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The Maccoa Duck *Oxyura maccoa* International Species Action Plan

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Acronyms

ADU	Avian Demographic Unit, University of Cape Town
AEWA	African Eurasian Waterbird Agreement
AGRED	African Gamebird Research Education and Development Trust
AWC	African Waterbird Census
CBD	Convention on Biological Diversity
CITES	Convention on the International Trade in Endangered Species
CMS	Convention on Migratory Species (Bonn Convention)
CWAC	Co-ordinated Waterbird Count (South Africa)
IAAPs	Interested and Affected Parties
IBA	Important Bird Area (of BirdLife International)
EWT	Endangered Wildlife Trust
MDAG	Maccoa Duck Action Group
NRF	National Research Foundation (South Africa)
SSC	Species Survival Commission (of the IUCN)
IUCN	International Union for the Conservation of Nature
WCST	Wildlife and Conservation Society of Tanzania
WFW	Working for Water (South Africa)

Executive summary

The Maccoa Duck *Oxyura maccoa* is a localized, relatively scarce species confined to Africa, with northern (Ethiopia, Kenya, Tanzania and Eritrea) and southern (Angola, Namibia, Botswana, Zimbabwe, South Africa and Lesotho) populations. Previous estimates of its population size, particularly northern populations, were not based on hard data. These reports gave an impression that this species was far more numerous than the actual situation. Similarly, its distribution was described as including several countries for which there were either no records, or very few, giving a false impression of a wider distribution.

Apart from correcting the status of both populations to reflect its true abundance and distribution, information on trends in populations are presented. The northern populations appear to be in rapid decline. The southern population has now stabilised, after a period of increase in range and abundance following colonisation of artificial impoundments. The first national estimate of the population size of Maccoa Ducks in South Africa based on count data is given. At 4500-5500 birds, South Africa has the largest national population of this species, however, there is some evidence that the South African populations may now be in decline. The revised global population estimate is 9000-11750 birds.

Both the estimates of the total population size and rate of declines in at least the northern populations indicate that the status of this species should be elevated to Near-threatened globally, and more precise work on Southern Africa populations may show this species to have a global status of Vulnerable with a global population less than 10 000 birds. Regardless, it is clear that the conservation status of this species is worse than previously understood, and both research and conservation actions are required to quantify the conservation risks.

A primary element of future action is creating awareness amongst conservation organisations at international and national level on the need for concern about this species.

Because of a lack of information and lack of definition of threats, many of the proposed activities will depend on a more accurate assessment of threats and a better understanding of the biology of the Maccoa Duck, particularly its movements between breeding and non-breeding seasons.

The Maccoa Duck feeds mainly on benthic invertebrates, and thus has a higher position in the trophic chain compared to most ducks, which often feed to a larger extent on plant foods. Therefore the Maccoa Duck may be a better indicator than most wetland bird species of pollution resulting from biological concentration of contaminants up the food chain, and may also be a useful indicator of wetland quality.

The northern and southern populations appear to be subjected to different set of threats. Northern populations appear to be subject to factors resulting largely from the subsistence activities of local communities. The perceived threats to the southern populations are the result of the increasing commercialisation of agriculture and intensification of industry (e.g. pollution) and development of urbanisation with demands for leisure activities and disposal of wastes.

The Workshop saw the formation of the Maccoa Duck Action group with AGRED offering a secretariat for co-ordinating communication and action. The possibility that this group may evolve into an International Species Working group under AEWA is discussed.

1. Biological Assessment

General information	The Maccoa Duck is a highly aquatic diving duck restricted to eastern and southern Africa. It has always been comparatively scarce and its biology is not well known. Movements are poorly understood but most movements probably take place over distances of <500 kms. Breeding demographics are not well documented, so that interpretation of its biology in relation to breeding is not simple. This is particularly true for its distribution and movements. Previous estimates of its numbers have been far too high, based on repeated citations of estimates based on guesswork. These high estimates have helped mask the threat posed on northern populations in particular. The most detailed synthesis of the biology of this species is Colahan (2005).
Taxonomy	Class: Aves Order: Anseriformes Family: Anatidae Tribe: Oxyurini Genus: *Oxyura* Species: *O. maccoa* Subspecies: none defined Scott & Rose (1996) defined three separate and isolated populations in the Ethiopian highlands, East Africa and Southern Africa. No subspecies are recognised. They argued for separation of the East African population from the Ethiopian population, on the basis that the Maccoa Duck is an essentially sedentary species of highland areas in Ethiopia and East Africa. They felt that the geographic separation of these populations is a highly probable consequence of the broad band of unsuitable, low-lying country in south-eastern Sudan, southern Ethiopia and northern Kenya separating the two populations. However, historically, there are records from northern Kenya in this supposed gap region (Neil Baker pers. comm.), and it may be that there continues to be migration along the Rift Valley lakes between Ethiopia and countries further south. However, there is insufficient evidence at this stage to conclude these are a single population e.g. Nasirwa (*in litt*.) supports the contention of a large gap with little or no suitable habitat in the intervening area. Thus this Species Action plan accepts that there are two northern populations: the Ethiopian (including any Maccoa Ducks in Eritrea, following the first record of this species from that country) and the Tanzanian/Kenyan population. Clearly, this issue requires better resolution.
Population development	Historically, the Southern African population has increased during the twentieth century due to occupation of artificial impoundments in

	Namibia, Botswana and some areas of South Africa, presumably occupying Angola, Zimbabwe and Lesotho as a result. However, there are no indications that this spread is continuing and there is cause to believe that declines may have begun. However, it is also clear that the Southern Africa population is smaller than previously estimated, presumably a result of inadequate data. The populations in East Africa (centred on Kenya, Tanzania, Rwanda, Burundi and Uganda) have declined considerably, perhaps by as much as 50% in the last 10 years. Data for Ethiopia do not allow an accurate estimation of status, but indications from other wetland species suggest a slower decline. However, there is now a single record from Eritrea of five birds (see Table 2a), suggesting that there might be an additional small population there. For the northern populations, the estimated populations are lower than previously estimated by Dodman (in review), and far lower than by Scott and Rose (1996).
Distribution throughout the annual cycle	The northern populations are confined to comparatively small areas in Ethiopia, Tanzania, Kenya and Rwanda (one recent record), centred on lakes within the Rift Valley. The northern populations are now concentrated in high-lying inland areas. In Tanzania, movements recorded between breeding areas in temporary wetlands to concentrations in permanent deeper water when not breeding. In southern Africa, populations occur from sea-level in the west (South Africa and Namibia) to inland waters at high altitudes (Angola, Namibia, Botswana, Zimbabwe, South Africa and Lesotho). Movements probably take place over distances of less than 500 km, with occasional records of large numbers in non-breeding concentrations on larger wetlands.
Survival and productivity	Nothing recorded on longevity and annual survival. Survival from hatching to fledging is probably <50% (Clark 1964).
Life history: Breeding	The description of the nest and breeding is taken from Tarboton (2001). The Maccoa Duck nests over deep water in emergent vegetation, usually *Typha* or sedges. The nest is a deep, round bowl constructed from plant stems which are pulled down from a standing position, and woven into a bulky bowl-shaped structure with a deep open cup that stands 100-230 mm above the water. Some nests have a ramp leading from the water to the cup. The nest would be conspicuous, were it not screened by vegetation. Old nests of Red-knobbed Coot *Fulica cristata* are occasionally used. Nests are anchored to vegetation and therefore prone to flooding when water levels rise. Nests are surprisingly difficult to detect and females are very inconspicuous during the breeding season. Males are polgynous and promiscuous. Breeding males defend territories from other males. There may be several females breeding simultaneously within a male's territory within 20m of each other. Successful territories stretch for up to 80m along emergent vegetation, and unsuccessful males may hold inferior territories without breeding

