

7th MEETING OF THE AEWA STANDING COMMITTEE
26 – 27 November 2011, Bergen, Norway

DRAFT INTERNATIONAL SINGLE SPECIES ACTION PLAN FOR THE CONSERVATION OF THE SLATY EGRET

Egretta vinaceigula

2012-2022



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Milestones in the production of the plan

Stakeholder workshop: 3-5 March 2011, Maun, Botswana

First draft: May 2011, presented to the workshop participants

Second draft: July 2011, presented to the Range States and the AEWA Technical Committee

Third draft: October 2011, presented at the 7th meeting of the AEWA Standing Committee (26-27 November 2011, Bergen, Norway) and the 5th session of the Meeting of the Parties (14-18 May 2012, La Rochelle, France)

Geographical scope

This single species action plan requires implementation in the following countries regularly supporting Slaty Egrets: Botswana, Namibia, South Africa, Zambia and Zimbabwe and in Angola where the species might be resident.

Reviews

Recommended citation: Tyler, S.J. (compiler) 2011. International Single Species Action Plan for the conservation of the Slaty Egret (*Egretta vinaceigula*). AEWA Technical series No. **XX**. Bonn, Germany.

Photograph on the cover: Slaty Egret with fish

Photo: Grant Atkinson

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List of Acronyms

AEWA: Agreement on the Conservation of African-Eurasian Migratory Waterbirds

BLB: BirdLife Botswana

BLZ: BirdLife Zimbabwe

CBD: Convention on Biological Diversity

CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora

CMS: Convention on the Conservation of Migratory Species of Wild Animals

DRC: Democratic Republic of Congo

DWNP: Department of Wildlife and National Parks in Botswana

EIA: Environmental Impact Assessment

IBA: Important Bird Area

EIA: Environmental Impact Assessment

OKACOM: The Permanent Okavango Basin River Water Commission

Ramsar: The Convention on Wetlands, signed in Ramsar, Iran, in 1971

SEIA: Strategic Environmental Impact Assessment

WHC: Convention concerning the Protection of the World Cultural and Natural Heritage, adopted by United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1972

ZAMCOM: Zambezi Watercourse Commission

ZOS: Zambian Ornithological Society

Executive Summary

- The Slaty Egret (*Egretta vinaceigula*) is listed as Vulnerable in the IUCN Red List and BirdLife International because of the species' small and restricted population in southern/central Africa.
- The global population is now estimated to be between 3,000 and 5,000 individuals with most birds breeding in the core area, the Okavango Delta in Botswana and along the Chobe River in Botswana and Namibia. The Slaty Egret is probably dispersive from its core area and during extreme droughts may occasionally breed elsewhere if conditions there are suitable. There is no definite evidence of breeding in Zambia but large flocks occur at some sites and recently fledged juveniles have been seen (P. Leonard, pers. comm.). Whether these are from the Botswana and Namibian breeding population or there is a separate Zambian breeding population is unknown. Breeding may possibly occur in the Kazungula Swamp in Zimbabwe and there is one recent breeding record in South Africa. Wandering or dispersing birds occasionally occur further south in Botswana and in South Africa. Recently the species has been found in Angola and Mozambique but its actual status in these countries is unknown. Slaty Egrets are confined to wetland edges. There are few data on population trends but in some countries the species has declined or is believed to be declining. This may however, merely reflect changing climatic conditions from year-to-year or on a longer time scale.
- Principal threats affecting the species: In general seasonal marshes are threatened by factors such as drainage (for cultivation), flood regulation and dams as along the Kafue River in Zambia, catchment erosion, water abstraction for crops, alien vegetation, human disturbance and excessive trampling and grazing by livestock and cutting of reeds and other marsh vegetation for basketry, thatching and fodder. In Botswana a major threat to roost and nest sites is fire which can destroy reeds. Trampling of reed-beds by Elephants (*Loxodonta africana*) and predation at some nest sites by African Fish Eagles (*Haliaeetus vocifer*) may also reduce productivity. Climate change is considered a threat in the long term.
- The goal of this action plan is to improve the conservation status and knowledge base of the Slaty Egret within the next 10 years.

Objectives and top priority actions – (1) gain better information on extent of range in all countries and population size in different seasons, (2) implement surveys to identify all breeding colonies in Botswana and possibly in Zimbabwe and Zambia and key non-breeding sites in all range states, (3) Implement a study of breeding biology to assess productivity and factors limiting such, (4) prevent or control development that would reduce the species' breeding habitat, (5) implement EIA studies in the species habitats before any development, (6) initiate a study to determine movements of Slaty Egrets between range states using radio transmitters on nestlings or full-grown birds, (7) Safeguard key wetlands through designation as reserves or protected areas, (8) control disturbance and fires at breeding and roost sites (9) prevent or control factors that reduce feeding efficiency and prey availability.

- Emphasis for site conservation activities will primarily focus on countries with confirmed breeding colonies (Botswana and Namibia) with secondary emphasis on countries where breeding is suspected (Angola, Zambia and Zimbabwe) or breeding occurs only occasionally (South Africa).

1 - Biological Assessment

General Information

The Slaty Egret is a small slaty-blue egret with yellow legs and feet. It has a rufous throat patch. Immature birds have more extensive reddish streaks from the throat down the breast. In breeding plumage adults have long head plumes and their feet become chrome yellow.

Because of its small range in central and southern Africa and a possibly declining population, it is listed as Vulnerable in the IUCN Red List, a status it has held since 1994 (BirdLife International 2011).

Taxonomy and biogeographic populations

- The Slaty Egret (*Egretta vinaceigula*), also previously known as the Brown-throated or Red-throated Egret, belongs to the family Ardeidae (Order CICONIIFORMES) which includes herons, tiger-herons, night-herons, bitterns and egrets. The Slaty Egret first became known to science on the basis of two specimens obtained in the 1870s by Thomas Ayres and housed in the collections of the British Museum (Natural History). Originally wrongly identified as juvenile Black Herons (Egrets) (*E. ardesiaca*), they were then shown to represent an unnamed species *Melanophoyx vinaceigula* (Sharpe 1895, Potchefstroom, Transvaal). In 1958 a third specimen was obtained, by R.H.N. Smithers, in the Caprivi Strip. The work by Benson *et al.* (1971) showed on morphological and ecological grounds that the Slaty Egret was a separate species and not a colour phase of the Black Egret. Benson *et al.* believed that the Slaty Egret was found chiefly in the Chobe River system of northern Botswana although it is now known that the Okavango Delta holds a much larger population and that it occurs widely in Zambia. The Slaty Egret is monotypic, birds being similar morphologically throughout the range of the species.

Distribution throughout the annual cycle

- Birds appear to breed following summers of high rainfall. In Botswana and Namibia the breeding season is from March to July but colonies are not used every year. Birds move within the Delta according to the state of floods. They follow floodwater into newly inundated areas and also favour areas that are drying and where fish are concentrated. Within the Okavango system and the Chobe River floodplain distribution therefore, varies through the year. Some birds, particularly dispersing immatures, may wander beyond the core breeding and feeding areas, especially outside the breeding season (non-breeding between October and January). At such times they may appear in South Africa (particularly in the sub-tropical north-east, rarely in the arid west), in Mozambique in the Zambezi Delta and in other areas of Zimbabwe.

Habitat requirements

- Slaty Egrets forage at the edges of wetlands or in shallow often vegetated water in pans, lagoons and rivers. They roost communally either in mixed species or single species roosts in reed-beds and in Water Figs on islands in lagoons.

Breeding sites in Botswana include reed (*Phragmites australis*) beds, Date Palm (*Phoenix reclinata*) thickets on islands in swamps, thickets of Water Figs (*Ficus verruculosus*) on islands in lagoons and flooded *Acacia* trees (Hancock *et al.* 2005). In Namibia Hines (1992) found two colonies containing eggs and chicks in *Acacia kirkii* trees in temporary wetlands – inundated tree savanna in the Tsumkwe area of the Nyae Nyae Pans system in

northern Namibia. There were 12 nests in 1989 and five in 1994. (For information on breeding sites see Appendix 2).

