medium | NGOs, Universities, Research Institutions | | x | x | x | | | | |
| | Investigate population effects on vultures of trade in body parts for belief-based use | Research & Monitoring | 1-5 yr | High | NGOs, Universities, Research Institutions | | x | x | x | | | | |
| | Identify human health impacts of use and consumption of vulture body parts for belief-based use | Research & Monitoring | 1-5 yr | High | Government health department and private healthcare providers | | x | x | x | | | | |
| | Develop and implement regular, standardised monitoring protocol for trade in vulture body parts at national border posts and at key markets through surveys and police customs controls | Research & Monitoring | 1-3 yr | Medium | Government, NGOs, CITES | | x | x | x | | | | |
| | Set up and manage a database to record all belief-based use trade information | Research & Monitoring | 1-3 yr | Medium | Government, NGOs | | x | x | x | | | | |
| **Result 3.2 Governments, local communities and other stakeholders understand scale and impact of trade in and belief-based use of vulture body parts** | Present and discuss research and monitoring results on belief-based use of vultures with relevant Government departments (e.g. Environment, Agriculture, Health) and other stakeholders to agree appropriate national actions | Education & Awareness | 1-5 yr | High | NGOs, Universities, Research Institutions, Government, religious leaders, conventional | | x | x | x | | | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | medical community, local leaders, traditional healers, consumers | | | | | | | | |
| | Implement multi-media awareness campaigns to highlight negative (human health and ecological) impacts of belief-based use of vulture body parts; target public (especially suppliers, traditional healers, religious leaders, consumers and youth), using research results | Education & Awareness | 1-10 yr | High | National and Local Government, NGOs | | x | x | x | | | | |
| **Result 3.3 All appropriate policy instruments and legal measures are established and/or aligned to reduce belief-based use of vulture body parts** | Train customs and law enforcement officers to identify vultures and their body parts to enable effective confiscation and enforcement actions, particularly at borders | Action | 1-5 yr | High | Government, NGOs | | x | x | x | | | | |
| | Reduce reliance on traditional healers by promoting and improving access to conventional medicine: support mobile clinics in rural and remote areas in areas with known belief-based use | Action | 1-5 yr | Medium | Government, Health care practitioners | | x | x | x | | | | |
| | Implement CMS guidelines to prevent the risk of poisoning on migratory birds | Policy & Legislation | 1-5 yr | Medium | Government | | x | x | x | | | | |
| | Engage with CITES and put forward a proposal to uplist all threatened African vulture species to Appendix I of CITES | Policy & Legislation | 1-5 yr | Medium | Government | | x | x | x | | | | |
| **Objective 4. Reduce or halt declines in vulture populations associated with sentinel poisoning by poachers** | | | | | | | | | | | | | |
| **Result 4.1 Barriers to prosecuting offenders of** | Review existing policy and legislation to identify barriers to successful prosecution of wildlife crime offenders | Research & Monitoring | 1-3 yr | High | NGOs, Universities, | | | | x | | | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
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| **wildlife crime are understood** | | | | | Research Institutions, Government - Judiciary | | | | | | | | |
| **Result 4.2 Information on sentinel poisoning incidents is properly collected, managed and shared** | Develop new, or support existing, poisoning- and poaching-related databases, and link them where possible and appropriate | Research & Monitoring | 1-10 yr | High | NGOs, Universities, Research Institutions, Government; IUCN SSC VSG | | | | x | | | | |
| | Confirm or identify poaching hotspots (especially of elephants) | Research & Monitoring | 1-3 yr | Medium | NGOs, Universities, Research Institutions | | | | x | | | | |
| **Result 4.3 Governments, local communities and other stakeholders understand scale and impact of sentinel poisoning** | Raise awareness of law enforcement, judiciary and public through targeted campaigns on the link between elephant and bushmeat poaching and vulture declines | Education & Awareness | 1-5 yr | High | Government, Wildlife Authorities, NGOs | | | | x | | | | |
| **Result 4.4 Conservation authorities, communities and others take collaborative action to respond to or prevent poisoning incidents** | Expand poisoning response training programmes to support conservation staff to rapidly respond to poisoning incidents | Action | 1-10 yr | High | NGOs, national and local government | | | | x | | | | |
| | Identify and provide effective sustainable (alternative) livelihoods to encourage people to move away from poaching (e.g. recruit poachers into law enforcement) | Action | 1-5 yr | Medium | Government, NGOs | | | | x | | | | |
| | Enhance capacity to sample and analyse poisons used in | Action | 1-5 yr | Medium | Government, | | | | x | | | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | elephant and bushmeat poaching among relevant national institutions | | | | Laboratories, research institutions and NGOs | | | | | | | | |
| | Increase capacity and resources for effective law enforcement to tackle elephant and bushmeat poaching within Protected Areas | Action | 1-10 yr | High | Wildlife authorities, Police service | | | | x | | | | |
| | Enhance networking and coordination between initiatives on vulture conservation and preventing elephant poaching between conservation practitioners, researchers, Governments and elephant anti-poaching groups | Action | 1-10 yr | High | NGOs, Government, IUCN, linkage to MIKE, IUCN SSG Elephant, Rhino and Vulture Specialist Groups, CITES. | | | | x | | | | |
| **Result 4.5 Legal and policy measures respond to causes and impact of poaching on vultures and are enforced** | Introduce and enforce severe penalties on those found guilty of carrying out illegal wildlife poisoning events, treating those that impact on vultures and on other fauna with equal seriousness | Policy & Legislation | 1-5 yr | High | Government | | | | x | | | | |
| | Develop and enforce legislation to control, ban or restrict the sale, storage, distribution, use and disposal of toxic chemicals used in elephant and bushmeat poaching | Policy & Legislation | 1-5 yr | Medium | Government | | | | x | | | | |
| | Work with CITES Secretariat and Parties to propose listing vultures on CITES Appendix I | Policy & Legislation | 1-5 yr | Medium | CITES, Government, NGOs | | | | x | | | | |
| **Objective 5. Reduce vulture mortality caused by electrocutions linked to energy transmission infrastructure** | | | | | | | | | | | | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
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| **Result 5.1 Current vulture mortality and sensitivity in relation to electrocution understood, including population impacts, hotspots and improved designs** | Determine baseline impact electrocution with energy infrastructure at appropriate levels (e.g. total population, subregion, country or subnational) for each species | Research & Monitoring | 1-10 yr | High | NGOs, Universities, Research Institutions | x | x | x | x | x | x | x | x |
| | Complete sensitivity mapping for priority areas adding to existing analyses (e.g. Red Sea flyway) to identify areas where energy infrastructure poses greatest electrocution risks to vultures; combine tracking data, site prioritisation (IBAs), vulture counts and other sources | Research & Monitoring | 1-3 yr | High | African Union, IUCN, BirdLife, Banks, Energy companies, ARDB, EWT, Movebank | x | x | x | x | x | x | x | |
| | Conduct long-term post-construction monitoring of electrocution impacts of energy infrastructure | Research & Monitoring | 1-10 yr | High | Private sector, national or local government | x | x | x | x | | x | | |
| **Result 5.2 Public and private sector support and promote adoption of vulture-friendly energy infrastructure** | Increase awareness of risks to vultures from energy infrastructure and promote tested mitigation methods to private sector, Government agencies and general public | Education & Awareness | 1-5 yr | High | NGOs, Government, electricity utility companies | x | x | x | x | x | x | x | x |
| | Promote bird-friendly energy technology as set out in CMS guidelines on energy infrastructure (*Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the African-Eurasian Region*; draft *Renewable Energy Technologies and Migratory Species: Guidelines for Sustainable Deployment*) | Action | 1-5 yr | High | Donors, NGOs, Government | x | x | x | x | x | x | x | x |
| | Develop a Pan-African Energy Task Force probably as a subgroup of the CMS Energy Task Force and energy developers operating in Africa to ensure risk to vultures from energy infrastructure is minimised | Action | 1-3 yr | High | CMS Energy Task Force, CMS Government | x | x | x | x | | | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | focal points and energy developers, NGOs | | | | | | | | |
| | Develop and promote locally appropriate guidance (e.g. formal guidelines, business plan booklet) based on existing guidelines on bird-friendly energy infrastructure | Action | 1-3 yr | Medium | Universities, electricity utility companies, NGOs | x | x | x | x | | x | | |
| | Develop cost-benefit model to reflect advantage of being proactive and implement retrofitting. | Action | 1-3 yr | High | Utilities, Energy Department, Environment Agency | x | x | x | x | x | x | x | X |
| | Engage with donors of large energy infrastructure developments to include safeguards ensuring bird-friendly technology and allocation of project resources to long-term monitoring | Policy & Legislation | 1-5 yr | High | Donors, NGOs, Government | x | x | x | x | | x | | |
| | Advocate adoption of by correct minimum standards by Power Africa initiative | Policy & Legislation | 1-10 yr | High | NGOs, Government, Donors (USAID) | x | x | x | x | | x | | |
| | Create, or identify existing, national energy associations and engage them to support vulture-friendly power grids both pre- and post- construction | Policy & Legislation | 1-3 yr | High | Energy companies, government, NGOs | x | x | x | x | | x | | |
| | Integrate guidance into policy and legislation that ensures all future energy infrastructure adopts bird-friendly technologies and designs, and enforces phasing- | Policy & Legislation | 1-5 yr | Medium | Government, NGOs | x | x | x | x | x | x | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
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| | out of old risk-prone technologies | | | | | | | | | | | | |
| **Result 5.3 Energy infrastructure (electricity power grids) impacts on vultures are reduced by implementation of improved designs** | Promotion/review of existing legislation/regulations national and international | Policy & Legislation | 1-3 years | Medium | Governments and NGO's | x | x | x | x | x | x | x | x |
| | Implement CMS guidelines on energy infrastructure in new projects | Action | 1-5 yr | Medium | Government, energy companies | x | x | x | x | x | x | x | x |
| | For existing energy infrastructure, implement CMS guidelines by phasing out energy infrastructure designs that pose electrocution risk to vultures and other birds, and advocate retro-fitting with known bird-friendly designs within current maintenance schedules | Action | 1-10 yr | High | Government, energy companies, NGO's, CMS | x | x | x | x | x | x | | |
| | Ensure full implementation of mitigation measures in Protected Area and Natura 2000 sites | Policy & Legislation | 1-3 years | High | Governments/ public bodies | | | | | x | x | | |
| | Improve planning of routing and construction of new power lines. Promote the use of undergound options where appropriate. | Education & Awareness | 1-6 years | High | Companies/NGO's/Governments | | | | | x | x | | |
| | Definition and implemention of standard protocol for data collection | Action | 1-3 years | High | Researchers/Companies | x | x | x | | x | x | x | x |
| | Increase monitoring of power-lines including assessing efectiveness of mitigation measures | Research & Monitoring | 4-6 years | Medium | Public officials and ideally companies | x | x | x | x | x | x | x | x |
| | Ensure maintenance of anti-electrocution measures | Policy & Legislation | 4-6 years | High | Energy Companies | x | x | x | x | x | x | x | x |
| | Conduct training and capacity building to support implementation of guidelines | Action | 1-5 yr | Medium | Government, energy companies, NGO's, CMS | x | x | x | x | x | X | | |
| | Design and implement a minimum standards and | Action | 1-5 yr | High | Energy | x | x | x | x | | x | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | monitoring framework for all vulture satellite tracking data | | | | companies, government, NGOs | | | | | | | | |
| | Ensure all international and national guidelines on energy infrastructure incorporate adequate criteria regarding routing of future lines | Policy & Legislation | 1-5 yr | High | Energy companies, government, NGOs, CMS | x | x | x | x | x | x | | |
| | Capacity building on legislation/regulation implementation for public officers | Education & Awareness | 1-6 years | High | Private sector/ NGO's/ Legal (prossecuters) | | | | | x | x | | |
| **Objective 6. Reduce vulture mortality caused by collisions linked to energy transmission infrastructure** | | | | | | | | | | | | | |
| **Result 6.1 Current vulture mortality and sensitivity in relation to collision understood, including population impacts, hotspots and improved designs** | Determine baseline impact of collisions and electrocution with energy infrastructure at appropriate levels (e.g. total population, subregion, country or subnational) for each species | Research & Monitoring | 1-10 yr | High | NGOs, Universities, Research Institutions | x | x | x | x | x | X | x | x |
| | Complete sensitivity mapping for priority areas adding to existing analyses (e.g. Red Sea flyway) to identify areas where energy infrastructure poses greatest collision risks to vultures; combine tracking data, site prioritisation (IBAs), vulture counts and other sources | Research & Monitoring | 1-3 yr | High | African Union, IUCN, BirdLife, Banks, Energy companies, ARDB, EWT, Movebank | x | x | x | x | x | x | x | |
| | Conduct long-term post-construction monitoring of collision impacts of energy infrastructure R&I | Research & Monitoring | 1-10 yr | High | Private sector, national or local government | x | x | x | x | | x | | |