	successfully (Siegfried 1976). Males take no part in incubation or chick rearing. Territorial behaviour often indicates breeding activity. The clutch is usually 5-6 eggs, but up to 12 recorded, with more than eight eggs being deposited by two females. Eggs are often dumped in other ducks' nests (see also Dean 1970, Milstein 1973, Lees-May 1974). Incubation of 25-27 days by female only and young cared for by female only. Maclean (1997) notes that in South Africa, it breeds in August –January (peak October-November) in the Western Cape Province, throughout the year in Gauteng, Mpumalanga and Northwest Provinces (Tarboton *et al*.1987), and throughout the year in Zimbabwe (Irwin 1981), although mainly in northern South Africa. Broadly speaking there is a winter trough and a summer peak in breeding. Timing of breeding appears to be related to rainfall. There is no marked synchronisation of breeding.
Life history: Feeding	Maccoa Ducks feed by diving for extended periods, with dives lasting for 15-22 seconds (Macnae 1959) during foraging spells of 30-60 minutes (Siegfried *et al.* 1976a). The diet is mainly small invertebrates, including midge larvae, ostracods, gastropods (Siegfried *et al.* 1976b), *Daphnia* and plant material (Stark & Sclater 1906), seeds of *Persicaria* and *Polygonum*, and roots and seeds of other plants (Brown *et al.* 1982).
Life history: Outside breeding season	Maccoa Ducks occur in concentrations in the non-breeding season on larger waters, which may be devoid of vegetation, but are presumably rich in invertebrates. The species is subject to local movements which vary from year to year, and which are not well understood.
Habitat requirements: Breeding	It breeds on inland waters, mainly smaller temporary and permanent freshwater deep nutritious wetlands (IUCN Habitats types 5.5, 5.6, 5.7 and 5.8). Emergent vegetation especially *Typha*, is critical for breeding (Irwin 1981, Hockey *et al*. 1989, Maclean 1997). It also breeds on sewage ponds (Maclean 1997). Irwin (1981) described the habitat as pans and dams providing some emergent vegetation with adjacent expanse of open water, nesting in clumps of sedges and rushes.
Habitat requirements: Feeding	Refer to breeding (above) and non-breeding sections (below).
Habitat requirements: Outside Breeding season	Uses large and small permanent and temporary freshwater wetlands (IUCN Habitats 5.5, 5.6, 5.7 and 5.8) as well as large or small permanent or temporary saline or alkaline wetlands (IUCN Habitats 5.14, 5.15, 5.16 and 5.17). When not breeding, it may use habitats without any emergent vegetation at all (Maclean 1997).

Distribution of the Maccoa Duck

The general distribution of the species is shown below (Fig. 1a), and is much modified from Scott & Rose (1996). Apart from the reduction in general distribution of the northern populations, the following four figures show how localised the distribution is within the broad limits of both the northern (Figs. 1b and 1c) and southern (Figs. 1d and 1d) populations.

The species was listed as occurring in several countries by Brown *et al*. 1982 and del Hoyo *et al.* (1992) but these records are not based on valid original information (Baker 2004). There is no information to suggest that the species has ever occurred in Malawi, Mozambique or Sudan or has ever been more than a vagrant in Swaziland and Burundi (Dodman in review, Parker 1994, Neil Baker this workshop.). There are two recent records of single birds in Uganda, both dated 2003 (Pauline Nantongo-Kalundu pers. comm). Thus the lack of more recent records from these countries does not indicate any actual loss in range. There are no records of recent occurrence in the Democratic Republic of the Congo and only one record in 1983 from Rwanda. Its present status in these countries is unknown (Neil Baker pers. comm.). O. Nasirwa (*in litt*.) notes that the species may still persist in western Kenya in areas, which are seldom visited.

The current distribution is shown below (Fig. 1a), with historical and current distributions in East Africa (Figs. 1b, 1c) and South Africa (Figs. 1d, 1e).