The diet of the Slaty Egret comprises mainly fish, 5-10 cm in length and larval and adult amphibians, but also occasionally dragonflies (Odonata) and molluscs (del Hoyo 1992, Milewski 1976, Matthews & McQuaid 1983). In the temporary wetlands of eastern Bushmanland, Namibia where there are no fish, Slaty Egrets caught large tadpoles of African Bullfrog (*Pyxicephalus adspersus*) and aquatic insects. Adults regurgitate prey items whole for chicks. Pellets regurgitated by chicks contained only dragonfly larvae (Libellulidae) (Hines 1992). Observations in the Okavango Delta between 2004 and 2006 showed that they hunted mainly for small fish and frogs, but also took many aquatic invertebrates and their larvae (corixids) and also beetles (Coleoptera) (Hancock *et al.* 2005). They probably take any small prey item available on/in mud or in shallow water. Slaty Egrets normally forage alone or in small groups of up to eight birds, rarely over 60. One aggregation of 63 birds was observed on the Okavango floodplain. There is an association between foraging Slaty Egrets and Lechwe in the Okavango Delta, the birds favouring short vegetation where the mammals have been grazing or where grasslands are inundated after fires (Hancock *et al.* 2005).

Preferred foraging habitats in Botswana include seasonally inundated floodplains with shallow water and the muddy edges of lagoons that are drying out as well as temporarily inundated areas such as Lake Ngami. In early August 2004 as the lake was filling 21 Slaty Egrets were observed feeding at the leading edge of the floodwater (pers. obs.). On the floodplain of the Okavango River favoured feeding areas in November 2004 were the edges of cattle and Elephant and Hippopotamus tracks through well-vegetated drying channels and pools. In Namibia they particularly use small shallow pans which are well vegetated with grasses, sedges and floating macrophytes (Hines 1992).

Survival and productivity

Little is known about the survival and productivity of this species. Adults are likely to be long-lived as are other herons and egrets (20+ years). Breeding success can be affected by human interference, by predators, fire and poor floods (BirdLife International 2000, 2011). In Namibia Hines (1992) found very heavy predation, probably by a juvenile African Fish Eagle. Most nests were predated causing nil breeding success. Ginn (1974) reported Fish Eagles raiding a heronry in Moremi G.R. in August 1974. On the Boro River breeding success of Slaty Egrets was low: *c.* 30% in 1988 and 1989 while all eggs were preyed upon in 1992, giving an overall success of *c.* 10% for the six years (Randall & Herremans 1994). Other potential predators include Black Crake (*Amaurornis flavirostris*) as Masterson (1971) during a trip to Botswana August/September 1970 observed Black Crake predation on Purple Heron (*Ardea purpurea*) eggs.

Population size and trends

1. Distribution by country

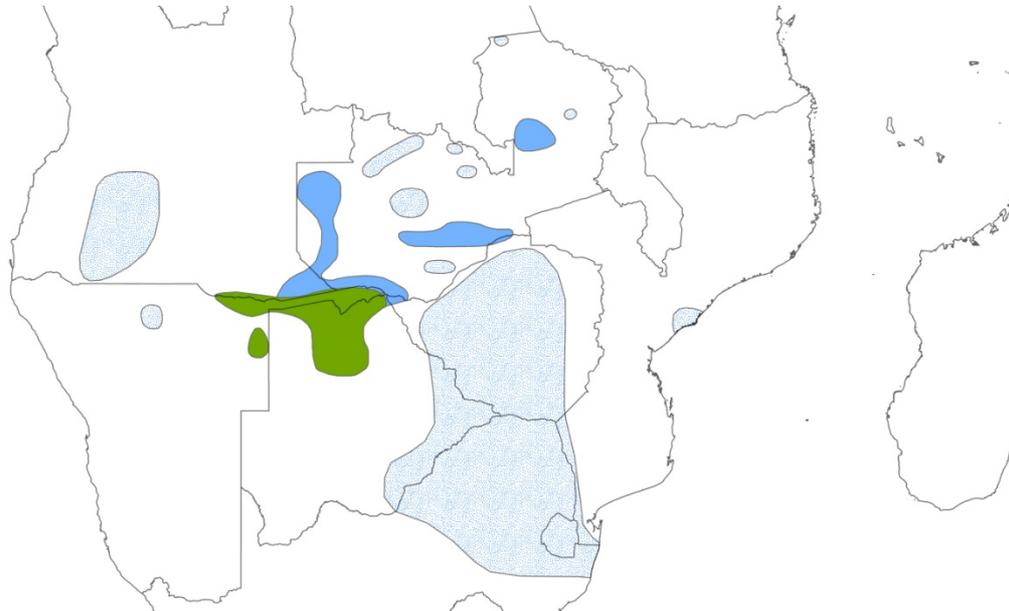


Figure 1. Known or probable range states for the Slaty Egret. The solid green areas indicate where it is resident and may sometimes breed, solid blue where it occurs as a regular non-breeding visitor, and the fainter blue-dotted areas are where it is an occasional non-breeding visitor.

Table 1. Countries where Slaty Egrets have bred or visited.

The central column lists countries where breeding may possibly occur but has not yet been proven. Countries may be listed in more than one column e.g. in South Africa there has been one recent breeding record but most birds there are non-breeding visitors.

Breeding known	Possibly breeding	Non-breeding visitor
<i>List of countries</i>	<i>List of countries</i>	<i>List of countries</i>
BOTSWANA	ZIMBABWE	MOZAMBIQUE
NAMIBIA	ANGOLA	ZAMBIA
SOUTH AFRICA	ZAMBIA	ZIMBABWE
		NAMIBIA
		ANGOLA
		SOUTH AFRICA

The distribution of the Slaty Egret ranges from northern Botswana, notably the Okavango Delta and Linyanti/Chobe system in Botswana, the Caprivi Strip area of northern Namibia, through northwest Zimbabwe to wetlands in Zambia, such as the Kafue Flats and the Bangweulu Swamp. The species may also occur in Shaba Province of the Democratic

Republic of Congo (DRC) but there is no confirmation of this. It has recently been confirmed in adjacent eastern Angola. An increasingly reported non-breeding visitor to South Africa, where very small numbers may be resident and an isolated breeding attempt has been recorded. The estimated range of the species covers 67,000 km² (BirdLife International 2000). Collar *et al.* (1994) noted that it was nowhere common. However, in some areas of the Okavango Delta it is locally frequent and at times common. For example, over 120 Slaty Egrets were found at remaining pools on the drying floodplain of the Okavango River between Mohembo, Seronga and Eretsha from 26 November to 2 December 2004 and one concentration of 63 birds was noted in shallow floodwater (S.J. Tyler, pers. obs.).

Angola/DRC: The Slaty Egret was until recently not definitely known from Angola, although it was considered very likely to occur in the south east and along the wet southern edge. It may occur on the Angola/DRC border where there are extensive floodplains, but it has yet to be recorded (Richard Dean, *in lit.*) and was not listed by Pinto (1983). Dowsett (1993) noted that it was a species whose occurrence in Angola requires proof. It occurs on the floodplains at the Cuíto-Cubango River junction, on the border between Angola and Namibia (Hines 1992), and on the border between Angola and Botswana (Penry 1994) and may extend along river systems into extreme southern Cuando Cubango. It is also likely to occur in southeast Cuando Cubango along the Cuando River as Beel (1992) found it close to the Angolan border on the Mashi River (= Cuando River) floodplain in Zambia.

Pedro van Pinto (pers. comm.) also noted that there were no records for Angola but it is highly likely to occur in the southeast and east regions, as it has been regularly recorded in the Caprivi strip, less than 50km from the Angolan border. It is a regular visitor at Liuwa Plain NP in Zambia, again 50km from the Angolan border, and one can find very similar habitat on the Angolan side. He stressed that it was also important to note that these regions of Angola (east and southeast) are extremely remote, frequently of almost impossible access and virtually unstudied. Even during the colonial days, this region was known as “terras do fim do mundo” (lands of the end of the world)! Given the available data, he wrote that he would be surprised if they were not frequent visitors to this region.