| **Result 6.2 Public and private sector support and promote adoption** | Increase awareness of risks to vultures from energy infrastructure and promote tested mitigation methods to private sector, Government agencies and general | Education & Awareness | 1-5 yr | High | NGOs, Government, electricity | x | x | x | x | x | x | x | x |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **of vulture-friendly energy infrastructure** | public | | | | utility companies | | | | | | | | |
| | Promote bird-friendly energy technology as set out in CMS guidelines on energy infrastructure (*Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the African-Eurasian Region*; draft *Renewable Energy Technologies and Migratory Species: Guidelines for Sustainable Deployment*) AGT | Action | 1-5 yr | High | Donors, NGOs, Government | x | x | x | x | x | x | x | x |
| | Develop a Pan-African Energy Task Force probably as a subgroup of the CMS Energy Task Force and energy developers operating in Africa to ensure risk to vultures from energy infrastructure is minimised | Action | 1-3 yr | High | CMS Energy Task Force, CMS Government focal points and energy developers, NGOs | x | x | x | x | | | | |
| | Develop cost-benefit model to reflect advantage of being proactive and implement mitigation. | Action | 1-3 yr | High | Utilities, Energy Department, Environment Agency | x | x | x | x | x | x | x | x |
| | Develop and promote locally appropriate guidance (e.g. formal guidelines, business plan booklet) based on existing guidelines on bird-friendly energy infrastructure | Action | 1-3 yr | Medium | Universities, electricity utility companies, NGOs | x | x | x | x | | x | | |
| | Engage with donors of large energy infrastructure developments to include safeguards ensuring bird-friendly technology and allocation of project resources | Policy & Legislation | 1-5 yr | High | Donors, NGOs, Government | x | x | x | x | | x | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | to long-term monitoring | | | | | | | | | | | | |
| | Advocate adoption of by correct minimum standards energy utilities and developers | Policy & Legislation | 1-10 yr | High | NGOs, Government, Donors (USAID) | x | x | x | x | x | x | x | x |
| | Create, or identify existing, national energy associations and engage them to support vulture-friendly power grids both pre- and post- construction | Policy & Legislation | 1-3 yr | High | Energy companies, government, NGOs | x | x | x | x | | x | | |
| | Integrate guidance into policy and legislation that ensures all future energy infrastructure adopts bird-friendly technologies and designs, and enforces phasing-out of old risk-prone technologies | Policy & Legislation | 1-5 yr | Medium | Government, NGOs | x | x | x | x | x | x | | |
| **Result 6.3 Energy infrastructure (electricity power grids) impacts on vultures are reduced by implementation of improved designs** | Promotion/review of existing legislation/regulations national and international | Policy & Legislation | 1-3 years | Medium | Governments and NGO's | x | x | x | x | x | x | x | x |
| | Implement CMS guidelines on energy infrastructure in new projects | Action | 1-5 yr | Medium | Government, energy companies | x | x | x | x | x | x | x | x |
| | For existing energy infrastructure, implement CMS guidelines by phasing out energy infrastructure designs that pose collision risk to vultures and other birds | Action | 1-10 yr | High | Government, energy companies, NGO's, CMS | x | x | x | x | x | x | | |
| | Ensure full implementation of mitigation measures in Protected Area and Natura 2000 sites | Policy & Legislation | 1-3 years | High | Governments/ public bodies | | | | | x | x | | |
| | Improve planning of routing and construction of new power lines. Promote the use of undergoun options where appropriate. | Education & Awareness | 1-6 years | High | Companies/NGO's/Governments | | | | | x | x | | |
| | Develop and promote the development of viable | Research & | 1-5 yr | High | Private sector, | x | x | x | x | x | x | x | x |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | alternative renewable generation technology to replace current wind-turbines, e.g. bladeless turbines. | Monitoring | | | Utility companies, Governent, NGO's | | | | | | | | |
| | Definition and implemention of standard protocol for data collection | Action | 1-3 years | High | Researchers/Companies | x | x | x | | x | x | x | x |
| | Increase monitoring of power-lines including assessing efectiveness of mitigation measures | Research & Monitoring | 4-6 years | Medium | Public officials and ideally companies | x | x | x | x | x | x | x | x |
| | Ensure maintenance of anti-electrocution measures | Policy & Legislation | 4-6 years | High | Energy Companies | x | x | x | x | x | x | x | x |
| | Conduct training and capacity building to support implementation of guidelines | Action | 1-5 yr | Medium | Government, energy companies, NGO's, CMS | x | x | x | x | x | x | x | |
| | Design and implement a minimum standards and monitoring framework for all vulture satellite tracking data | Action | 1-5 yr | High | Energy companies, government, NGOs | x | x | x | x | | | x | |
| | Ensure all international and national guidelines on energy infrastructure incorporate adequate criteria regarding routing of future lines | Policy & Legislation | 1-5 yr | High | Energy companies, government, NGOs, CMS | x | x | x | x | x | x | x | |
| | Capacity building on legislation/regulation implementation with public officers | Education & Awareness | 1-6 years | High | Private sector/ NGO's/ Legal (prossecuters) | | | | | x | x | x | |
| **Objective 7. Ensure availability of poison-free food for vultures to sustain populations** | | | | | | | | | | | | | |
| **Result 7.1 Increase** | Investigate changes in food availability for vultures at a | Research & | 1-5 yr | Medium | Research | | x | x | x | | x | X | x |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **understanding of role of food availability in vulture declines** | range of spatial scales (site level to regional level), and any resulting impacts on vulture populations | Monitoring | | | Institutions, Universities and NGOs | | | | | | | | |
| | If vulture food shortage is confirmed, identify drivers with specific reference to ungulate declines and stricter sanitation at abattoirs and refuse dumps (proposed root causes) | Research & Monitoring | 1-5 yr | High | Research Institutions, Universities and NGOs | | x | x | x | | x | x | x |
| | Develop and apply scavenger-friendly vet regulations | Action | 4-6 years | High | Veterinary and conservation/ environmental authorities | | | | | x | x | x | x |
| **Result 7.2 Where appropriate, develop and implement country-specific or more local strategies to ensure food availability** | Participate in or promote measures to restore wildlife populations in protected areas, with special attention to benefiting vultures by conserving existing wild ungulate populations and maintaining Protected Area networks; special attention to W Africa but also elsewhere e.g. Malawi. In Cambodia this also means maintaining domestic ungulate presence. | Action | 1-10 yr | Medium | Government, NGOs, Wildlife authorities | | x | x | x | | | | x |
| | Agree science-based guidance to support any supplementary feeding strategies (e.g. vulture restaurants) | Action | 1-3 yr | High | Government, NGOs, Wildlife authorities | | x | x | x | | | | |
| | Ensure resources to cover operational costs for sites for 5-10 years | Action | 1-3 years | High | Conservation and vet authorities | | | | | x | | | |
| | Develop clear goals/methods for supplementary feeding programs | Action | 1-3 years | High | Conservation and vet authorities | | | | x | x | X | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Training & capacity building in the management of sites | Education & Awareness | 4-6 years | High | Conservation and vet authorities | | | | | x | X | | |
| | Monitoring and information exchange between sites | Research & Monitoring | 4-6 years | High | Conservation and vet authorities | | | | x | x | | | |
| | Promote appropriate traditional livestock management practices (e.g. livestock carcass 'abandonment' and NSAID-free treatments for livestock) | Action | 1-5 yr | High | Farmers, livestock departments, NGOs | x | x | x | x | x | x | | x |
| | Develop vulture-safe (poison-free) systems for provision of carrion from abattoirs; test, document and promote successful approaches | Action | 1-5 yr | Medium | Abattoir managers, NGOs | | x | x | x | | x | | |
| **Objective 8. Ensure availability of suitable habitat for vultures to nest and forage** | | | | | | | | | | | | | |
| **Result 8.1 Nest trees used by vultures conserved** | Investigate nest tree use by vultures and identify key nesting areas (where not known) – working with local communities to show importance | Research & Monitoring | 1-5 yr | Low | Research Institutions, Universities and NGOs | | x | x | x | | x | | x |
| | Assess nest tree availability in relation to tree loss and other variables (e.g. changes over time, Protected Area boundaries, land use, human use, elephants, fire) | Research & Monitoring | 1-5 yr | Low | Research Institutions, Universities and NGOs | | x | x | x | | x | | x |
| | Promote recognition and conservation of remnant/important trees in key places e.g. in urban areas: including encouraging/recognising local ownership or shared rights; including those not yet fully grown | Education & Awareness | 1-3 yr | Medium | Government, NGOs, Wildlife authorities, local communities | | x | x | x | | x | | |
| | Establish reforestation schemes to reduce pressure on | Action | 1-10 yr | Low | Government, | | x | x | x | | x | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | vulture nesting trees | | | | NGOs, Wildlife authorities | | | | | | | | |
| | Minimise the impacts of human settlement expansion on vulture habitat, inter alia by use of information on impact of tree loss on nest tree availability to balance/mitigate tree loss as urban areas expand | Action | 1-10 yr | Medium | Town planners, regulatory authorities | x | x | x | x | | x | | |
| **Result 8.2 Rangelands conserved as suitable habitat for vultures** | Promote sustainable management of rangelands through holistic land (farm, mining concession etc.) management to ensure healthy rangelands for vultures e.g. cattle grazing rotation to reduce degradation | Education & Awareness | 1-10 yr | Medium | NGOs working with landowners/associations | x | x | x | x | | x | | |
| | Integrate knowledge of vulture habitat requirements into land or ecosystem management for rangelands, Protected Areas etc. | Action | 1-10 yr | Medium | NGOs working with landowners/associations | x | x | x | x | | x | | |
| | Limit access to key/sensitive/vulnerable areas for vultures | Policy & Legislation | 1-3 yr | High | Protected Area Managers, Land owners, Wildlife Authorities, Local Communities | x | x | x | x | | x | | |
| | Make vultures part of biodiversity planning and indicator systems in conservation and/or development (e.g. mining) projects | Policy & Legislation | 1-10 yr | Medium | Universities, NGOs, government, private sector e.g. mining | x | x | x | x | | x | | |
| **Objective 9: Reduce direct persecution and disturbance caused by human activities** | | | | | | | | | | | | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Result 9.2 Reduced mortality caused by direct persecution** | Improvement of legislation, policies and law enforcement | Policy & Legislation | 7-10 years | High | International and local authorities | **x** | **x** | **x** | **x** | **x** | **x** | | |
| | Increase public awereness of the drivers (public campaigns) | Education & Awareness | 7-10 years | High | NGO/media / livestock breeders / hunting assoc. | **x** | **x** | **x** | **x** | **x** | **x** | | **x** |
| | Improve capacity in law enforcement | Education & Awareness | 7-10 years | High | NGOs, national and international authorities | **x** | **x** | **x** | **x** | **x** | **x** | | |
| | Bann of taxidermy exihibtions (private collectors) | Policy & Legislation | 4-6 years | Medium | NGOs and national authorities | | | | | **x** | | | |
| **Result 9.2 Increase breeding success by reducing disturbance** | Increase public awereness of the drivers (public campaigns) causing disturbance | Education & Awareness | 7-10 years | High | International and local authorities | | | | | x | x | | x |
| | Promote the establishment of sensitivity zones around breeding cliffs and clusters (tree-nesting vultures) to reduce disturbance and prevent development | Policy & Legislation | 1-5 years | Medium | Government, Environmental authorities | x | x | x | x | x | x | | |
| | Improve security around breeding sites | Action | 7-10 years | High | NGO/media / livestock breeders / hunting assoc. | | | | | x | x | | x |
| | Improve control of development at or near breeding sites (EIA's and other relevant studies) | Action | 7-10 years | High | NGOs, national and international authorities | | | | | x | x | x | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Establish new protected ares and expand existing network of vultures area networks | Action | 4-6 years | Medium | NGOs and national authorities | | | | | x | x | | x |
| | Investigate and promote alternative options for shelter to reduce the use of trees for shade/dwelling construction | Education & Awareness | 4-6 years | Low | Environmental Agencies | | | | | | x | | |
| **Objective 10: Support vulture conservation through cross-cutting actions that may contribute to mitigation of most or all threats** | | | | | | | | | | | | | |
| **Result 10.1 Increase understanding of basic biological and ecological parameters influencing vulture populations** | Census 2017-2018 + census 2026-2027 all the 4 sp. Across the European and Middle East range and monitoring of breeding productivity | Research & Monitoring | 1-10 years | High | NGOs and Governments | | | | | x | x | | |
| | Improve knowledge of population size, distribution, trend and movements across range states for all vulture species and record data in a central/national database | Research & Monitoring | 1-5 yr | Medium | NGOs, Universities, Research Institutions, ARDB | x | x | x | x | | x | x | x |
| | Study breeding and spatial ecology of vulture species, and identify most important breeding, feeding and roosting sites for each, per country | Research & Monitoring | 1-5 yr | High | NGOs, Universities, Research Institutions, ARDB | x | x | x | x | | x | x | x |
| | Conduct a detailed assessment on the scale and impact of trade in live birds and eggs across the range of the Vulture MsAP | Research & Monitoring | 1-5 yr | Medium | Universities, Environmental Agencies, CITES | x | x | x | x | x | x | x | x |
| | Investigate the impact of climate change on behaviour, survival and productivity of vultures in range states | Research & Monitoring | 1-10 yr | Low | NGOs, Universities, Research Institutions | x | x | x | x | | x | | |