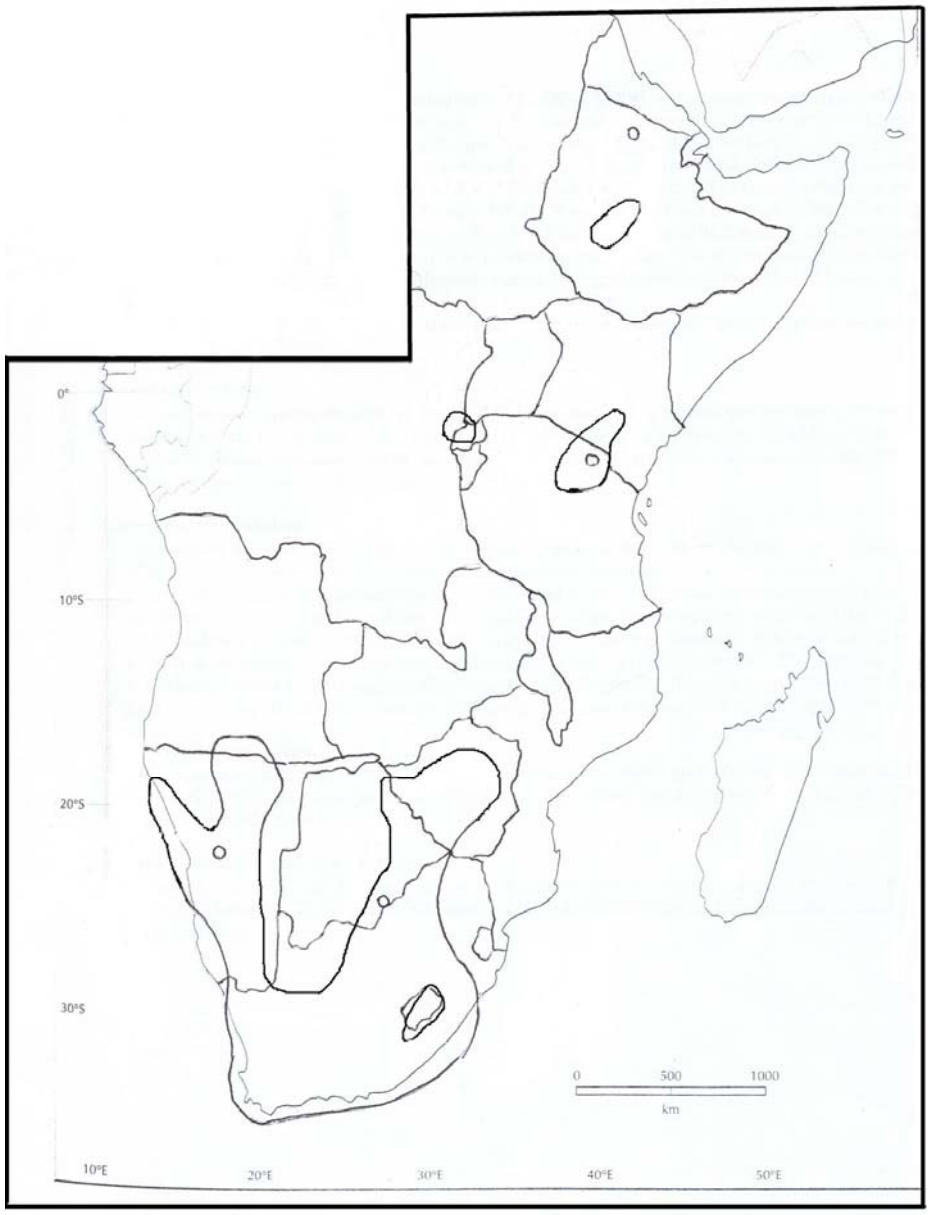


Figure 1a. The current global distribution of the Maccoa Duck based on Scott & Rose (1996) and revised according to Neil Baker (Tanzania Bird Atlas, this workshop, Figs. 1b & 1c), the South African Bird Atlas (Maclean 1997) and CWAC counts (M.J. Wheeler, ADU, this workshop, Figs. 1d & 1e).

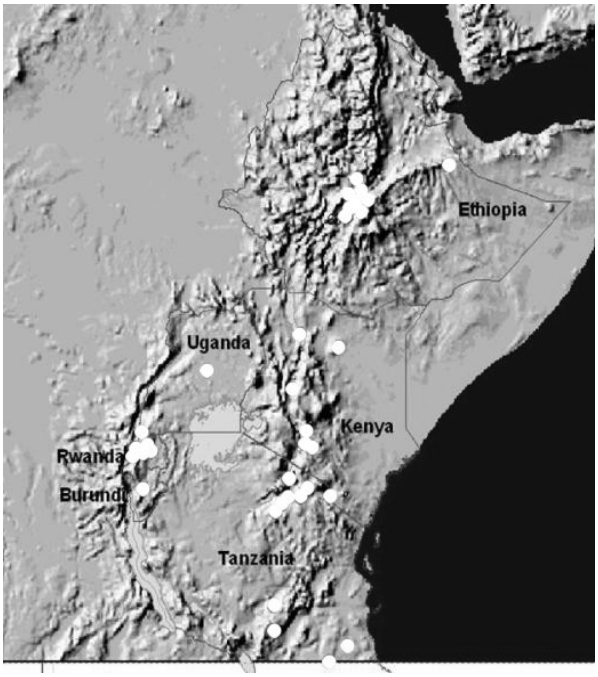


Figure 1b. The historical distribution records of the northern populations of Maccoa Duck (Neil Baker, Tanzania Bird Atlas).

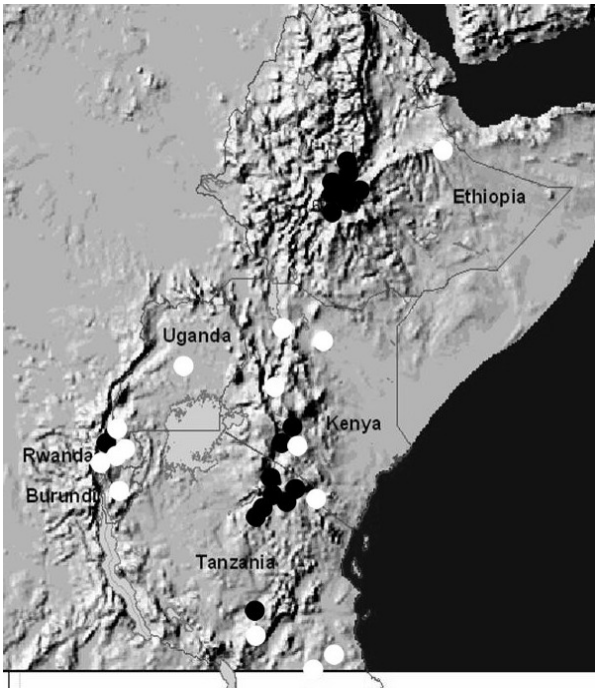


Figure 1c. The current distribution records of the northern populations of Maccoa Duck (Neil Baker, Tanzania Bird Atlas). White circles show sites where the Maccoa Duck no longer occurs and black circles show sites where it still occurs.

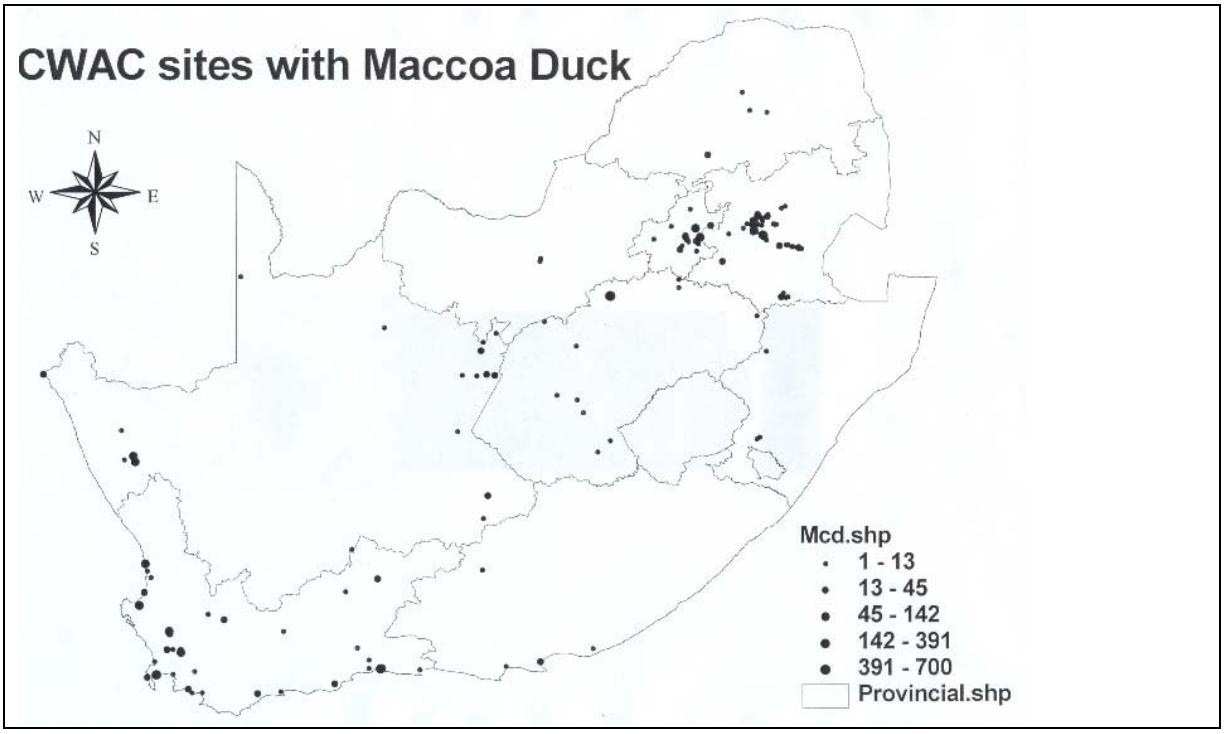


Figure 1d. Current distribution records of Maccoa Duck in South Africa (showing provincial boundaries) and numbers of birds recorded based on CWACs (M.J. Wheeler, ADU).