Finally, Mills *et al.* (2010) found four specimens in the Lubango Bird Skin Collection in Angola; these, the first definite records from Angola, had been wrongly labelled as Black Egrets and had been collected in June 1968 by the Cunene River.

In the DRC there is still no evidence of Slaty Egrets but it is likely that some occur in that country

Botswana: It occurs widely in the Linyanti/Chobe system and throughout the Okavango Delta. At the southern edge of the Okavango Delta birds often move down onto the Thamalakane and Boteti Rivers when these hold water and have developed emergent vegetation. The distribution in the Okavango Delta is well-known and is based on hundreds of sightings (with GPS coordinates) particularly from work carried out in 2004 for the Okavango Delta Management Plan (Hancock *et al.* 2005). Although distributed throughout the Delta, the pattern of distribution changes according to the season and state of the floodwater (Hancock *et al.* 2005).

Elsewhere, wandering birds have turned up at a few other places: two were seen at Mwaku and Tale Pans north of Lake Ngami in early 2000 (Mark Muller, pers.comm.), one at Nxai Pan on 5 December 1988 (R & V Lovett, in Brewster & Tyler 1999), one at Phakalane sewage ponds for two months from late October to late December 1999 (Brewster & Tyler 2000a) and one in the northern Makgadikgadi Pans system in 2009 (R. Randall, pers. comm.). When Lake

Ngami fills, Slaty Egrets turn up there as they did in August 1989 and again in August 2004 when about 20 were noted at the leading edge.

Malawi: Although there are several claims for Slaty Egrets in Malawi (e.g. on the lower Shire River), none of these have been confirmed (Bob Medland, *in litt.*).

Mozambique: Whilst recorded by Ginn *et al.* (1989) for the Zambezi Delta, Slaty Egrets were not seen in this delta by fieldworkers such as Bob Douthwaite, Richard Beilfuss and other observers from the International Crane Federation and from Mozambique; Carlos Bentos (pers.comm.) surveyed the Zambezi Delta fairly intensively for about eight or nine years up to 1994 and did not observe any Slaty Egrets.

BirdLife International (2000) noted that it wandered to the delta when not breeding but Parker (2001) did not mention Slaty Egret as occurring in the Zambezi Delta Important Bird Area. Parker (*in litt.* 2004) knew of no credible records for Slaty Egrets in Mozambique and he regarded its presence in Mozambique as unconfirmed.

However, Parker (2010) then reported confirmation of several sightings of single Slaty Egrets between 2003 and 2005 near Marromeu in the Zambezi River Delta by various observers and he now considers that the species is at least an occasional non-breeding visitor to central Mozambique.

Namibia: The population in Namibia is estimated as 300 birds (Simmons & Brown, *in prep.*) but could be as high as 600 (H. Kolberg, pers.comm.). Slaty Egrets occur in the Caprivi Strip on the Namibian side of the Linyanti/Chobe System and along the Okavango River upriver from Mohembo in Bwabwata National Park (including the former Mahango Game Reserve). When ephemeral pans in the Nyae Nyae system fill with rain, Slaty Egrets sometimes move in to breed in the Tsumkwe area (Hines 1992). Occasional birds turn up elsewhere as at Daan Viljoen reserve near Windhoek in February 2008 and also recently at Etosha Pans.

In the former Mahango Game Reserve January counts along the Okavango generally produce only one or two birds (one in 1993, 1995 and 1999, two in 2001) whilst winter counts in July/August at Mahango have included one in 1991, four in 1997, eleven in 2000, two in 2001 (at Shamvura) and six in both 2002 and 2003 (Mark Paxton & Linda Sheehan, pers. comm.). Usually single birds are encountered, sometimes groups of three to four birds all keeping their distance from one another.

In the Caprivi along the Chobe River 15 Slaty Egrets were counted in September 1998 (Mark Paxton & Linda Sheehan, pers. comm.). Simmons & Brown (*in prep.*) noted nine birds in 23 km of the river and estimated that along the 100 km of the Chobe in Namibia there might be 40 birds.

The Namibian population could be the same as the Botswana population birds moving up and down the Okavango River and along the Chobe/Linyanti River.

South Africa: The species is regularly recorded in South Africa, but is overall sparse in occurrence. It has been recorded in every month of the year, with peak numbers from November to February, coinciding with peak floods in north-eastern South Africa. Numbers vary from one to eight individuals per year, with a marked increase in reporting rates since 1999 to present. Most records are believed to pertain to non-breeding wanderers or dispersing immatures, with only one confirmed but unsuccessful breeding attempt recorded at Nylsvley Nature Reserve (Tarboton 1996). The majority of South African records are concentrated in

the north-east, with core distribution centres on the Highveld wetlands around Johannesburg, and in temporarily inundated pans, river floodplains and farm dams in the Bushveld north of Pretoria (but partly attributable to increased observation by birdwatchers in this populated part of the country). Additionally, singletons have been recorded on the Limpopo River, in Kruger National Park, in the northern KwaZulu-Natal reserves, in Seekoeivlei wetland of the eastern Free State, and in atypical habitat in Kgalagadi Transfrontier Park and near Niewoudtville in the Northern Cape.

Zambia: The species occurs at least in some years in the Barotse floodplain, Liuwa Plain, Kafue Flats, Bangweulu swamps and Simungoma on the Zambezi floodplain. Seasonal movements have been shown by Aspinall (1989). Although there are no breeding records, Pete Leonard suspected that they may now be breeding at Lochinvar as a short-billed juvenile was seen there in 1997. Some 21 birds were seen there in January 2003 by Carl Beel and about 100 birds were at Liuwa National Park in June 2003; these included 54 in one flock (Demey 2003). Bob Douthwaite (pers. comm.) has had no recent sight records from the Kafue Flats but some birds were seen there by Richard Beilfuss (pers. comm.) during crane surveys. The estimated Zambian population ranges from a few hundred (Bob Dowsett) to 500-1000 birds (Pete Leonard, in BLI 2000).

Zimbabwe: The species is sparse and uncommon in Zimbabwe although a very small population appears to be resident in Kazungula Swamp in the extreme west of the country, bordering on Botswana. Between 1978 and 2005 there were 33 records of the species in Zimbabwe, mainly of single birds but occasionally of up to four individuals. Eleven records come from the Kazungula to Victoria Falls area of the Zambezi River but most are from Mashonaland, particularly the two dams on the Manyame River, Lake Chivero (Lake McIlvaine) and Lake Manyame (Darwendale Dam/Lake Robertson) built in 1973 (see MacCallum 1990). These dams have attracted 14 records. The first record in Zimbabwe was of a bird at Rainham Dam close to Harare in 1978 with another record 10 years later from this dam. Occasional Slaty Egrets wander into other areas of the Mashonaland Highveld Zimbabwe when non-breeding; four records come from Ngamo Pan in Hwange National Park, one from Kazuma Pan on the Botswana/Zimbabwe border south of Kazungula and one bird was seen on the middle Zambezi River in the north.

In the Kazungula to Victoria Falls area of the Zambezi River where Slaty Egrets may breed records come from all months except February but mostly in March and April and from August to November. Up to four birds were seen there in March to May 1987. Mashonaland records are mainly from October to April with singles in May, June and September.

For important sites in each country see Appendix 3.

Population size and trends are poorly understood because of the dispersed nature of this species in often inaccessible floodplains. Table 2 provides some estimates from casual records and from a concerted effort in 2004/2005 to visit as many areas of the Okavango Delta as possible and to carry out coordinated counts at a sample of roosts. The lack of good historical data and of more recent data from most range states makes it difficult to assess any real trends.