| Result | Action | Category | Time-frame | Priority | Stakeholders | North Africa | West Africa | East Africa | Southern Africa | Europe | Middle East | South Asia | SE/N/C Asia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Result 10.2 Promote environmental and socio-economic values of vultures** | Conduct a Total Economic Value (TEV) study of vultures in Africa which includes their role as indicator species, disease control agents, eco-tourism attraction etc. | Research & Monitoring | 1-3 yr | High | NGOs, Universities, Research Institutions | x | x | x | x | x | x | | |
| | Develop and implement a communications strategy and tools to promote the conservation of vultures across the flyway | Education & Awareness | 1-3 yr | High | CMS, NGO's, Governments, Media | x | x | x | x | x | x | x | x |
| | Use and support existing events such as International Vulture Awareness Day to promote the conservation of vultures globally | Education & Awareness | 1-3 yr | High | CMS, NGO's, Media, Governments | x | x | x | x | x | x | x | x |
| **Result 10.3 Promote enhanced protection of Old World Vultures in national and international legislation** | Promote listing of ten Endangered and Critically Endangeres Old World Vultures to CMS Appendix I | Policy & Legislation | 1 year | High | CMS Parties | x | x | x | x | x | x | x | x |
| | Aim to ensure that vultures are afforded legal protection in all Range States | Policy & Legislation | 1-5 yr | High | Governments | x | x | x | x | x | x | x | x |