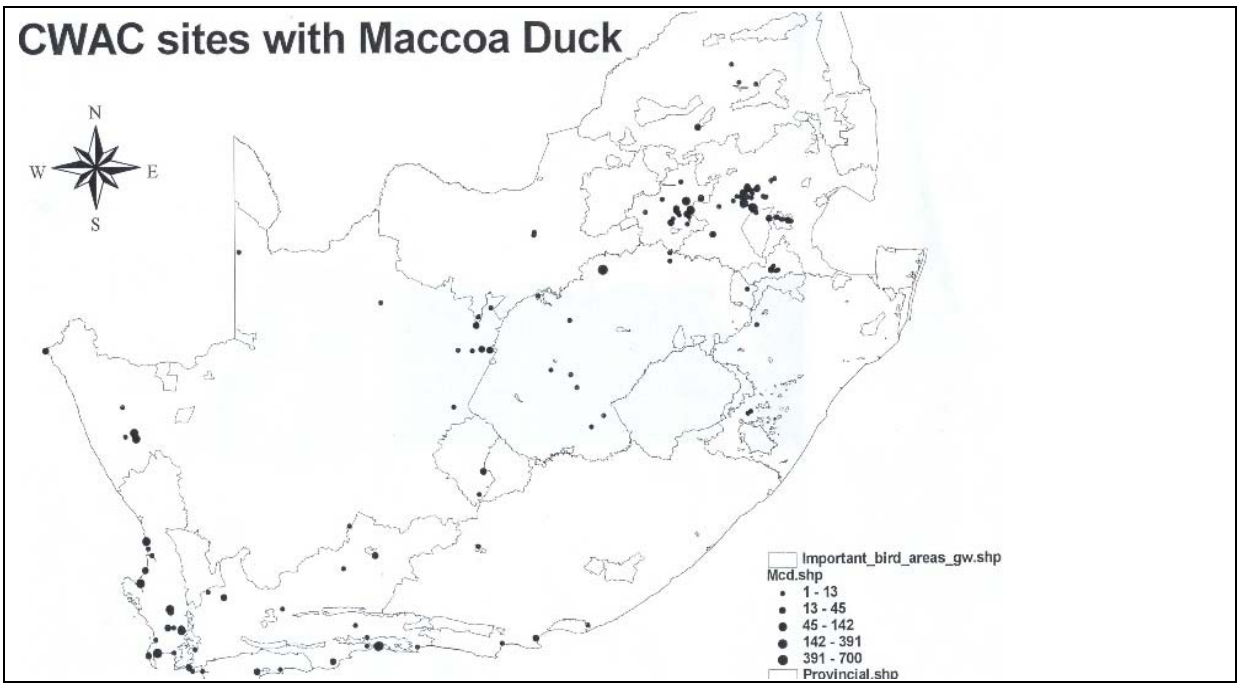


Figure 1e. Current distribution records of Maccoa Duck in relation to IBAs in South Africa from CWACs (M.J. Wheeler, ADU).

2. Available key information

Table 2a. Population estimates for the Maccoa Duck. It is not possible to distinguish between breeding and non-breeding populations for the Maccoa Duck in any country. Data quality, date of estimates and references in all cases do not separate breeding and non-breeding populations. Code for Quality is given as Good (Observed) (Go), Good (estimated) (Ge), Medium (estimated) (Me), Medium (Inferred) (Mi), Poor (Ps) and Unknown (Un), according to the format for AEWA Single Species Action Plan, Sept 2002.

Country	Breeding/ non-breeding no.	Quality	Year(s) of the estimate	Breeding Population trend in the last 10 years (or 3 generations)	Quality	Baseline population	References
Ethiopia	500-2000	Me	2005	Decline	Ps	1000-5000 500-3000	Scott & Rose 1996 Dodman in review
Eritrea	5	Go	2005	Unknown			Ken Harte in litt
Kenya	<1000	Ge		Decline Mi		No data	
Tanzania	500	Go	2005	Decline 50% Go			
Uganda	0?	Ps				?	
Rwanda	0	Ps				?	This workshop
East Africa (excludes Ethiopia)	1500	Ge	2005	Decline		15000-25000 1000-1500	Scott & Rose 1996 Dodman in review
Angola	50	Mi	Recent	Dean 2000		Absent?	
Namibia	2000	Go	1990s	Simmons & Brown *in prep*		Absent	Stark & Sclater 1906
Botswana	300	Ge	1999-2000	Tyler 2001		Absent	Smithers 1964
Zimbabwe	100-300	Mi	2005	Unknown		No data	
South Africa	4500-5500	Go	2005	Unknown		No data	
Lesotho	10-100	Go	1990	Unknown		No data	
Southern African region	7000-8250	Ge	2005	Unknown		>10 000 15000-25000 <10 000	Callaghan & Green 1993 Scott & Rose 1996 Dodman in review

Table 2b. Maccoa Duck population estimate for South Africa based on provincial population estimates using Coordinated Waterbird Counts (M.J. Wheeler, ADU). These are the sum of the maximum counts multiplied by a factor of 1.5, for wetlands where Maccoa Duck have been recorded.

Province of South Africa	Count
Western Cape	2148
Northern Cape	455
Eastern Cape	30
KwaZulu-Natal	6
North-west	14
Free State	1125
Mpumalanga	1257
Gauteng	305
Limpopo	48
Total	5388

Table 2c. Revised estimates of national population sizes of Maccoa Duck in Southern and Eastern Africa from this workshop.

Country	Estimate	Reference
Angola	50	Based on information in Dean 2000
Botswana	300	Tyler 2001
Namibia	2000	Simmons and Brown *in prep*.
South Africa	4500-5500	This workshop, Table 2b
Zimbabwe	100-300	This workshop
Southern African population	**7000-8250**	**This workshop**
Ethiopia	500-2000	This workshop
Eritrea	5	Harte (*in litt*.)
Kenya	1000	This workshop
Tanzania	500	This workshop
East African populations	**2000-3500**	
Global estimate	**9000-11750**	**This workshop (rounded estimates)**

Table 3a. Knowledge on habitat, diet and occurrence of the Maccoa Duck in Important Bird Areas and Protected Areas in countries in which the population equals or exceeds 50 birds.