<i>Table 1 Population size and trend by country</i>	Breeding numbers	Quality	Year(s) of the estimate	Breeding population trend in the last 10 years (or 3 generations)	Quality	Maximum size of migrating or non breeding populations in the last 10 years (or 3 generations)	Quality	Year(s) of the estimate
<i>Botswana</i>	? up to 500 pairs 50-60		1990s 1988-89	Unknown		Est. 2000-3000	Good (estimate)	2005
<i>Namibia</i>	?			Unknown		300	Good (estimate)	2005/6
<i>South Africa</i>	3-5 in years of good rainfall			None known		3-25	Medium (inferred)	2000-2010
<i>Zambia</i>	?			None known		200-300 to 500-1,000	Medium (estimate)	2005
<i>Zimbabwe</i>	0			-		? <20	Medium (inferred)	
<i>Angola</i>	0			-		?		
<i>Mozambique</i>	0			-		1-2	Poor (suspected)	2010
Overall						Ca. 4,000		

Notes

- ✓ **Quality: Good (Observed)** = based on reliable or representative quantitative data derived from complete counts or comprehensive measurements.
Good (Estimated) = based on reliable or representative quantitative data derived from sampling or interpolation.
Medium (Estimated) = based on incomplete quantitative data derived from sampling or interpolation.
Medium (Inferred) = based on incomplete or poor quantitative data derived from indirect evidence.
Poor (Suspected) = based on no quantitative data, but guesses derived from circumstantial evidence.

Breeding records in Botswana

Despite the size of the Okavango Delta, few breeding colonies containing a mix of herons, egrets, storks or pelicans, have been recorded. The best known mixed heronries are in Moremi Game Reserve on the Maunachira River, viz. Xakanaxa, Gadikwe and Gcobega lagoons (Cooper 1969, Masterson 1971, Fothergill 1982, Gaosafelwe *et al.* 1997, Tyler *et al.* 2002, Tyler & Hancock 2006). Other heronries have been found at Xhamu Lediba at the bottom of the Panhandle (Patterson 1976, Newman 1985), on the Boro River near Xaxaba (Randall & Herremans 1994) and by the Okavango River below Shakawe (Pryce *et al.* 2004).

Slaty Egrets have been found in only one of these mixed heronries although D. Skinner recorded Slaty Egrets breeding with other species in 1980/81; unfortunately no further details are provided (Anon 1981). Generally it seems that Slaty Egrets nest earlier than other herons and egrets and nest in single species colonies or with Rufous-bellied Herons. Eleven Slaty Egret breeding colonies are known in Botswana – one in the Chobe area and the rest in the Okavango Delta. Some are no longer occupied as the large one on the upper Boro in reeds but seven small active Slaty Egret breeding colonies have been found in the Okavango Delta since 2000 (see Appendix 2). These have mainly been single species colonies in reeds or in palm thickets.

2. - Threats

General overview

The Slaty Egret population may be declining due to a number of threats but there remains a general lack of key knowledge on the species. Particular gaps in knowledge relate to population size and trends, breeding sites, breeding biology, productivity and survival and the relative significance of threats in different range states.

The main threats include:

- (1) Loss of and degradation of, wetlands especially seasonal marshes due to drainage for agriculture, flood regulation and dams for hydropower generation and water abstraction.
- (2) Reduced feeding opportunities through reduction in prey from overfishing and reduced visibility due to catchment erosion and resulting siltation, to eutrophication and due to alien vegetation.
- (3) Reduced productivity due to various forms of human disturbance including fire.
- (4) Lack of protection and management of key sites in some range states.

Other minor threats include:

- (5) Trampling of reed-beds by Elephants *Loxodonta africana* and predation at some nest sites by African Fish Eagles *Haliaeetus vocifer* may also reduce productivity.
- (6) The use of insecticides for control of insect 'pests' such as Tsetse-fly *Glossina* sp. and Mosquitoes *Anopheles* might also adversely affect food availability.
- (7) Climate change is considered a threat in the long term.

1. Loss of and degradation of wetlands

Importance: High

Drainage of floodplains and other wetlands for agriculture is occurring throughout the species' range, particularly in Namibia, thereby reducing foraging areas for Slaty Egrets. An example is the cultivation of the shallow Lake Liambezi in the Chobe floodplain.

Dams can have major impacts if they reduce the extent of seasonal flooding downstream. A proposed dam on the Okavango River in Namibia upriver from the Botswana border was recently opposed because of concerns about effects downriver. Other proposals of similar concern have included siphoning off water from the Okavango River in Namibia to pipe to Windhoek. Again the major concern was about a reduction in the volume of water reaching the permanent swamps and seasonal floodplains of the Okavango Delta.

Not all dams are necessarily damaging. The impoundments might retain water throughout the year in areas which otherwise at times would be dry. For example, dams on the Manyame River in Zimbabwe afford foraging habitat for visiting Slaty Egrets. Even sewage lagoons might attract feeding egrets as at Phakalane Sewage Ponds near Gaborone in Botswana.

The extent of flooding over the seasonal floodplains of the Okavango Delta and the Chobe/Linyanti system on the Botswana/Namibian border is extremely variable and depends to a large extent on the amount of rain falling in the Angolan highlands. However, there is also a cyclical pattern that may occur over a 70-80 year period with a series of years of low flows followed by a series of years with high flows. The Okavango Delta and Chobe/Linyanti system are presently experiencing high flows and extensive flooding with water extending further south from the delta along the Boteti River, Lake Ngami again being full and the Savuti Channel in Chobe National Park once again flowing. Although anthropogenic activities

have no or little impact on these cyclical changes, any water abstraction from the Okavango River in Angola and Namibia could have severe consequences in the drier years.

2. Lack of protection of key sites and their management **Importance: High**

Not all the known breeding sites within Botswana are legally safeguarded. Nor is the occasional breeding site in Nyae Nyae Pans in Namibia. Protection and sympathetic management of wetlands in the Slaty Egret's range would help address some local threats.

3. Reduced feeding opportunities **Importance: Medium**

A reduction in prey and any reduction in visibility of prey could have severe consequences for Slaty Egrets. As much of the species' diet by weight and number comprises fish, over-fishing by local communities is of concern. On the Okavango River in Botswana fine mesh nets were introduced in the 1980s and have caused declines in Tilapia and other fish, especially where nets are set at the mouths of small channels. With a reduction in fish stocks in the Delta, some fishermen are now targeting Lake Ngami. Sport fishing is commonplace on the Okavango River but many sport fishermen now release any Tiger Fish they catch.

In Angola, Namibia and in other range states there is much cultivation of land immediately adjacent to watercourses. This can result in increased sedimentation as well as fertiliser or pesticide run-off. Increased sedimentation may reduce the visibility of the water for foraging Slaty Egrets as well as impacting on benthic invertebrates. Fertiliser run-off may cause algal blooms, again reducing visibility whilst pesticides may reduce the availability of prey.

Two South American species of aquatic plant from tropical and sub-tropical regions have invaded waterways and lakes in parts of Africa. They both have the potential to cause loss of biodiversity and reduce the available prey for Slaty Egrets.

Common Water Hyacinth (*Eichhornia crassipes*) is one of seven species of water hyacinth in the genus *Eichhornia*. It is a free-floating perennial that is very fast-growing; it spreads by stolons that break off into new plants and by seed which is produced in abundance and can be viable for 30 years. Water Hyacinth appeared in Lake Victoria in the 1980s and spread prolifically up to 1998. It was reduced by control methods to 2001 but has resurged in some places. It now occurs in Zimbabwe and Zambia. It has many adverse effects but it can smother aquatic life by de-oxygenating water and it reduces nutrients available for young fish. An introduced alien water fern (*Azolla sp.*) is quite extensive on quiet backwaters of the middle Zambezi River in Zimbabwe and may have a similar effect.

The Water Fern, Giant Salvinia or Kariba Weed (*Salvinia molesta*) is native to SE Brazil but has been introduced to many other countries including Africa. It covers the surface of water bodies forming a floating mat that blocks out sunlight needed by other aquatic plants and algae to photosynthesise and oxygenate the water. When the Water Fern dies and decays it uses more oxygen to the detriment of other aquatic life. It forms such a dense mat that it can kill plants, insects and fish trapped beneath. It occurs widely in Zimbabwe and in the Okavango Delta in Botswana. In Lake Kariba the waters became oligotrophic, to a great extent due to the Kariba Weed absorbing all the nutrients. Control methods have been locally successful, the main control agent being an introduced weevil *Cyrtobagus salviniae*. Controls on the movement of boats and fishing gear between waters also limit its spread.

These alien invasive plants by reducing biodiversity in wetlands and carpeting the water surface are very likely to have an adverse impact on Slaty Egrets through reducing the birds' food supply and affecting the visibility of its prey.