### 7.5. Results and Action per Range Country

To further guide decision-making by range countries in terms of the implementation of appropriate actions from Table 8, the following (Table 9) gives an indication of results that would be appropriate to pursue per country based on available information obtained from the questionnaires and regional workshops.

Table 9. Suggested priority Results and Actions per range country

| Key: | |
|---|---|
| Not relevant | |
| Not known | |
| No information | |
| Needs to be assessed | |
| Low priority | |
| Medium priority | |
| High priority | |
| Critical priority | |

## Objectives and Results - Relevance per Range Country

| Country | Region | Result 1.1 | Result 1.2 | Result 1.3 | Result 1.4 | Result 1.5 | Result 2.1 | Result 2.2 | Result 2.3 | Result 2.4 | Result 3.1 | Result 3.2 | Result 3.3 | Result 4.1 | Result 4.2 | Result 4.3 | Result 4.4 | Result 4.5 | Result 5.1 | Result 5.2 | Result 5.3 | Result 6.1 | Result 6.2 | Result 6.3 | Result 7.1 | Result 7.2 | Result 8.1 | Result 8.2 | Result 9.1 | Result 9.2 | Result 10.1 | Result 10.2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Afghanistan | AS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Albania | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Algeria | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Andorra | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Angola | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Armenia | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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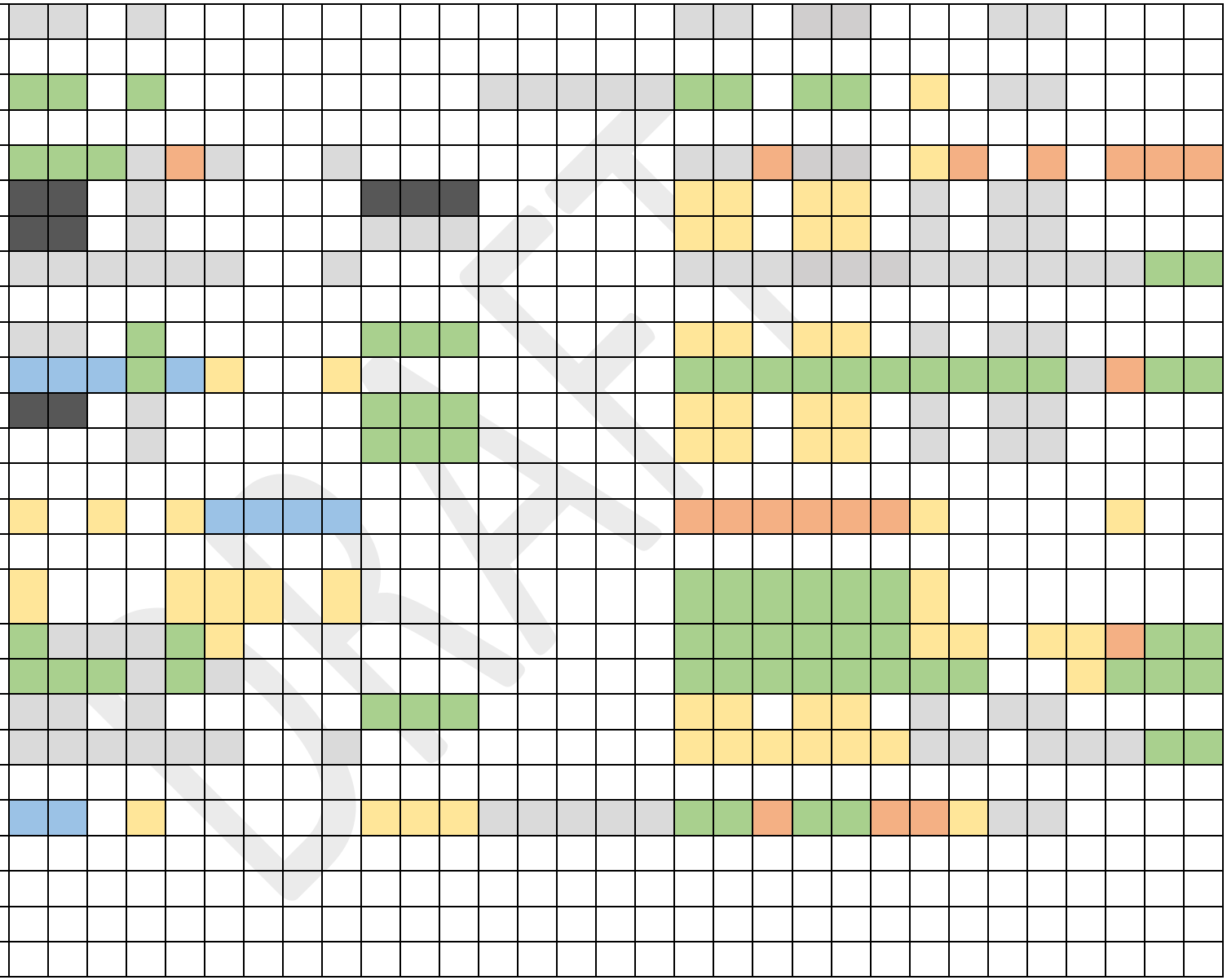
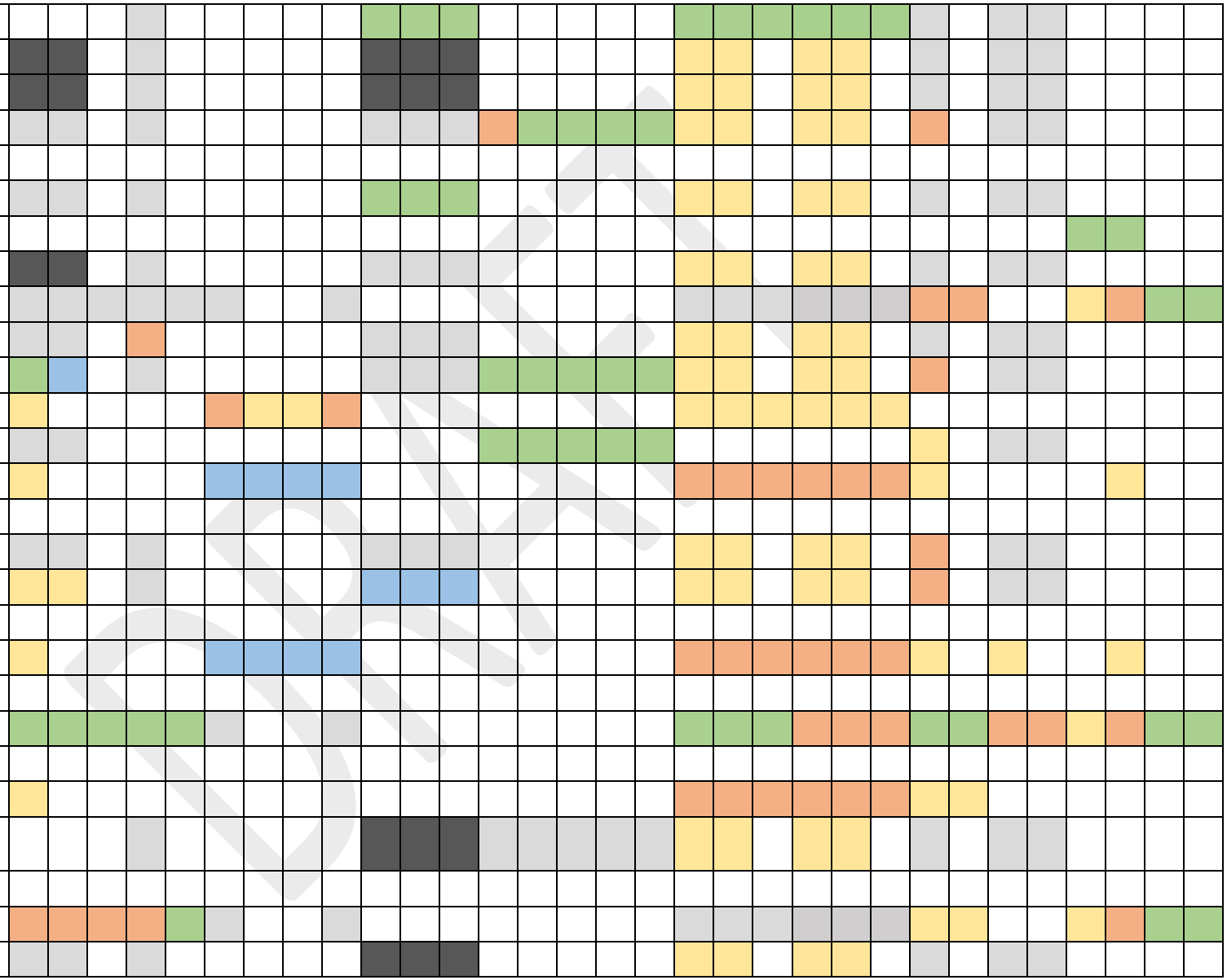
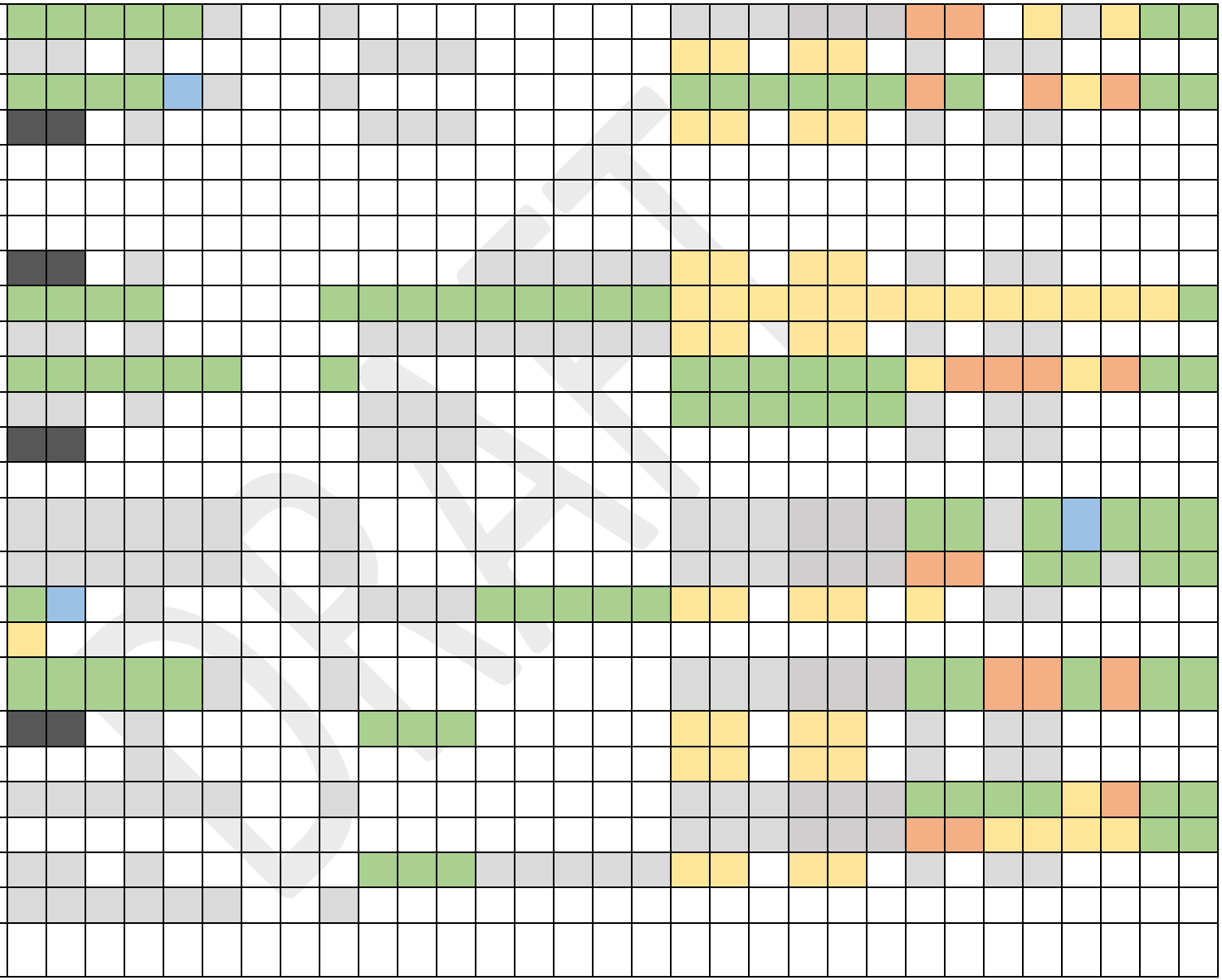
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Azerbaijan | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bangladesh | AS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Belgium | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benin | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bhutan | AS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bosnia and Herzegovina | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Botswana | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bulgaria | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Burkina Faso | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Burundi | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cambodia | AS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cameroon | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cape Verde | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Central African Republic | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chad | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Croatia | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cyprus | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Czech Republic | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Denmark | EU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Djibouti | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DPR China | AS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DPR Korea | AS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DR Congo | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Egypt | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Equatorial Guinea | AF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | |
|---|---|---|
| Eritrea | AF |  |
| Estonia | EU | |
| Ethiopia | AF | |
| Finland | EU | |
| France | EU | |
| Gabon | AF | |
| Gambia | AF | |
| Georgia | EU | |
| Germany | EU | |
| Ghana | AF | |
| Greece | EU | |
| Guinea | AF | |
| Guinea-Bissau | AF | |
| Hungary | EU | |
| India | AS | |
| Iraq | EU | |
| Islamic Republic of Iran | AS | |
| Israel | EU | |
| Italy | EU | |
| Ivory Coast | AF | |
| Jordan | EU | |
| Kazakhstan | EU | |
| Kenya | AF | |
| Kuwait | EU | |
| Kyrgyzstan | EU | |
| Lao PDR | AS | |
| Lebanon | EU | |