Type of Knowledge	**Breeding and Non-breeding**								
	Ethiopia	Kenya	Tanzania	Angola	Namibia	Botswana	Zimbabwe	South Africa	Lesotho
Habitat and diet									
- Habitat use	Partly known	Partly known	Partly known	Partly known	Partly known	Partly known	Partly known	Partly known	Partly known
- Diet	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Partly known	Unknown
Site Protection									
- Number of IBAs where the species breeds or occurs	4	2	3	1	3	2	2	22	0
- Proportion of the population in IBAs	?	80%?	80%?	100%?	10%?	>50%	30%?	30%?	0
- Proportion of the national population in protected areas	?	80%?	80%?	100%?	10%?	>50%	30%?	20%?	0

3. Threats

This section described the identified threats or perceived threats in order of relative importance. The threat codes given refer to the hierarchical classification of threats as contained on www.iucn.org/themes/ssc/sis/authority.htm.

High

Drowning in gill nets. **** Gill-nets set for fish catch and kill Maccoa Ducks as an incidental by-catch. This was identified as the major threat by Callaghan and Green (1993) for the East African population on larger water bodies. Threat code 4.1.1.2.

Draining of wetlands. **** The draining of wetlands for various reasons, including conversion to farmlands is thought to be an important threat. This applies mainly to smaller water bodies which are used by the Maccoa Duck for breeding. Threat code 1.1.1 & 1.4.

Pollution. **** As Maccoa Duck feed on invertebrates in bottom sediment, there is the possibility that levels of pollutants may have lethal and sub-lethal effects through biological concentration up the food chain. Levels of pesticides were recorded by Tannock *et al*. (1983) in birds from Zimbabwe. The extent of these threats is not known but not considered important at present. Threat code 6.3.1, 6.3.2 & 6.3.3.

Alien vegetation. *** In South Africa in particular, water bodies are prone to invasion by aquatic alien species whilst the wetland margins may be invaded by alien terrestrial plants. In Kenya, in areas around Naivasha where >60% of birds are thought to occur, water bodies have been invaded by the Louisiana Red Crayfish, Water Hyacinth and *Salvinia molesta* (O. Nasirwa *in litt).* Threat code 1.5.

Variable water levels. *** This threat refers to the rapid change in water levels in impoundments notably in Southern Africa, but also increased variability in water levels as a result of e.g. loss of forest cover in catchments in Kenya. Rapid changes can disrupt breeding and feeding conditions for Maccoa Ducks. Variation in water levels of natural wetlands is not included here. Threat code is 1.8.

Medium

Improved treatment of sewage water. ** The numbers of Maccoa Ducks at Strandfontein Sewage Works, Western Cape, South Africa, was recorded as dropping from 500 to less than 50 after a new treatment plant altered feeding conditions (Hockey *et al.* 1989). New legislation in South Africa has specified standards for high water quality, which will reduce the productivity of aquatic food chains in settling ponds of sewage plants and will probably significantly reduce the food supply of Maccoa Ducks. Threat code 1.1.8.

Disturbance. *** This is incidental disturbance with two very different sources – recreational usage of large water bodies in Southern Africa and incidental disturbance resulting from activities of subsistence living of local communities around wetlands. Threat code 1.4.2. & 10.1

Nest predation and poaching. ** This is the deliberate searching for eggs in nests of Maccoa Ducks in small ephemeral wetlands where they exist. Threat code 3.1.1.

Low

Sport hunting. * Bags are limited and controlled by permit. It is unlikely that this is a significant threat except locally. In South Africa, where the bird is protected, questioning of experienced duck hunters suggest that it is rarely shot and then by accident (A. Berruti, AGRED). When disturbed, birds usually

seek to escape to cover by swimming low in the water or by diving and swimming underwater (Macnae 1959, Clark 1964). Because this species does not readily flush (Clancey 1967), it is less likely to be an accidental or deliberate target for sport hunters. Threat code 3.5.1.

Botulism. * Botulism (ingestion of toxins released by the bacterium (*Clostridium botulinum*) has been recorded on at least one occasion in the Free State Province of South Africa (van Heerden 1974). Thirty-one birds (5.8 % of Maccoa Ducks counted at the site) were affected (presumably this means they died in all cases) over summer of 1972-1973 at Witpan in the Free State, Goldfields, South Africa. From time to time, botulism outbreaks occur in South Africa, and it is likely that Maccoa Ducks are infected and die during such occurrences. However, this is unlikely to be a significant mortality. Hilgarth and Kear (1984) note a death as a result of avian tuberculosis in captivity. Threat code 8.5.

Local

Competition and hybridisation with *Oxyura jamaicensis*. *. There is a probable record of *O. jamaicensis* from Eritrea (Dodman & Taylor 1995) from which the Maccoa Duck has now been recorded (Harte *in litt*). As this species is a major threat to *Oxyura lecucocephala* (Birdlife International 2005c) and is increasing in its distribution in Eurasia, it does represent a future threat to the integrity of the Ethiopian population of *O. maccoa*, then possibly southwards to East Africa and finally southern Africa. Another possibility is the escape of captive *Oxyura jamaicensis* from collections in South Africa. No other hybridisation reported with other species (Milstein 1979). At present a very local threat but it does have the potential to become an important threat. Threat codes 2.1 & 2.3.

Bird trade. * This is regarded as a low priority threat. Threat code 3.5.2.

Unknown

Alien benthic-feeding fish.** Based on the threat posed to the Australian Blue-billed Duck *Oxyura australis* (BirdLife International 2005a), it is possible that the introduction of alien benthic feeding species, notably carp, is a potential threat by direct competition for benthic invertebrates with the Maccoa Duck. Threat code 2.1.

Table 4.1 The importance of threats resulting in a reduction in breeding success at the national level for Ethiopia, Kenya, Tanzania, Namibia, Botswana, South Africa and Zimbabwe. The threats are ranked relative to each other (-1: a threat believed to have a negligible impact, -2: a threat believed to have a medium impact, -3: a threat believed to have a high impact and -4: a threat believed to have a critical impact and that needs to be addressed immediately). Threats are coded according to the IUCN SSC SiS Threats Authority files.

		Countries						
Threat code	**Threats reducing breeding success**	**Ethiopia**	**Kenya**	**Tanzania**	**Namibia**	**Botswana**	**Zimbabwe**	**South Africa**
High								
1.1.1, 1.4.	Draining of wetlands	1	3	1	1	1	1	2
4.1.1.2	Drowning in gill-nets	1	2	1	1	1	1	1
6.3.1., 6.3.2, 6.3.3.	Pollution	1	1	1	2	2	1	2
1.5.	Invasive alien vegetation on wetlands	1	2	1	1	1	1	3
1.8	Variable water levels	1	2/3	1	3	3	3	3
Medium								
1.1.8	Improved quality of sewage farm water	1	1	1	1	1	1	2
1.4.2., 10.1.	Disturbance	2	2	3	1	1	2	2
3.1.1	Nest predation and poaching	2	2	2	2	1	1	1
Low								
3.5.1.	Sport hunting	1	1	1	1	1	1	1
8.5.	Botulism	1	1	1	1	1	1	1
Unknown								
2.1.; 2.3.	Competition with *O. jamaicensis*	1	1	1	1	1	1	1
2.1	Competition with alien fish	1	1	1	1	1	1	2
3.5.2.	Bird trade	1	1	1	1	1	1	1