4. Reduced productivity through disturbance and fire **Importance: Medium**

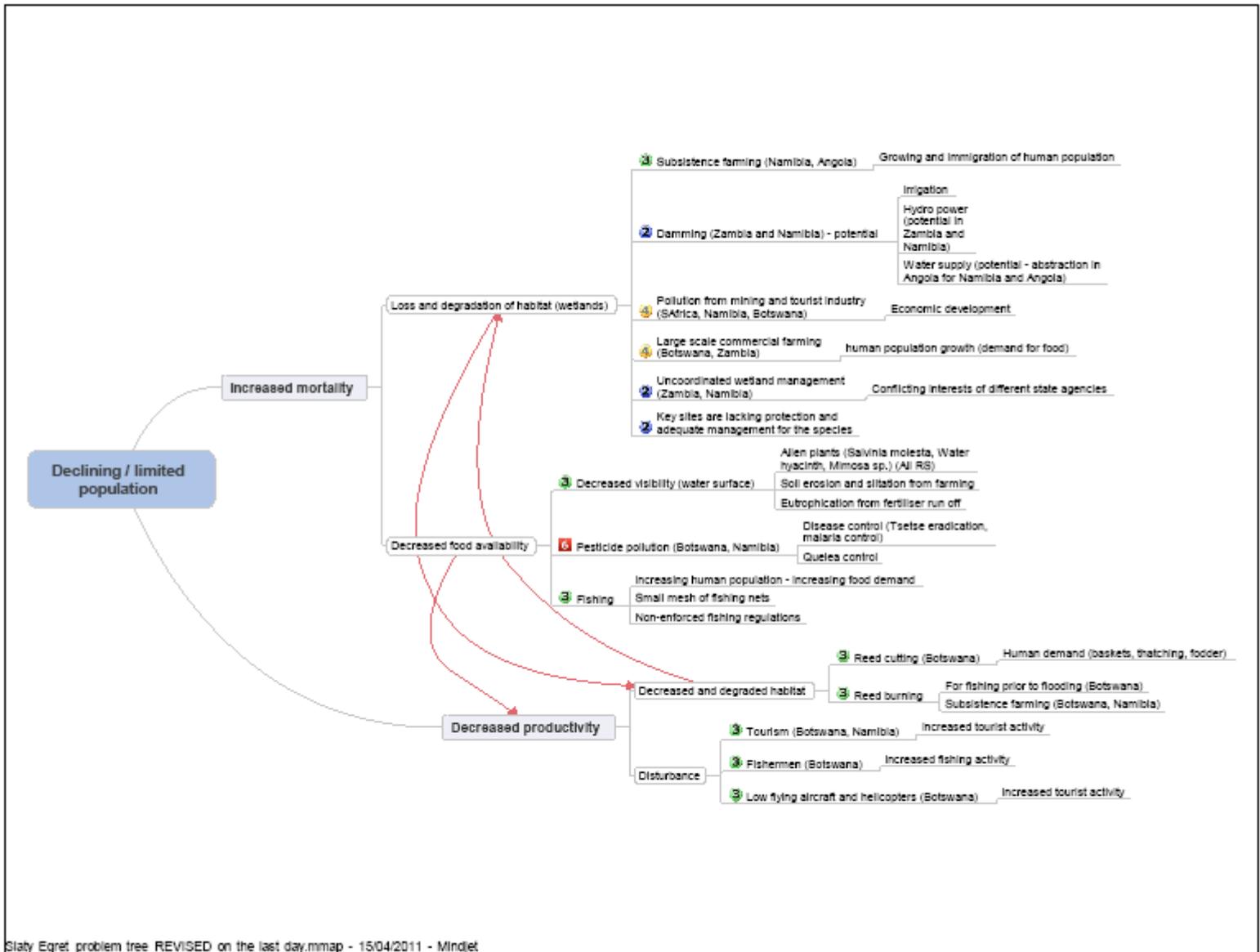
Although data are lacking, the disturbance of breeding sites in the Okavango Delta by fishermen and by people from local communities collecting reeds or palm leaves may locally cause problems. Fire is a major problem in the Delta in the dry season, some fires being the result of lightning strikes but others deliberately started. Fire may spread through breeding colonies especially those in reed-beds. Indeed the site of a major breeding colony in the 1990s was destroyed by fire. Whilst reed-beds will generally recover if water is not a limiting factor, in drier periods this may not be the case. Moreover, Slaty Egrets prefer well-established reed-beds with a tangle of old reeds and other vegetation and these cannot quickly be replaced. Slaty Egrets usually roost in reed-beds along with other egret species so the loss of or damage to reed-beds could restrict roosting opportunities too.

The threats facing the Slaty Egret are analysed in detail using problem trees (see below).

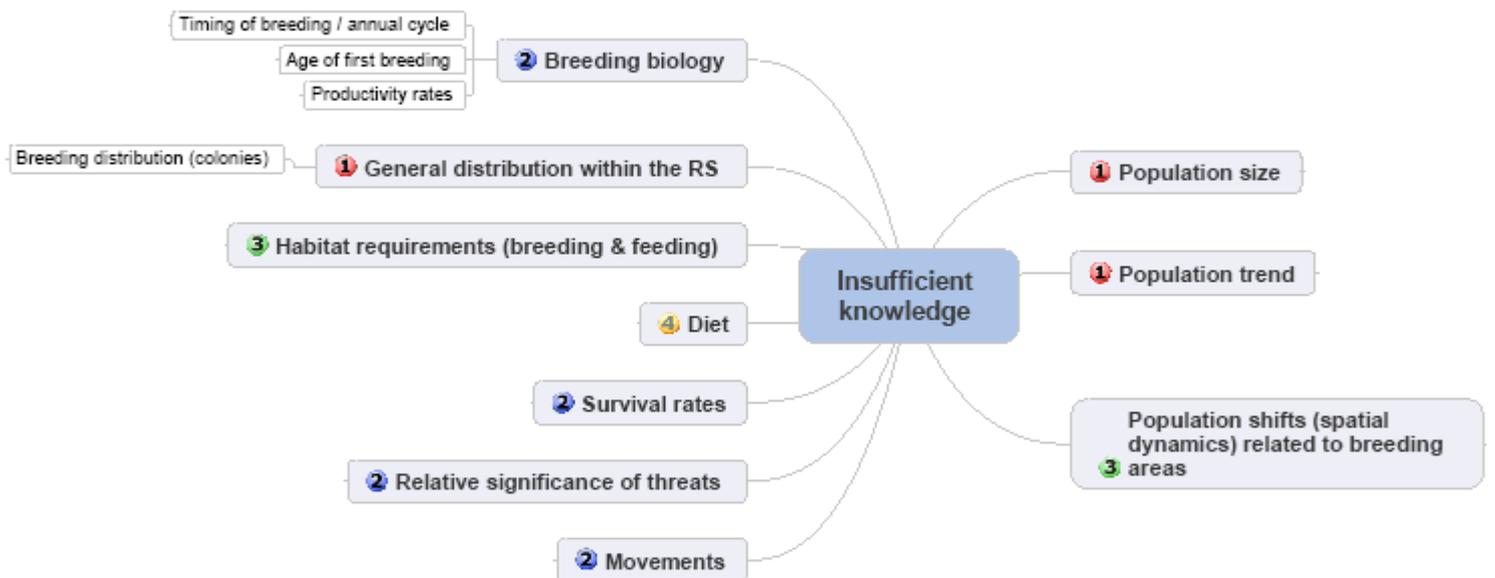
Importance: (critical (1), high (2), medium (3), low (4), local (5), unknown (6))
The importance of each threat is given for the global population.

- A full list of threats at national and biogeographical level is given in Appendix 1.

The Problem Trees created at the Slaty Egret Workshop in Maun are given below. The first problem tree shows factors believed to be causing population declines or limited population size. The second shows gaps in our knowledge.



Slaty Egret_problem tree_REVISED on the last day.mmap - 15/04/2011 - Mindjet



3 – Policies and Legislation relevant for Management

The countries where Slaty Egrets occur have all signed up to some international conservation conventions or agreements but only South Africa is at present signatory to the African Eurasian Waterbird Agreement (see Table 3.1).