| | | |
|---|---|---|
| Lesotho | AF |  |
| Liberia | AF | |
| Libya | AF | |
| Malawi | AF | |
| Malaysia | AS | |
| Mali | AF | |
| Malta | EU | |
| Mauritania | AF | |
| Mongolia | AS | |
| Morocco | AF | |
| Mozambique | AF | |
| Myanmar | AS | |
| Namibia | AF | |
| Nepal | AS | |
| Netherlands | EU | |
| Niger | AF | |
| Nigeria | AF | |
| Oman | EU | |
| Pakistan | AS | |
| Poland | EU | |
| Portugal | EU | |
| Qatar | EU | |
| Republic of Korea | AS | |
| Republic of the Congo | AF | |
| Romania | EU | |
| Russia | EU | |
| Rwanda | AF | |

| | | |
|---|---|---|
| Saudi Arabia | EU |  |
| Senegal | AF | |
| Serbia | EU | |
| Sierra Leone | AF | |
| Singapore | AS | |
| Slovakia | EU | |
| Slovenia | EU | |
| Somalia | AF | |
| South Africa | AF | |
| South Sudan | AF | |
| Spain | EU | |
| Sudan | AF | |
| Swaziland | AF | |
| Switzerland | EU | |
| Syrian Arab Republic | EU | |
| Tajikistan | EU | |
| Tanzania | AF | |
| Thailand | AS | |
| The FYR of Macedonia | EU | |
| Togo | AF | |
| Tunisia | AF | |
| Turkey | EU | |
| Turkmenistan | EU | |
| Uganda | AF | |
| Ukraine | EU | |
| United Arab Emirates | EU | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **United Kingdom** | **EU** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Uzbekistan** | **EU** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Vietnam** | **AS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Western Sahara** | **AF** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Yemen** | **EU** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Zambia** | **AF** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Zimbabwe** | **AF** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

# 8. International Coordination of Action Plan Implementation

**The need for an Implementation Plan**

An implementation plan allows stakeholders in the Vulture MsAP to think through critical components required for the successful launch and running of vulture conservation initiatives before beginning, thereby saving time, energy, and money. By detailing all critical steps before starting the project, stakeholders can anticipate factors they otherwise would not consider until encountered and identify potential problems and challenges on the front end. The planning becomes proactive instead of reactive, which allows best practices to be used and ensures that energy and time are spent on implementing a high quality, well-thought-out plan. It also allows an opportunity to consider vital aspects such as international coordination, assessing the need for and securing of resources and the effective communication of the aims, objectives and actions recommended in the VMsAP to identified key stakeholder groups through and effective communications strategy.

For discussion at the overarching workshop.

Discussions to focus on:

1. Strategic Implementation Plan
    - 1.1 Collaborative Projects
    - 1.2 Synergies with existing CMS initiatives
    - 1.3 Engaging Governments in the adoption and implementation of the Plan
    - 1.4 Monitoring and Evaluation
2. Budget, Fundraising and Resource Mobilisation
3. Strategic Communications Plan
4. Priority Actions for Immediate Implementation

## 9. References

This section provides a comprehensive list of all sources used in the drafting of the VMsAP.

For African and Asian information, all sources cited in the text are listed here. (Some further completion and checking needed)


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Conservatoin of Cinereous Vulture (publication/thesis)
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Habitat and Black Vulture Habitat Management in Spain (manual)
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http://bartgeier.ch/de/uebersicht-wildbruten

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IUCN Red List (text, data, maps and more)
http://datazone.birdlife.org/species/search or http://www.iucnredlist.org/

Vultures in Romania
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## 10. ANNEXES

### Annex 1: Workshop Delegates and Other Contributors

In all tables, the Country column primarily indicates the specialist area of knowledge of the participant, but in certain cases their country of residence.

**Workshop Participants – Africa**: Dakar, Senegal, 18–21 October 2016

| Name | Affiliation | Country |
|---|---|---|
| Alfonso Godino | AMUS-Acción por el Mundo Salvaje | Spain |
| Wilfried Adjakpa | Centre for Ornithology and Environment | Benin |
| Arjun Amar | Percy Fitzpatrick Institute of Field Ornithology, University of Cape Town | South Africa |
| Andre Botha | IUCN SSC Vulture Specialist Group | South Africa |
| Ara Monadjem | University of Swaziland | Swaziland |
| Alvaro Camiña | IFG-WBG | Spain |
| Bakary Magassouba | Office Guinéen des Parcs et Réserves, Ministère de l'Environnement | Guinea |
| Beckie Garbett | Raptors Botswana | Botswana |
| Campbell Murn | The Hawk Conservancy Trust | UK |
| Chris Bowden | SAVE & RSPB | India/UK |
| Chris Kelly | Wildlife Act | South Africa |
| Clément Daboné | Universite de Ouagadougou | Burkina Faso |
| Corinne Kendall | North Carolina Zoo | USA/Tanzania |
| Darcy Ogada | The Peregrine Fund | Kenya |
| Dipali Mukherjee | BirdLife International | Ghana |
| Evan Buechley | University of Utah | Ethiopia |
| Fadzai Matsvimbo | BirdLife Zimbabwe | Zimbabwe |
| Glyn Maude | Raptors Botswana | Botswana |
| Humbu Mafumo | Department of Environmental Affairs | South Africa |
| Ian Rushworth | KwaZulu-Natal Wildlife/Bearded Vulture Task Force | South Africa |
| Japheth Roberts | Ghana Wildlife Society | Ghana |
| Jean Marc Thiollay | Ligue pour la Protection des Oiseaux | France |
| Justus Deikumah | University of Cape Coast | Ghana |
| Joseph Onoja | Nigerian Conservation Foundation | Nigeria |

| Name | Affiliation | Country |
|---|---|---|
| Kariuki Ndanganga | BirdLife International | Kenya |
| Keith Bildstein | Hawk Mountain Sanctuary | USA |
| Kerri Wolter | VulPro | South Africa |
| Lizanne Roxburgh | Endangered Wildlife Trust | South Africa |
| Romaric Serge Lokossou | Centre d'Etudes de Recherches et de Formation Forestière/Environment Ministry | Benin |
| Louis Phipps | Nottingham Trent University | UK |
| Lourens Leeuwner | Endangered Wildlife Trust | South Africa |
| Lindy Thompson | University of Kwazulu Natal | South Africa |
| Maggie Hirschauer | VulPro | South Africa |
| Masumi Gudka | BirdLife International | Kenya |
| Micheal Kibuule | Makerere University | Uganda |
| Miguel Xavier | National Institute of Biodiversity and Protected Areas Management | Angola |
| Mike McGrady | independent | Djibouti |
| Mohamed Amezian | GREPOM/BirdLife Morocco | Morocco |
| Mohamed Henriques | Institute of Biodiversity and Protected Areas | Guinea-Bissau |
| Nick P. Williams | Coordinating Unit of the CMS Raptors MoU | UAE |
| Nonofo Ntsima | Government of Botswana | Botswana |
| Nicomyila Gilbent | ACNR- Birdlife Rwanda | Rwanda |
| Ouni Ridha | Tunisia Wildlife Conservation Society | Tunisia |
| Paul Gacheru | Nature Kenya | Kenya |
| Patrick Benson | University of Maryland | South Africa |
| Ralph Buij | Alterra, Wageningen University | Netherlands |
| Roger Safford | BirdLife International | UK |
| Robert Thomson | Percy Fitzpatrick Institute of Field Ornithology, University of Cape Town | South Africa |
| Sonja Krüger | KwaZulu-Natal Wildlife/Bearded Vulture Task Force | South Africa |
| Simon Gear | BirdLife South Africa | South Africa |
| Imad Cherkaoui | AEWA-Tc | Morocco |
| Thomas Rabeil | Sahara Conservation Fund | Niger/Chad |
| Volker Salewski | NABU | Germany |
| Yilma Abebe | Ethiopian Wildlife and Natural History Society | Ethiopia). |

**Workshop participants – Europe:** *Monfragüe, Spain, 26-28 October 2016*

| Name | Affiliation | Country |
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| Taulant Bino | Albanian Ornithological Society | Albania |
| Sevak Baloyan | Management Agency- Ministry for Nature Protection | Armenia |
| Philippe Helsen | KMDA / European Black Vulture EEP | Belgium |
| Boris Barov | BirdLife International | Belgium |
| Noelia Vallejo-Pedregal | European Comission | Belgium |
| Dobromir Dobrev | Bulgarian society for the protection of birds/ Birdlife Bulgaria | Bulgaria |
| Stoycho Stoychev | Bulgarian Society for the Protection of Birds | Bulgaria |
| Hristo Peshev | Fund for Wild Flora and Fauna | Bulgaria |
| Goran Sušić | Ornithological station Rijeka Institute of Ornithology CASA | Croatia |
| Mohamed Habib | Red Sea Association for environment and water sports | Egypt |
| Osama Elgebaly | Egyptian Environmental Affairs Agency | Egypt |
| Olivier Patrimonio | Ministry of environment - France | France |
| Raphaël Néouze | L.P.O. Birdlife France | France |
| Borja Heredia | UNEP/Convention on Migratory Species | Germany |
| Stavros Xirouchakis | Natural History Museum of Crete – University of Crete | Greece |
| Elzbieta Kret | World Wildlife Fund | Greece |
| Victoria Saravia | Hellenic Ornithological Society | Greece |
| Miklós Dudás | Hortobágy National Park Directorate | Hungary |
| Szilvia Gőri | Hortobágy National Park Directorate | Hungary |
| Ohad Hatzofe | Nature and Parks Authority | Israel |
| Guido Ceccolini | Association CERM Endangered Raptors Centre | Italy |
| Anna Cenerini | Association CERM Endangered Raptors Centre | Italy |
| Alessandro Andreotti | Istituto Superiore per la Protezione e la Ricerca Ambientale | Italy |
| Fiammetta Berlinguer | University of Sassari | Italy |
| Filvio Genero | Vulture Conservation Foundation | Italy |
| Laith El-Moghrabi | ECO Consult | Jordan |
| Tareq Qaneer | The Royal Society for the Conservation of Nature | Jordan |
| Tuguldur Enkhtsetseg | The Nature Conservancy | Mongolia |
| Eduardo Santos | LPN – Liga para a Protecção da Natureza | Portugal |