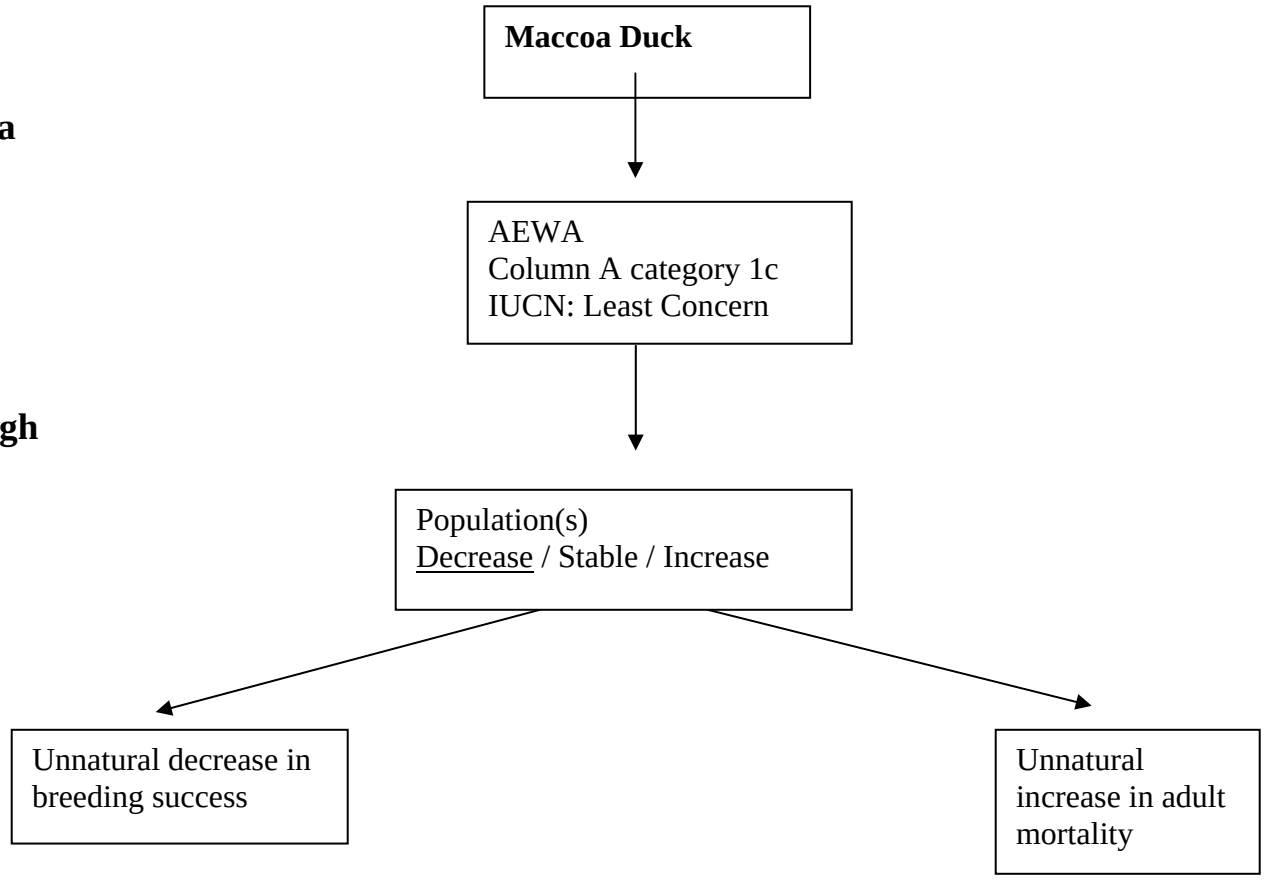
Table 4.2 The importance of threats resulting in a reduction in adult survival at the national level for Ethiopia, Kenya, Tanzania, Namibia, Botswana, South Africa and Zimbabwe. Threats are coded according to the IUCN SSC SiS Threats Authority files. (-1: a threat believed to have a negligible impact, -2: a threat believed to have a medium impact, -3: a threat believed to have a high impact and -4: a threat believed to have a critical impact and that needs to be addressed immediately).

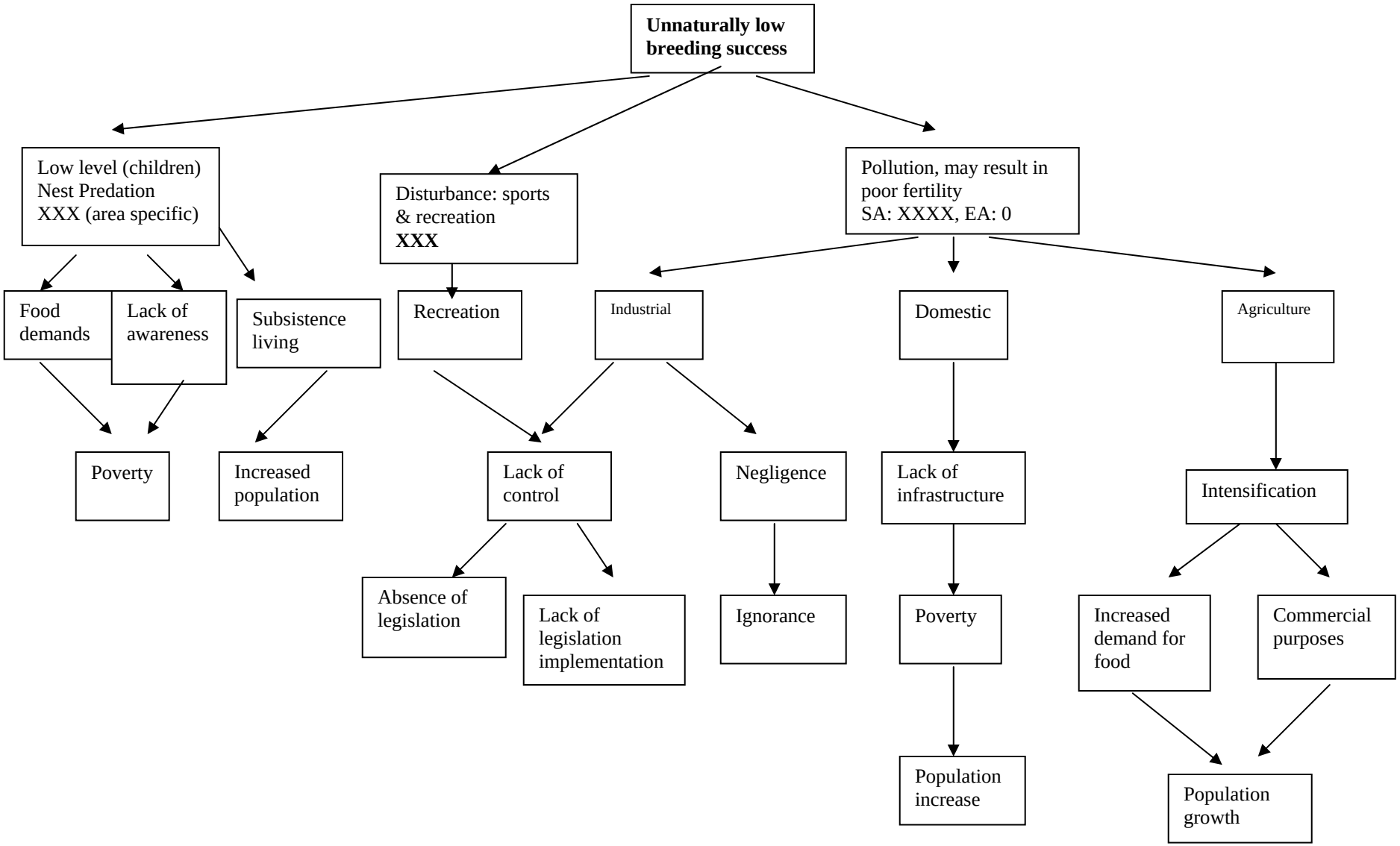
		Countries						
Threat code	**Threats reducing breeding success**	**Ethiopia**	**Kenya**	**Tanzania**	**Namibia**	**Botswana**	**Zimbabwe**	**South Africa**
High								
1.1.1, 1.4.	Draining of wetlands	1	3	1	1	1	1	3
4.1.1.2	Drowning in gill-nets	2	2	3	1	1	1	1
6.3.1., 6.3.2, 6.3.3.	Pollution	1	1	1	1	1	1	1
1.5.	Invasive alien vegetation on wetlands	1	2	1	1	1	1	3
1.8	Variable water levels	1	2/3	1	3	3	3	3
Medium								
1.1.8	Improved quality of sewage farm water	1	1	1	1	1	1	1
1.4.2., 10.1.	Disturbance	1	2	1	1	1	1	2
3.1.1	Nest predation and poaching	1	2	1	1	1	1	1
Low								
3.5.1.	Sport hunting	1	1	1	1	1	1	1
8.5.	Botulism	1	1	1	1	1	1	1
Unknown								
2.1.; 2.3.	Competition with *O. jamaicensis*	1	1	1	1	1	1	1
2.1	Competition with alien fish	1	1	1	1	1	1	1
3.5.2.	Bird trade	1	1	1	1	1	1	1