Table 3.1: Membership of range states in International Conservation Conventions and Agreements

	AEWA	CBD	CMS (Bonn)	CITES	Ramsar	WHC
Angola		X				X
Botswana		X		X	X	X
Namibia		X		X	X	X
South Africa	X	X	X	X	X	X
Zambia		X		X	X	X
Zimbabwe		X		X		X

Slaty Egrets are only listed by Namibia and Botswana in their national Red Data Books and although in most range states they receive general protection along with many other species, few countries have given the species specific legal protection (see Table 3.2 below). Apart from attention given to Slaty Egret in the Okavango Delta Management Plan prepared because of the site's Ramsar status, no range state has developed an action plan for the species and monitoring of Slaty Egrets is very *ad hoc*, birds mainly being incidentally seen during biannual waterbird counts. Apart from in the Okavango Delta and in the Caprivi Strip there have been few attempts to establish the species' population size.

Table 3.2 National policies, legislation and ongoing activities

Country	Status in National Red Data Book	Legal status and responsible authority	National Action Plan	Monitoring programme
Angola		No legal status (Ministry of Environment)	None	None
Botswana	Included in RDB list	Protected species under (Ministry of Environment, Wildlife & Tourism)	Plan for Okavango Delta in Ramsar Management Plan 2006; a Slaty Egret working group existed in 2004 and 2005	Biannual waterbird counts at a sample of sites; occasional coordinated roost counts; sporadic visits to heronries
Namibia	Included in RDB list	Protected species under Nature Conservation Ordinance No.4 of 1975 (Ministry of Environment & Tourism)	None	Biannual waterbird counts but no recent cover of key sites
South Africa	Mentioned in an appendix of the Eskom RDB for South Africa, Lesotho and Swaziland *	No protection status	None	Biannual waterbird counts
Zambia	RDB in preparation	Protected species under Zambia Wildlife Act (Zambia Wildlife Authority)	None	Biannual waterbird counts
Zimbabwe	?	? General wildlife Act (Parks and Wildlife Management Authority)	None	Biannual waterbird counts

*This species is mentioned in an appendix of the Eskom RDB for South Africa, Lesotho and Swaziland, under the heading “Globally threatened peripheral species - no evidence yet exists for persistent established populations”. Thus it is “not viewed as Threatened or Near-Threatened in South Africa, but requires monitoring for other reasons.

4 – Framework for Action

Goal

Downgrade the species/population from the globally threatened categories in the IUCN Red List and remove the species from AEWA Column A, Category 1.

Purpose

Improve the current conservation status and knowledge base of the Slaty Egret within the next 10 years.

Overall aims are to prevent further habitat loss and degradation caused by human activities in areas of importance for the species, to ensure adequate food availability and accessibility, to avoid disturbance to breeding sites and to fill the most significant knowledge gaps.

Objectives

Four objectives have been outlined:

Objective 1. Prevent further habitat loss and degradation caused by human activities in areas of importance for the species

Objective 2. Ensure adequate food availability and access

Objective 3: Avoid disturbance at all breeding colonies

Objective 4: Fill most significant gaps in knowledge

Table 4.1: Results and indicators

Results	Indicators	Means of verification
Result 1.1: No detrimental dam constructions are implemented within the catchments of sites of importance for the species	Input into EIAs/SEAs; inclusion of OKACOM and ZAMCOM plans for hydrological constructions	Satellite images or aerial surveys of rivers; Inspection of EIAs/SEAs for potentially damaging projects; views sought of OKACOM and ZAMCOM
Result 1.2: Wetland management in each range state is undertaken in a coordinated way	Active national consultative Wetland Working Groups/Forums (inter-agency bodies)	Government reports on new inter-agency wetland working groups

Result 1.3: All key sites are protected and adequately managed for the species	Breeding and other key sites protected ; Slaty Egret requirements and local community engagement included in site management plans	Analysis of site management plans
Result 1.4: Impacts of subsistence farming on the species' habitat within key sites are minimized	Local community members involved in conservation of key sites Increased frequency of land use law enforcement activities per year	Satellite images or aerial photography of habitats
Result 1.5: Reed-beds used as breeding and roosting sites are not burned or harvested	Inclusion of breeding and roosting site safeguard measures in site management plans; populations and trends determined	Satellite imagery and on ground surveys of extent of resource
Result 2.1: Access to food is not limited by poor visibility at the water surface or by poor water clarity	Coverage/extent of removal/control of alien aquatic weeds. Frequency of landuse law enforcement activities per year to prevent erosion, siltation, fertilizer run-off etc. Access to food not limited	Aerial surveys of watercourses
Result 2.2: Food supply is sufficient to maintain a stable or increasing population of Slaty Egrets	Revised (improved) fisheries regulations in Botswana. Increased frequency of fisheries regulation enforcement and community engagement activities per year. Sufficient food for Slaty Egrets	Fish population trends produced by Fisheries Department; number of fishery enforcements and outcome of questionnaires put to local fishing communities about fish stocks
Result 3.1: Breeding colonies are not disturbed by tourists, fishermen or local villages	Agreements in plans and with local communities to avoid human disturbance during the presence of species at breeding colonies other than managed visits	National reports to appropriate government departments, NGOs and to AEWA on counts at breeding colonies and analysis of trends in breeding numbers
Results 4.1: Population size and trend are determined on a triennial basis as a result of extensive coordinated field surveys	Roost counts conducted at as many sites as possible every three years	Reports to appropriate government departments, NGOs and to AEWA
Result 4.2: Extent of the species' breeding and non-breeding	Collation of all sightings; special surveys carried out in all range states	Regional analysis of bird numbers and reports to appropriate

distribution in each range state are established with a focus on identifying all breeding localities and monitoring these regularly	through the year and efforts made to find breeding colonies	government departments, NGOs and to AEWA
Result 4.3: The species' movement patterns are determined through the use of remote tracking	Research outputs of scientific investigations - movement patterns understood	Resulting paper(s)
Result 4.4: The species' breeding biology are described more fully through intensive field studies	Research outputs of scientific investigations - breeding biology fully understood	Resulting paper(s)
Result 4.5: Age-specific survival rates are established through intensive field studies	Research outputs of scientific investigations	Resulting paper(s)
Result 4.6: The species' critical threats are determined through scientific research	Research outputs of scientific investigations	Resulting paper(s)

Table 4.2: Actions, their relative importance, time scale and lead agencies

Result	Action	Priority	Time Scale	Lead organization
Objective 1. Prevent further habitat loss and degradation caused by human activities in areas of importance for the species				
Result 1.1: No detrimental dam constructions are implemented within the catchments of sites of importance for the species	1.1.1 Monitor through ¹ OKACOM and ² ZAMCOM plans for hydrological constructions	Essential	Ongoing	Wildlife Departments or other appropriate agency
	1.1.2 Ensure that SEAs/EIAs carried out for proposals for damming take full account of the impact on the Slaty Egret and its habitat	Essential	As necessary	Wildlife Departments or other appropriate agency
	1.1.3 Develop and implement an advocacy plan	Essential	As necessary	Wildlife Departments or other appropriate agency
Result 1.2: Wetland management in each range state is undertaken in a coordinated way	1.2.1 Lobby for establishment of an inter-agency body to undertake integrated wetland management in the country (Zambia and Namibia)	Essential	Immediate	Wildlife Departments or other appropriate agency
Result 1.3: All key sites are protected and adequately managed for the species	1.3.1 Designate all unprotected known key breeding sites as protected under the national legislation	High	Ongoing	Government agencies and Conservation NGOs
	1.3.2 Designate as protected all key sites to be identified as such	High	Ongoing	Government agencies, Conservation NGOs
	1.3.3 Develop and implement management plans for those key sites with no plan at present, taking full account of the needs of Slaty Egrets	High	Short/Ongoing	Wildlife Departments or other appropriate agency
	1.3.4 Existing management plans for key sites should take full account of the needs of Slaty Egrets	High	Short	Wildlife Departments or other appropriate agency
	1.3.5 Involve local community groups in the conservation of key sites	High	Short/Ongoing	Wildlife Departments or other appropriate agency and conservation NGOs