| Name | Affiliation | Country |
|---|---|---|
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| Julieta Costa | Society for the Study of Birds - BirdLife Portugal | Portugal |
| Alice Gama | Vulture Conservation Foundation | Portugal |
| Elena Shnayder | Sibecocenter, LLC | Russia |
| Mohammed Shobrak | Saudi Wildlife Authority & Taif University | Saudi Arabia |
| Bratislv Grubac | Institute for Nature Conservation of Serbia | Serbia |
| Uros Pantovic | Bird Protection and Study Society of Serbia | Serbia |
| Sasa Marinkovic | Birds of Prey protection Foundation | Serbia |
| André Botha | Endangered Wildlife Trust | South Africa |
| Eduardo Soto Largo | CBD Habitat | Spain |
| Joan Real | University of Barcelona | Spain |
| Helena Tauler-Ametller | University of Barcelona | Spain |
| Antonio Hernádez-Matías | University of Barcelona | Spain |
| Alvaro Camiña | IFC World Bank Group / Vulture Conservation Foundation | Spain |
| Rubén Moreno-Opo | Ministry of Agriculture, Food an Environment of Spain | Spain |
| Pascal López-López | University of Valencia | Spain |
| Ernesto Álvarez Xusto | Grupo de Rehabilitación de la Fauna Autóctona y su Hábitat | Spain |
| Émilie Delepoulle | Grupo de Rehabilitación de la Fauna Autóctona y su Hábitat | Spain |
| Ana Heredia | | Spain |
| Jovan Andevski | Vulture Conservation Foundation | Spain |
| David Izquierdo | Vulture Conservation Foundation | Spain |
| Juan Carlos Atienza | Sociedad Española de Ornitologia / BirdLife Spain | Spain |
| David de la Bodega | Sociedad Española de Ornitologia / BirdLife Spain | Spain |
| Vanesa Palacios | Dirección General de Turismo - Junta de Extremadura | Spain |
| José Antonio Mateos Martín | Dirección General de Medio Ambiente - Junta de Extremadura | Spain |
| Ángel Sánchez | Dirección General de Medio Ambiente - Junta de Extremadura | Spain |
| Ángel Rodríguez Martín | National Park Monfragüe | Spain |
| Andrés Rodríguez | National Park Monfragüe | Spain |
| José Mª Abad Gomez-Pantoja | Dirección General de Medio Ambiente - Junta de Extremadura | Spain |
| Carlos González Villalba | Dirección General de Medio Ambiente - Junta de Extremadura | Spain |
| Emilio Jiménez Díaz | Dirección General de Medio Ambiente - Junta de Extremadura | Spain |

| Name | Affiliation | Country |
|---|---|---|
| Raquel Burdalo | Diputación de Cáceres | Spain |
| Fernando Javier Grande Cano | Diputación de Cáceres | Spain |
| Daniel Hegglin | Vulture Conservation Foundation (VCF) | Switzerland |
| Itri Levent Erkol | Doğa Derneği - BirdLife Turkey | Turkey |
| İlker Özbahar | Turkish Nature Research Society | Turkey |
| José Tavares | Vulture Conservation Foundation | Turkey |
| Nick P. Williams | Coordinating Unit of the CMS Raptors MoU | United Arab Emirates |
| Shakeel Ahmed | Environment Agency – Abu Dhabi | United Arab Emirates |
| Iván Ramírez | BirdLife International | United Kingdom |
| Roman Kashkarov | Uzbekistan Society for the Protection of Birds | Uzbekistan |

**Workshop participants – Asia:** *Mumbai, India, 29-30 November 2016*

| Name | Affiliation | Country* |
|---|---|---|
| M. Monirul Khan | University of Dhaka | Bangladesh |
| Sarowar Alam | IUCN Bangladesh | Bangladesh |
| Shamim Ahmed | Prokriti O Jibon Foundation | Bangladesh |
| Phearun Sum | BirdLife International Cambodia Programme | Cambodia |
| Masphal Kry | Cambodia Forest Department | Cambodia |
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## Annex 2: Range and population status

### Annex 2.1 Range and status of the 15 VMsAP vulture species per country

**Key:**

| | |
|---|---|
| No data | |
| Non breeding | |
| Possibly breeding | |
| Extinct | |
| Breeding | |
| Vagrant | |
| Wintering | |

| Country | Region | Bearded Vulture | Egyptian Vulture | Red-headed Vulture | White-headed Vulture | Hooded Vulture | Himalayan Griffon | White-rumped Vulture | White-backed Vulture | Indian Vulture | Slender-billed Vulture | Cape Vulture | Rüppell's Vulture | Griffon Vulture | Cinereous Vulture | Lappet-faced Vulture |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Afghanistan | AS | | | | | | | | | | | | | | | |
| Albania | EU | | | | | | | | | | | | | | | |
| Algeria | AF | | | | | | | | | | | | | | | |
| Andorra | EU | | | | | | | | | | | | | | | |
| Angola | AF | | | | | | | | | | | | | | | |
| Armenia | EU | | | | | | | | | | | | | | | |
| Austria | EU | | | | | | | | | | | | | | | |
| Azerbaijan | EU | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bangladesh** | **AS** | | | | | | | | | | | | | | | |
| **Belgium** | **EU** | | | | | | | | | | | | | | | |
| **Benin** | **AF** | | | | | | | | | | | | | | | |
| **Bhutan** | **AS** | | | | | | | | | | | | | | | |
| **Bosnia and Herzegovina** | **EU** | | | | | | | | | | | | | | | |
| **Botswana** | **AF** | | | | | | | | | | | | | | | |
| **Bulgaria** | **EU** | | | | | | | | | | | | | | | |
| **Burkina Faso** | **AF** | | | | | | | | | | | | | | | |
| **Burundi** | **AF** | | | | | | | | | | | | | | | |
| **Cambodia** | **AS** | | | | | | | | | | | | | | | |
| **Cameroon** | **AF** | | | | | | | | | | | | | | | |
| **Cape Verde** | **AF** | | | | | | | | | | | | | | | |
| **Central African Republic** | **AF** | | | | | | | | | | | | | | | |
| **Chad** | **AF** | | | | | | | | | | | | | | | |
| **Croatia** | **EU** | | | | | | | | | | | | | | | |
| **Cyprus** | **EU** | | | | | | | | | | | | | | | |
| **Czech Republic** | **EU** | | | | | | | | | | | | | | | |
| **Denmark** | **EU** | | | | | | | | | | | | | | | |
| **Djibouti** | **AF** | | | | | | | | | | | | | | | |
| **DPR China** | **AS** | | | | | | | | | | | | | | | |
| **DPR Korea** | **AS** | | | | | | | | | | | | | | | |
| **DR Congo** | **AF** | | | | | | | | | | | | | | | |
| **Egypt** | **AF** | | | | | | | | | | | | | | | |
| **Equatorial Guinea** | **AF** | | | | | | | | | | | | | | | |
| **Eritrea** | **AF** | | | | | | | | | | | | | | | |
| **Estonia** | **EU** | | | | | | | | | | | | | | | |
| **Ethiopia** | **AF** | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Finland | EU | | | | | | | | | | | | | | | |
| France | EU | | | | | | | | | | | | | | | |
| Gabon | AF | | | | | | | | | | | | | | | |
| Gambia | AF | | | | | | | | | | | | | | | |
| Georgia | EU | | | | | | | | | | | | | | | |
| Germany | EU | | | | | | | | | | | | | | | |
| Ghana | AF | | | | | | | | | | | | | | | |
| Greece | EU | | | | | | | | | | | | | | | |
| Guinea | AF | | | | | | | | | | | | | | | |
| Guinea-Bissau | AF | | | | | | | | | | | | | | | |
| Hungary | EU | | | | | | | | | | | | | | | |
| Hungary | EU | | | | | | | | | | | | | | | |
| India | AS | | | | | | | | | | | | | | | |
| Iraq | EU | | | | | | | | | | | | | | | |
| Islamic Republic of Iran | AS | | | | | | | | | | | | | | | |
| Israel | EU | | | | | | | | | | | | | | | |
| Italy | EU | | | | | | | | | | | | | | | |
| Ivory Coast | AF | | | | | | | | | | | | | | | |
| Jordan | EU | | | | | | | | | | | | | | | |
| Kazakhstan | EU | | | | | | | | | | | | | | | |
| Kenya | AF | | | | | | | | | | | | | | | |
| Kuwait | EU | | | | | | | | | | | | | | | |
| Kyrgyzstan | EU | | | | | | | | | | | | | | | |
| Lao PDR | AS | | | | | | | | | | | | | | | |
| Lebanon | EU | | | | | | | | | | | | | | | |
| Lesotho | AF | | | | | | | | | | | | | | | |
| Liberia | AF | | | | | | | | | | | | | | | |
| Libya | AF | | | | | | | | | | | | | | | |
| Malawi | AF | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Malaysia | AS | | | | | | | | | | | | | | | |
| Mali | AF | | | | | | | | | | | | | | | |
| Malta | EU | | | | | | | | | | | | | | | |
| Mauritania | AF | | | | | | | | | | | | | | | |
| Mongolia | AS | | | | | | | | | | | | | | | |
| Morocco | AF | | | | | | | | | | | | | | | |
| Mozambique | AF | | | | | | | | | | | | | | | |
| Myanmar | AS | | | | | | | | | | | | | | | |
| Namibia | AF | | | | | | | | | | | | | | | |
| Nepal | AS | | | | | | | | | | | | | | | |
| Netherlands | EU | | | | | | | | | | | | | | | |
| Niger | AF | | | | | | | | | | | | | | | |
| Nigeria | AF | | | | | | | | | | | | | | | |
| Oman | EU | | | | | | | | | | | | | | | |
| Pakistan | AS | | | | | | | | | | | | | | | |
| Poland | EU | | | | | | | | | | | | | | | |
| Portugal | EU | | | | | | | | | | | | | | | |
| Qatar | EU | | | | | | | | | | | | | | | |
| Republic of Korea | AS | | | | | | | | | | | | | | | |
| Republic of the Congo | AF | | | | | | | | | | | | | | | |
| Romania | EU | | | | | | | | | | | | | | | |
| Russia | EU | | | | | | | | | | | | | | | |
| Rwanda | AF | | | | | | | | | | | | | | | |
| Saudi Arabia | EU | | | | | | | | | | | | | | | |
| Senegal | AF | | | | | | | | | | | | | | | |
| Serbia | EU | | | | | | | | | | | | | | | |
| Sierra Leone | AF | | | | | | | | | | | | | | | |
| Singapore | AS | | | | | | | | | | | | | | | |
| Slovakia | EU | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slovenia | EU | | | | | | | | | | | | | | | |
| Somalia | AF | | | | | | | | | | | | | | | |
| South Africa | AF | | | | | | | | | | | | | | | |
| South Sudan | AF | | | | | | | | | | | | | | | |
| Spain | EU | | | | | | | | | | | | | | | |
| Sudan | AF | | | | | | | | | | | | | | | |
| Swaziland | AF | | | | | | | | | | | | | | | |
| Switzerland | EU | | | | | | | | | | | | | | | |
| Syrian Arab Republic | EU | | | | | | | | | | | | | | | |
| Tajikistan | EU | | | | | | | | | | | | | | | |
| Tanzania | AF | | | | | | | | | | | | | | | |
| Thailand | AS | | | | | | | | | | | | | | | |
| The FYR of Macedonia | EU | | | | | | | | | | | | | | | |
| Togo | AF | | | | | | | | | | | | | | | |
| Tunisia | AF | | | | | | | | | | | | | | | |
| Turkey | EU | | | | | | | | | | | | | | | |
| Turkmenistan | EU | | | | | | | | | | | | | | | |
| Uganda | AF | | | | | | | | | | | | | | | |
| Ukraine | EU | | | | | | | | | | | | | | | |
| United Arab Emirates | EU | | | | | | | | | | | | | | | |
| United Kingdom | EU | | | | | | | | | | | | | | | |
| Uzbekistan | EU | | | | | | | | | | | | | | | |
| Vietnam | AS | | | | | | | | | | | | | | | |
| Western Sahara | AF | | | | | | | | | | | | | | | |
| Yemen | EU | | | | | | | | | | | | | | | |
| Zambia | AF | | | | | | | | | | | | | | | |
| Zimbabwe | AF | | | | | | | | | | | | | | | |