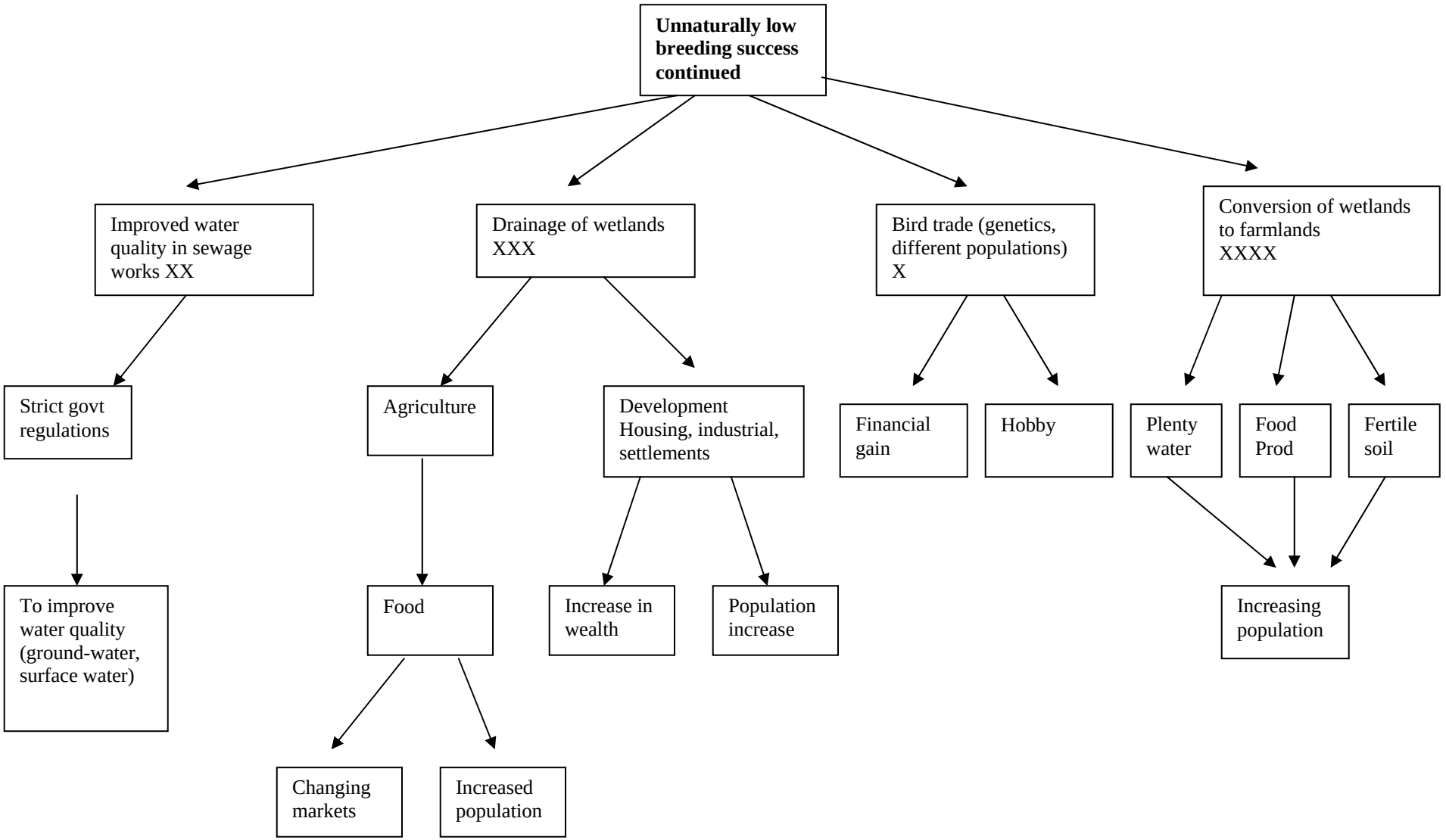
Figure 2. Problem tree of threats and problems relating to Maccoa Duck.