Result 1.4: Impacts of subsistence farming on the species' habitat within key sites are minimized	1.4.1. Enforce existing legislation on land use at water bodies and water courses (Angola and Namibia)	High/Medium	Ongoing	Wildlife Departments or other appropriate agency e.g. Ministry of Agriculture and NGOs in Angola and Namibia
	1.4.2 Involve local community groups in the conservation of key sites	High	Short/Ongoing	Wildlife Departments or other appropriate agency and conservation NGOs – all range states
Result 1.5: Reed-beds used as breeding and roosting sites are not burned or harvested	1.5.1 Ensure the issues are addressed in management plans	High	Short/Ongoing	Wildlife Departments or other appropriate agency in all range states, especially Botswana
	1.5.2 Involve local community groups in the conservation of key sites	High	Short/Ongoing	Wildlife Departments or other appropriate agency and conservation NGOs in all range states
	1.5.3 Implement a fire control strategy	High	Ongoing	Government agencies in all range states
Objective 2. Ensure adequate food availability and access				
Result 2.1: Access to food is not limited by poor visibility at the water surface or by poor water clarity	2.1.1 Continue ³ alien aquatic weed control in Slaty Egret key sites as a matter of priority	Medium	Ongoing	Wildlife Departments or other appropriate agency in Botswana, Zambia and Zimbabwe
	2.1.2 Start control measures at key sites where there is no control at present, where feasible	Medium	Ongoing	Wildlife Departments or other appropriate agency in Namibia and / Angola
	2.1.3 Enforce existing legislation on land use by water bodies and watercourses to prevent erosion, siltation and fertilizer run-off	High	Medium/Ongoing	Agriculture Departments or other appropriate agency
	2.1.4 Ensure management plans address these issues			
Result 2.2: Food supply is sufficient to maintain a stable or increasing population of Slaty Egrets	2.2.1. Improve fisheries regulations in Botswana e.g. mesh size	High	Medium	Fisheries and Wildlife Department or other appropriate agency in Botswana
	2.2.2 Enforce fisheries regulations in sites of importance for Slaty Egrets	High	Ongoing	Fisheries and Wildlife Departments or other appropriate agency in all range states

	2.2.3 Involve local community groups in the conservation of key sites through support and expansion of local conservation groups, e.g. Site Support Groups and their activities	High	Short/Ongoing	Wildlife Departments or other appropriate agency and conservation NGOs
Objective 3: Avoid disturbance at all breeding colonies				
Result 3.1: Breeding colonies are not disturbed by tourists, fishermen or local villages	3.1.1. Seasonally exclude boat traffic from close to breeding colonies	Essential	Ongoing	Wildlife Departments or other appropriate agency
	3.1.2 Raise awareness of the issues from boat traffic and low-flying aircraft and helicopters	Essential	Ongoing	Wildlife Departments or other appropriate agency
	3.1.3 Better enforce civil aviation regulations	Essential	Ongoing	Wildlife Departments or other appropriate agency
	3.1.4 Raise awareness among tour operators on the impacts of disturbance	Essential	Ongoing	Wildlife Departments or other appropriate agency
	3.1.5 Raise awareness among fishermen and local village people on impacts of disturbance	Essential	Ongoing	Wildlife Departments or other appropriate agency
Objective 4: Fill most significant gaps in knowledge				
Results 4.1: Population size and trend are determined on a triennial basis as a result of extensive coordinated field surveys	4.1.1. Convene a technical Working Group	Essential	Immediate	Coordinator of the Slaty Egret International Working Group
	4.1.2 Encourage setting up of National Slaty Egret Working Groups in all range states	Essential	Short/Ongoing	Governments, NGOs, Academic Institutions
	4.1.3 Develop an international strategy and work plan	Essential	Immediate	Technical Working Group (TWG)
	4.1.4 Implement the strategy and work plan	Essential	Short/Continuous	Governments, NGOs, Academic Institutions
	4.1.5 Publish and disseminate results of the surveys	High	As results become available	Authors and Technical Working Group of SEIWG
	4.1.6 Initiate/strengthen waterbird databases in range states and ensure that the Slaty Egret is included	High	Ongoing	Research institutions, Government agencies
Result 4.2: Extent of the species' breeding and non-breeding distribution	4.2.1 Develop and implement a research project	Essential	Immediate and ongoing	Technical Working Group (TWG), Governments, NGOs, Academic Institutions

	4.2.2 Publish and disseminate results of the surveys	High	As results become available	Authors and TWG
Result 4.3: The species' movement patterns are determined through the use of remote tracking	4.3.1 Develop and implement a research project	High	Short	TWG, SEIWG Coordinator, NGOs, Governments, Academic Institutions
	4.3.2 Publish and disseminate results	High	As results become available	Authors and TWG
Result 4.4: The species' breeding biology are described more fully through intensive field studies	4.4.1 Develop and implement a research project	High	Short	TWG, SEIWG Coordinator, NGOs, Governments, Academic Institutions
	4.4.2 Publish and disseminate results	High	As results become available	Authors and TWG
Result 4.5: Age-specific survival rates are established through intensive field studies	4.5.1 Develop and implement a research project	High	Short	TWG, SEIWG Coordinator, NGOs, Governments, Academic Institutions
	4.5.2 Publish and disseminate results	High	As results become available	Authors and TWG
Result 4.6: The species' critical threats are determined through scientific research	4.6.1 Develop and implement a research project	High	Short/ongoing	TWG, SEIWG Coordinator, NGOs, Governments, Academic Institutions
	4.6.2 Publish and disseminate results	High	As results become available	Authors and TWG

¹OKACOM – The Permanent Okavango Basin River Water Commission – was set up in 1994 when an agreement was signed by three member states – Angola, Botswana and Namibia – to promote co-ordinated and environmentally sustainable regulation of water resources development, whilst addressing the legitimate social and economic needs of each riparian state. A Secretariat provides administrative, financial and general secretarial services to OKACOM. A newsletter – *Okaflow* – is disseminated to interested parties.

²ZAMCOM – Zambezi Watercourse Commission (intergovernmental organisation) – agreement to set up ZAMCOM was agreed in July 2004 in Kasane, Botswana. Four countries have ratified; six of eight countries must sign up before the Commission comes into force. ZAMCOM's main objective is to promote equitable and reasonable utilization of water resources of the Zambezi watercourse and ensure efficient management of resources and sustainable development.

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APPENDIX 1.

Threats by country:

ANGOLA:

- 1) Lack of knowledge of the species' occurrence, its distribution and its breeding status
- 2) Increasing human population along Okavango headwaters

BOTSWANA

- 1) Limited knowledge of breeding status.
- 2) Limited knowledge of productivity and survival.
- 3) Fire destroying reed-beds which are used as breeding and roost sites.
- 4) Disturbance at breeding colonies from human activities – subsistence farming, gathering reeds, fishing, tourism, low-flying aircraft - and from domestic stock and game.
- 5) Competition with other herons and egrets?
- 6) Use of insecticides for control of insect 'pests' such as Mosquitoes and Tsetse-flies might also adversely affect food availability.
- 7) Alien aquatic weeds, notably *Salvinia molesta*, may carpet water surface and restrict foraging.
- 8) Declining fish stocks due to heavy use of monofilament nets and over-fishing may reduce prey availability.

NAMIBIA

- 1) Degradation of wetlands from agriculture.
- 2) Lack of integrated approach to the use of wetlands between Government agencies.
- 3) Disturbance.
- 4) Increasing human population and concentration of people along watercourses.
- 5) Lack of integrated approach to the use of wetlands between Government agencies.
- 6) Use of insecticides for control of insect 'pests' such as Mosquitoes and Tsetse-flies might also adversely affect food availability. DDT is still used for spraying mosquitoes and washing out of containers into watercourses may cause problems.
- 7) Hunting pressure?