## Annex 2.2-2.5 Status and breeding population estimates for European range countries

The following tables were derived from the questionnaires and were augmented by input received at the European Regional Workshop in October 2017. They reflect current status and breeding population estimates for the four vulture species that form part of the focus of the Vulture MsAP. Unfortunately, the same level of information in terms of breeding population estimates is not available for species occurring in Africa and Asia. This lack of information would be addressed by the implementation of Result 10.1 in Table 8.

### Annex 2.2: Status and breeding population estimates for Europe – Bearded Vulture

| Country | Status | Breeding | Q | Year(s) of | Breeding Population | Q |
|---|---|---|---|---|---|---|
| Albania | extinct | | | | | |
| Andorra | breeding | 1 | G | 2016 | stable | G |
| Armenia | breeding | 8-10 | M | 2007-2009 | stable | M |
| Austria | breeding | 3 | G | 2015 | small increase | G |
| Azerbaijan | breeding | 20-100 | P | 2000-2016 | stable | P |
| Bosnia and Herzegovina | extinct | | | | | |
| Bulgaria | extinct | 0 | G | 2016 | | |
| France | breeding | 59-61 | G | 2016 | small increase / large | G |
| Georgia | breeding | 20-25 | M | 2001-2012 | small increase | M |
| Greece | breeding | 6 | G | 2016 | moderate increase | G |
| Iraq | breeding | 20 | M | 2013 | | |
| Israel | extinct | | G | 2016 | | |
| Italy | breeding | 12 | G | 2016 | large increase | G |
| Jordan | extinct | | M | 1995 | | |
| Kazakhstan | breeding | 50-100 | M | 2012 | stable | M |
| Mongolia | breeding | 500-1000 | P | 2016 | small increase | P |
| Portugal | extinct | | G | 2005 | | |
| Romania | extinct | | | | | |
| Russian Federation | breeding | 181-237 | G | 2008 | moderate increase | G |
| Russian Federation (Altai- | breeding | 55-75 | G | 2016 | stable | G |
| Saudi Arabia | extinct | | M | 2010 | | |
| Serbia | extinct | | G | 2016 | | |
| Spain | breeding | 134 | G | 2015 | moderate increase /small | G/M |
| Switzerland | breeding | 14 | G | 2016 | large increase | G |
| Syrian Arab Republic | extinct | | M | 2008 | | |
| Tajikistan | breeding | **100s** | P | | | P |
| The FYR of Macedonia | extinct | | G | 2015 | | |
| Turkey | breeding | 160-200 | M | 2013 | decline | M |
| Turkmenistan | breeding | | | | | |
| Uzbekistan | breeding | 50-70 | M | 2009 | stable | P |
| Yemen | breeding | | | | | |

**Q – data quality: P – poor; M – Moderate; G - Good**

**Annex 2.3: Status and breeding population estimates for Europe – Cinereous Vulture**

| Country | Status | Breeding | Q | Year(s) of | Breeding Population trend | Q |
|---|---|---|---|---|---|---|
| Albania | extinct | | | | | |
| Armenia | breeding | 50 | M | 2007-2009 | stable | M |
| Azerbaijan | breeding | 20-100 | M | 2000-2016 | stable | M |
| Bosnia and | extinct | | | | | |
| Bulgaria | extinct | 0-1 | M | 2016 | stable | M |
| Croatia | extinct | | | | | |
| Cyprus | extinct | | G | | | |
| France | breeding | 30 | G | 2016 | small increase | G |
| Georgia | breeding | 10-25 | G | 1995-2016 | stable | G |
| Greece | breeding | 21-35 | G | 2006-2015 | stable | G |
| Hungary | extinct | | | | | |
| Israel | extinct | | G | 2016 | | |
| Italy | extinct | | G | 2016 | | |
| Jordan | extinct | | P | | | |
| Kazakhstan | breeding | 150-300 | M | 2012 | stable | M |
| Kyrgyzstan | | | | | | |
| Mongolia | breeding | 5000 -7000 | P | 2016 | small decline | P |
| Portugal | breeding | 18 | G | 2016 | large increase | G |
| Romania | extinct | | | | | |
| Russian Federation | breeding | 63-102 | M | 2004 | small decline | M |
| Russian Federation | breeding | 71-96 | G | 2009 | moderate increase | G |
| Saudi Arabia | non breeding | | | 2003 | wintering | |
| Serbia | extinct | | M | 2016 | | |
| Spain | breeding | 2068 | G | 2015/2012 | moderate increase | G |
| Tajikistan | breeding | 10-100 | P | | | |
| The FYR of Macedonia | extinct | | G | 2015 | | |
| Turkey | breeding | 80-200 | M | 2013 | decline | M/P |
| Turkmenistan | breeding | | | | | |
| Uzbekistan | breeding | 80-120 | M | 2005 | small decline | P |
| Yemen | breeding | | | | | |

**Annex 2.4: Status and breeding population estimates for Europe – Egyptian Vulture**

| Country | Status | Breeding | Q | Year(s) of | Breeding Population trend in | Q |
|---|---|---|---|---|---|---|
| Albania | breeding | 6-8 | G | 2016 | large decline | G |
| Armenia | breeding | 40-60 | M | 2007-2010 | stable | M |
| Azerbaijan | breeding | 80-250 | G | 2000-2016 | small decline | P |
| Bahrain | | | | | | |
| Bosnia and | extinct | | | | | |
| Bulgaria | breeding | 27 | G | 2015 | large decline | G |
| Croatia | extinct | | | | | |
| France | breeding | 70-80 | M | 2015 | stable | G |
| Georgia | breeding | 100-140 | M | 1980-2016 | decline | M |
| Greece | breeding | 5 | G | 2016 | large decline | G |
| Hungary | extinct | | | | | |
| Iraq | | | | | | |
| Israel | breeding | 50-55 | G | 2016 | stable | G |
| Italy | breeding | 8 | G | 2015 | decline | G |
| Jordan | possibly | | P | | | |
| Kazakhstan | breeding | 80-100 | M | 2012 | decline | |
| Kyrgyzstan | | | | | | |
| Lebanon | | | | | | |
| Oman | | | | | | |
| Portugal | breeding | 110-130 | M | 2012 | large decline | M |
| Qatar | | | | | | |
| Romania | breeding | 1-2 | M | 2005-2016 | | |
| Russian Federation | breeding | 88-121 | G | 2005 | stable | G |
| Saudi Arabia | breeding | **?** | M | 2012 | large decline | M |
| Serbia | extinct | | M | 2016 | | |
| Spain | breeding | 1452-1556 | G | 2008/2015 | stable/decline | G |
| Syrian Arab Republic | breeding | 25 | M | 2011 | | |
| Tajikistan | breeding | 50-500 | P | | | |
| The FYR of Macedonia | breeding | 23 | G | 2015 | large decline | G |
| Turkey | breeding | 1000-2000 | G | 2013 | decline | G |
| Turkmenistan | breeding | | | | | |
| United Arab Emirates | possibly | 2-5 | M | 2015 | | |
| Uzbekistan | breeding | 135-140 | G | 2011 | decline | G |
| Yemen | breeding | | | | | |