ZAMBIA

- 1) Lack of knowledge of the species' occurrence, its distribution and its breeding status
- 2) Lack of integrated approach to the use of wetlands between Government agencies
- 3) Use of insecticides for control of insect 'pests' such as Mosquitoes and Tsetse-flies might also adversely affect food availability.
- 4) Alien aquatic vegetation

ZIMBABWE

- 1) Lack of knowledge of the species' breeding status.
- 2) Use of insecticides for control of insect 'pests' such as Mosquitoes and Tsetse-flies might also adversely affect food availability.
- 3) Alien aquatic vegetation.
- 4) Drainage of vleis and other wetlands for agriculture.

N.B. CLIMATE CHANGE will affect all range states

APPENDIX 2

Breeding sites:

a) Breeding sites in Botswana

Slaty Egrets in Botswana usually nest in small colonies sometimes with other herons or egrets (Ardeidae) such as Rufous-bellied Herons *Ardeola rufiventris* or Little Egret *Egretta garzetta*. The large breeding colony discovered by Tim Liversedge (see below) appears to be exceptional. Until 2000 only three breeding sites were known in the Okavango Delta and one in the Chobe system. Since then Slaty Egrets have been found breeding at seven other sites in the Delta. Breeding occurs between March and August in years of high floods and after good rains.

1. Xakanaxa Lediba – This is a site known from June 1975 when Dowsett (1981) noted one nesting pair in Water Figs *Ficus verruculosa*. Then 11 nests were reported in March 1985 (Anon 1985, Fry et al. 1986). In Oct 2005 there were six pairs in Water Figs at this lagoon (P. Hancock, pers. comm.).
2. Boro River near Baboon Camp – 50-60 pairs of Slaty Egrets bred in reed-beds in 1988, 1989 and 1992 (Randall & Herremans 1994).
3. Top of the Boro system in reed-beds in early 1990s – 500 pairs (T. Liversedge, pers.comm.).
4. Jao Palm Island – Atkinson (2003) found breeding birds in a palm *Phoenix reclinata* thicket in June-August 2003, in 2004 and birds were again seen by P. Hancock in 2006.
5. Near Maya Pan, Fourth Bridge – in June 2000, near Maya Pan in the Xakanaxa region of Moremi Game Reserve, Reed (2006) noted at least four pairs of Slaty Egret busy constructing nests in a dense thicket of Candle-pod *Acacia hebeclada*. These trees were in an open flood plain that covered approximately 2 ha. This area had flooded historically but not in the 1980s or 1990s; only the very heavy rains and high floods of 2000 (and 2006 and 2009) filled this floodplain again.
6. Xini Lediba, Moremi Game Reserve – several pairs nested in a reed-bed in winter 2004 and again in May 2006 (Mark Muller, pers. comm.).
7. Qagha Island between Xigera and Mombo – more than 30 pairs nested on five palm islands at three sites in March/April 2006.
8. Reed-bed 2km north of Eagle Island Camp in the Boro floodplain – at least 2 pairs were nesting in April 2006 and 6-10 pairs in May 2006 (P.Hancock & Ken Oake); also Sept 2009.
9. Xou Lediba area – seen from microlight in May 2006 (Mark Muller & Brian Bridges, pers. comm.). ?number of pairs
10. Kasane Rapids – Randall (2001) found three to four pairs breeding in reeds by the Chobe River in June 1996 and five or six pairs in 1997.
11. Near Pom Pom airstrip in NG 30 near Xoranna Camp – occupied by Slaty Egrets and Rufous-bellied Herons in 2010.

A twelfth possible breeding site is currently under investigation (July 2011)

b) Breeding sites in Namibia and South Africa

In Namibia the only known breeding sites were in *Acacia kirkii* trees in an inundated area in the Tsumkwe area of the Nyae Nyae Pans system in northern Namibia. There were 12 nests in 1989 and five in 1994. In South Africa the only recent record is of a pair building a nest in a mixed egret colony at Nylsvlei Nature Reserve. This nest had two eggs in March 1996 but both the nest and eggs later disappeared.

c) Breeding biology

The nest is typical of small herons, being a platform constructed of sticks (30-40 cm in diameter and 10 cm deep) with no lining of reeds and measuring 30-40 cm in width and 10-15 cm in depth. The

clutch is 2-3 eggs of a pale blue-green colour and incubation is by both sexes as in all Ardeids (Fry *et al.* 1986, Hines 1992, del Hoyo *et al.* 1992). Of 11 nests in Moremi Game Reserve in 1985 eight contained two eggs, one had three eggs, one two chicks and the last nest had an egg and a chick. Eggs in Namibia measured 40.2-45.9 x 29.5-32.6 mm; the mean weight of 25 eggs in Namibia was 23.2 g with a range of 21-25 g (Hines 1992). Little is known of the incubation length but is 14-20 days in small bitterns and 18-30 days in larger species (del Hoyo *et al.* 1992). Hines (1992) found an incubation length of about 24 days at one nest and noted that in other small herons it was up to 27 days. Hatching is asynchronous because birds begin incubating from the first or second egg. Chicks have blackish down but are paler below. As in all herons, egrets and bitterns both sexes feed and guard the chicks. One adult always guards the nest with chicks whilst the other is away foraging. The fledging period is 25-30 days in small bitterns (maximum of 12-13 weeks in large *Ardea* herons) but chicks often leave the nest and wander about in the tree canopy or in reeds when half-fledged. It is not known at what age the egrets first breed but in small herons this is usually when one year old.

APPENDIX 3

Important sites in each range state where Slaty Egrets occur

Country	Main site	Ha	IBA/ RAMSAR	Protected status
Angola	Cuando/Cubango		None	No protection
Angola	Cuito-Cubango floodplains		None	No protection
Botswana	Okavango Delta	1,800,000	IBA; Ramsar site	Part (ca. 30%) protected in Moremi Game Reserve; Wildlife Management Areas cover much of remainder (60%)
Botswana	Chobe/Linyanti floodplain	ca.20,000	IBA	Part protected by Chobe National Park (on southern side of river)
Botswana	Lake Ngami	25,000-35,000	IBA; within Okavango Delta Ramsar site	WMA
Namibia	Nyae Nyae Pans System	120,000	IBA	No protection other than communal conservancies
Namibia	Okavango River/Bwabwata National Park, NE Namibia	24,462	IBA	Partially-protected by Bwabwata N.P. (637,363ha); this includes the former Mahango Game Reserve to the west of the river, the old West Caprivi Game Park and some formerly unprotected land to the east
Namibia	Eastern Caprivi wetlands	468,000	IBA	Partially protected by Mudumo N.P. (73,179 ha) and Mamili N.P. (34,582 ha) and Bwabwata N.P.to the west of the Kwando
South Africa	Nylsvley Nature Reserve in the Nyl floodplain	16,000	Ramsar site since 1998	N.R. is 3,985 ha
South Africa	Ndumu Game Reserve, Gauteng	12,420	Ramsar site since 1997	Proclaimed in 1939 as a Game Reserve since 1997
South Africa	Blesbokspruit drainage including Marievale Bird Sanctuary	1,858	Ramsar site since 1986	Part-protected
South Africa	Pienaars River floodplain	Ca. 2,700	X	Unprotected
Zambia	Simungoma, west Zambia; Zambezi floodplain	100,000	IBA	Woodland away from Zambezi floodplain protected as National Forest Reserve

Zambia	Bangweulu Swamps	1,284,000	IBA	The IBA is 40% of wetland area of Bangweulu basin. Part is Chikuni Game Management area which is a Ramsar site of 250,000 ha
Zambia	Liuwa Plain National Park	366,000	IBA	=National Park
Zambia	Kafue Flats	650,500	IBA; largely included in a Ramsar site of 600,500 ha	Comprises Kafue Flats Game Management Area (517,500 ha) and two National Parks – Lochinvar (41,000 ha) and Blue Lagoon (42,000 ha)
Zambia	Kafue National Park	2,240,000	IBA	= National Park
Zambia	Barotse floodplain	730,000	IBA	Within larger protected West Zambezi Game Management Area
Zimbabwe	Kazungula Swamp in west			Unprotected
Zimbabwe	Robert McIlwaine Recreational Park, includes Lake Chivero on the Manyame River and Lake Manyame near Harare	6,180	IBA	Protected under the Parks and Wildlife Act but much poaching is occurring