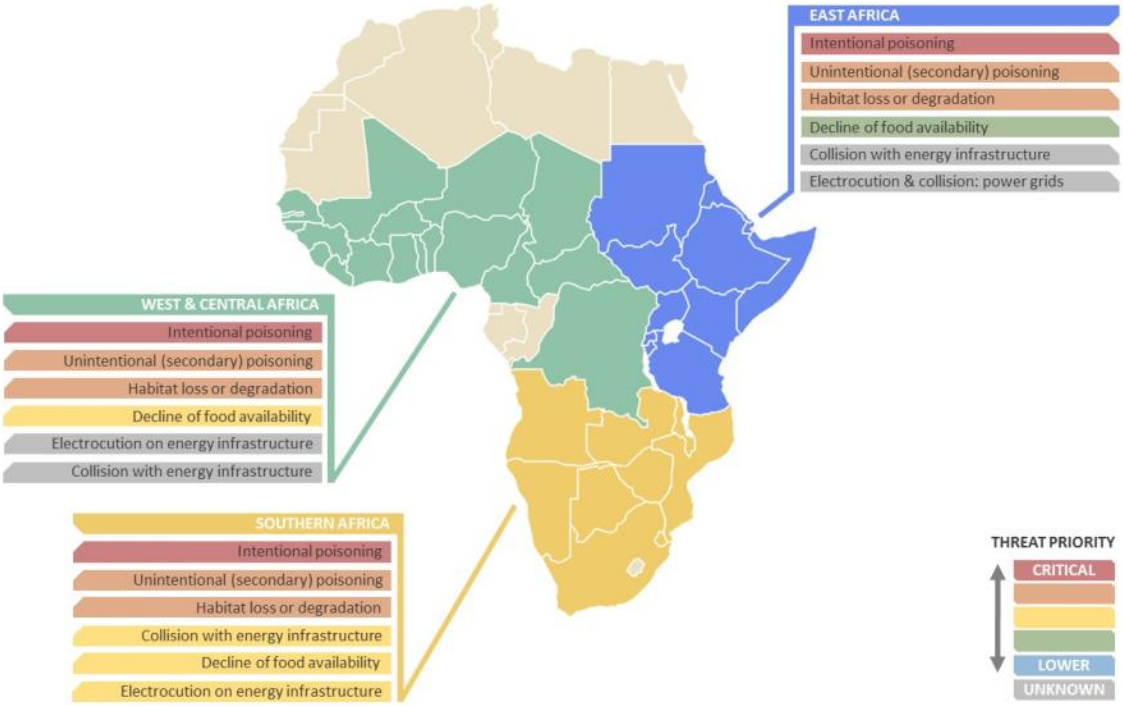
**Annex 2.5: Status and breeding population estimates for Europe – Griffon Vulture**

| Country | Status | Breeding | Q | Year(s) of | Breeding Population trend in | Q |
|---|---|---|---|---|---|---|
| Andorra | breeding | 2-3 | G | 2016 | small increase | G |
| Armenia | breeding | 35-40 | M | 2007-2010 | stable | M |
| Azerbaijan | breeding | 100-400 | M | 2000-2016 | small decline | P |
| Bosnia and Herzegovina | extinct | | | | | |
| Bulgaria | breeding | 80-100 | G | 2016 | large increase | G |
| Croatia | breeding | 90 | G | 2016 | decline | G |
| Cyprus | breeding | 1-3 | G | 2016 | decline | G |
| France | breeding | 2000 | G | 2016 | moderate increase | G |
| Georgia | breeding | 40-60 | M | 1991-2016 | small decline | M |
| Greece | breeding | 350-400 | G | 2015 | moderate increase | G |
| Hungary | extinct | | | | | |
| Iraq | | | | | | |
| Israel | breeding | 42 | G | 2016 | decline | G |
| Italy | breeding | 170 | M | 2016 | moderate increase | G |
| Jordan | breeding | 8-15 | G | 2014 | stable | G |
| Kazakhstan | breeding | 80-150 | M | 2012 | decline | M |
| Kyrgyzstan | | | | | | |
| Lebanon | | | | | | |
| Portugal | breeding | 750 | G | 2007 | moderate increase | G |
| Romania | extinct | | | | | |
| Russian Federation | breeding | 152-223 x 2 | M | 2001-2003 | decline | P |
| Saudi Arabia | breeding | 3000 | M | 2015 | large decline | M |
| Serbia | breeding | 150-200 | G | 2016 | large increase | G |
| Spain | breeding | 24609 | G | 2012 | large increase | G |
| Syrian Arab Republic | | | | | | |
| Tajikistan | breeding | | | | | |
| The FYR of Macedonia | breeding | 14 | G | 2015 | decline | G |
| Turkey | breeding | 150-200 | P | 2013 | small decline | P |
| Turkmenistan | breeding | | | | | |
| Ukraine (Crimea) | breeding | 23-25 | G | 2016 | stable | G |
| Uzbekistan | breeding | 140-150 | P | 2009 | decline | P |
| Yemen | breeding | | | | | |

## Annex 3: Threat Maps per Species

Maps still in development, to be inserted when completed. A first map is shown below; a final map for each species will use the same style.

**Fig. A3.1.** Threats to the White-headed Vulture *Trigonoceps occipitalis* in each subregion of its range. Only range states are brightly coloured; the species is absent from N Africa, Mauretania, Gabon and Equatorial Guinea.



## Annex 4: Current International, regional and national strategies; Species Action Plans

A4.1 Matrix of existing plans focused on specific species or threats

A4.2 List of and links to current international plans (spanning across more than one region)

4.2.1. CMS Guidelines to minimizing the risk of poisoning to Birds http://www.cms.int/sites/default/files/document/Guidelines%20to%20Prevent%20the%20Risk%20of%20Poisoning%20to%20Migratory%20Birds.pdf

4.2.2. CMS Preventing poisoning in Migratory Birds http://www.cms.int/en/document/preventing-poisoning-migratory-birds

4.2.3. Powerlines and Migratory Birds http://www.cms.int/sites/default/files/document/10_11_powerlines_e_1_0.pdf

4.2.4. Renewable Energy and Migratory Birds http://www.ascobans.org/sites/default/files/document/AC22_Inf_4.4_CMSres11.27_RenewableEnergy.pdf

A4.3 List of and links to current regional plans *(plans that are specific to one of the three regions)*

4.3.1. SAVE Blueprint http://save-vultures.org/resources/scientific-papers/

4.3.2. Pan-African Vulture Conservation Strategy (2012) https://www.ewt.org.za/BOP/PAVS%20PROCEEDINGS.pdf

4.3.3. Wildlife Comeback in Europe http://bigfiles.birdlife.cz/ebcc/WildlifeComeback_in_Europe-the_recovery_of_selected_mammal_and_bird_species.pdf (Bearded Vulture page: 228; Griffon Vulture 232; Cinereous Vulture page: 238).

4.3.4. Proposal EU Action Plan to Prevent Illegal Poisoning in Wildlife http://www.cms.int/en/document/proposal-eu-action-plan-prevent-illegal-poisoning-wildlife

A4.4 List of and links to current national plans *(plans that are country-specific)*

4.4.1. Bearded Vulture Biodiversity Management Plan (South Africa) http://www.gov.za/sites/www.gov.za/files/37620_gon350.pdf

4.4.2. Cambodia Vulture Action Plan 2016-2025 http://save-vultures.org/resources/action-plans/

4.4.3. Vulture Conservation Action Plan for Nepal 2015-2019 http://save-vultures.org/resources/action-plans/

4.4.4. Action Plan for Vulture Conservation in India http://save-vultures.org/resources/action-plans/

4.4.5. Bangladesh Vulture Action Plan (Imminent)

4.4.6. Pakistan Vulture Action Plan – https://www.iucn.org/asia/pakistan/countries/pakistan/national-vulture-conservation-strategy

A4.5 List of and links to existing species-focused plans

4.5.1. Egyptian Vulture Flyway Action Plan - http://lifeneophron.eu/files/docs/1482247547_665.pdf

4.5.2. Cinereous Vulture Flyway Action Plan –

4.5.3. Bearded Vulture Species Action Plan - http://ec.europa.eu/environment/nature/conservation/wildbirds/action_plans/docs/gypaetus_barbatus.pdf

4.5.4. Cinereous Vulture Species Action Plan - http://www.avibirds.com/saps/EU/Europe/EN/Cinereous%20Vulture1996.pdf

4.5.5. Latest review report for both SAPs: http://ec.europa.eu/environment/nature/conservation/wildbirds/action_plans/docs/Final%20report%20BirdLife%20review%20SAPs.pdf (Cinereous Vulture page: 85; Bearded Vulture page: 144)

4.5.6. Egyptian Vulture EU Species Action Plan http://ec.europa.eu/environment/nature/conservation/wildbirds/action_plans/docs/neophron_percnopterus.pdf

4.5.7. Bearded Vulture Biodiversity Management Plan (Southern Africa) http://www.gov.za/sites/www.gov.za/files/37620_gon350.pdf

4.5.8. Lappet-faced Vulture http://www.avibirds.com/saps/AF/Africa/EN/Lappet-faced%20Vulture2005.pdf

4.5.9. Action Plan for the conservation of the Cape Vulture in Namibia http://www.the-eis.com/data/literature/Cape_Vulture_Action_Plan_and_workshop_proceedings.pdf

4.5.10. Report on progress with regard to the Conservation Action Plan for the Cape Vulture in South Africa http://www.vulpro.com/wp-content/uploads/2016/05/cvtf-report-2012.pdf

A4.6 List of and links to threat-focused plans and strategies

4.6.1. CMS Guidelines to minimizing the risk of poisoning to Birds http://www.cms.int/sites/default/files/document/Guidelines%20to%20Prevent%20the%20Risk%20of%20Poisoning%20to%20Migratory%20Birds.pdf

4.6.2. CMS Preventing poisoning in Migratory Birds
http://www.cms.int/en/document/preventing-poisoning-migratory-birds

4.6.3. Proposal EU Action Plan to Prevent Illegal Poisoning in Wildlife
http://www.cms.int/en/document/proposal-eu-action-plan-prevent-illegal-poisoning-wildlife

4.6.4. Final review of scientific information on Lead
http://www.cms.int/en/document/final-review-scientific-information-lead-unepgc26inf11add1-dec2010

4.6.5. Sub-regional plan to prevent the Poisoning of Migratory Birds in southern Africa http://www.cms.int/en/document/sub-regional-implementation-plan-prevent-poisoning-migratory-birds-southern-african

4.6.6. Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the Africa-Eurasian Region http://www.unep-aewa.org/sites/default/files/publication/ts50_electr_guidelines_03122014.pdf

4.6.7. Powerlines and Migratory Birds
http://www.cms.int/sites/default/files/document/10_11_powerlines_e_1_0.pdf

4.6.8. Renewable Energy and Migratory Birds
http://www.ascobans.org/sites/default/files/document/AC22_Inf_4.4_CMSres11.27_RenewableEnergy.pdf

4.6.9. IUCN SSC Guidelines on Captive Breeding
http://cmsdata.iucn.org/downloads/1987_iucn_policy_statement___captive_breeding.pdf

4.6.10. IUCN SSC Guidelines for Reintroductions
https://portals.iucn.org/library/efiles/documents/PP-005.pdf