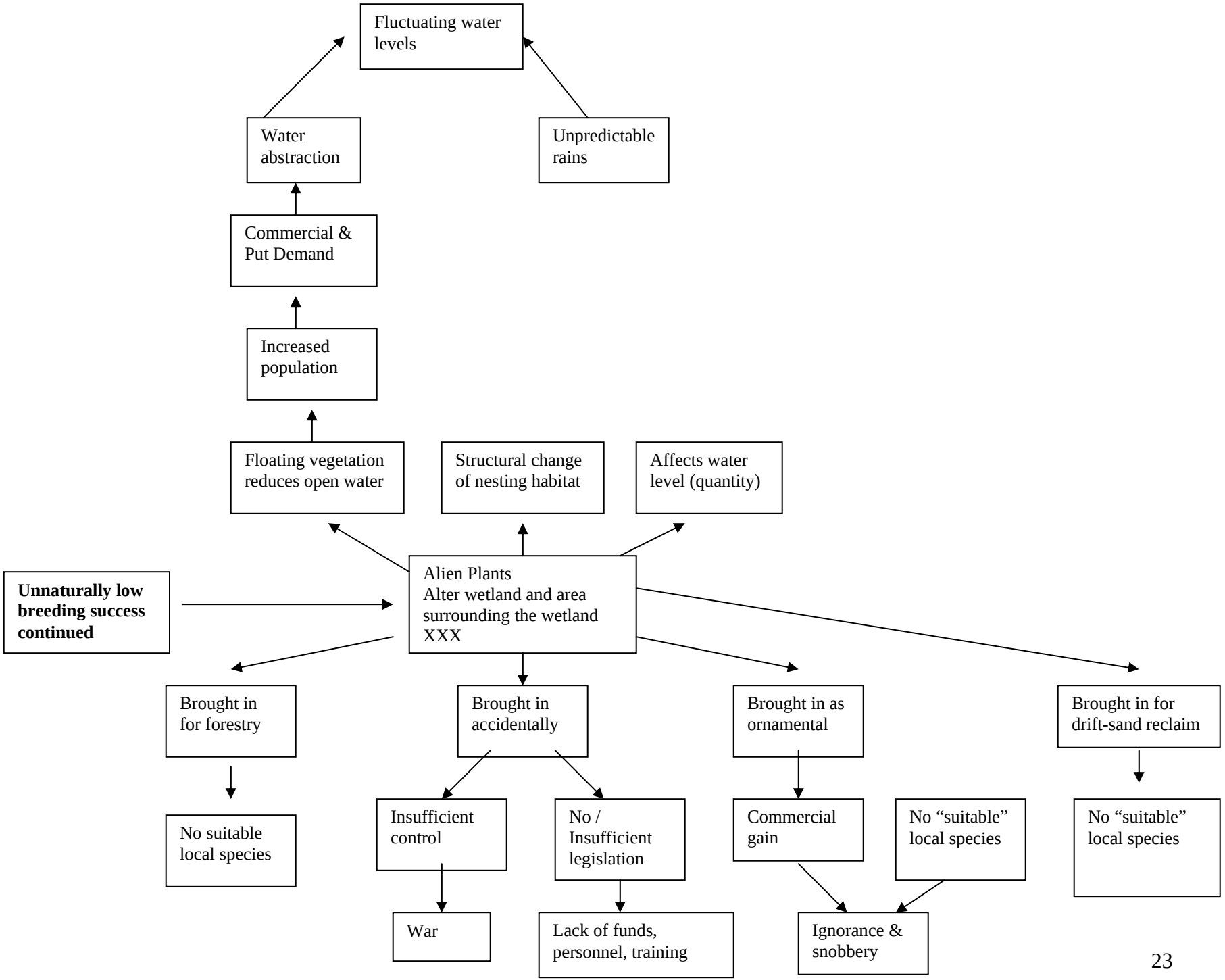
LEGEND:
SA = South Africa
EA = East Africa

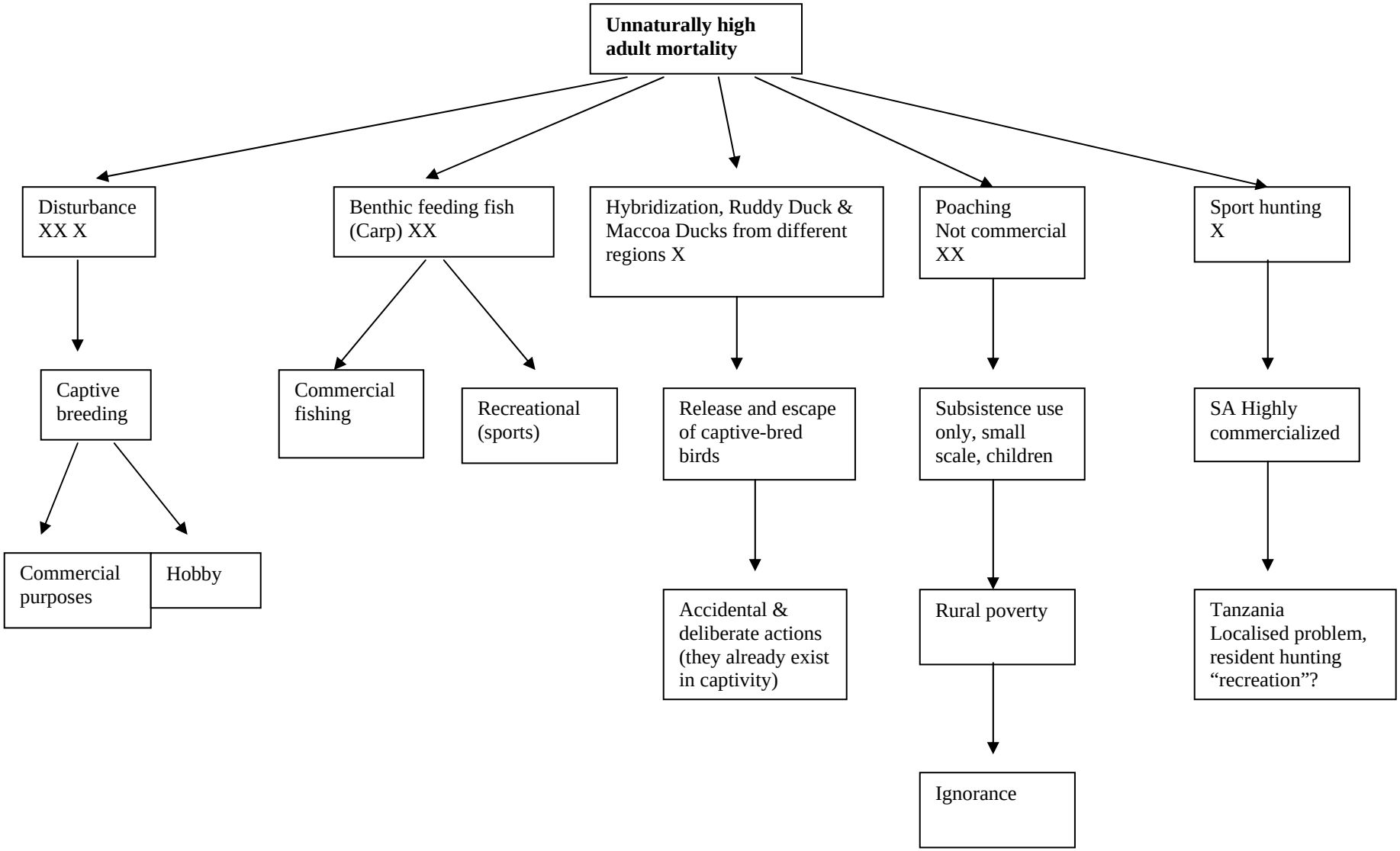
Rating
X = Low
XX = Medium
XXX = High
XXXX = Very High

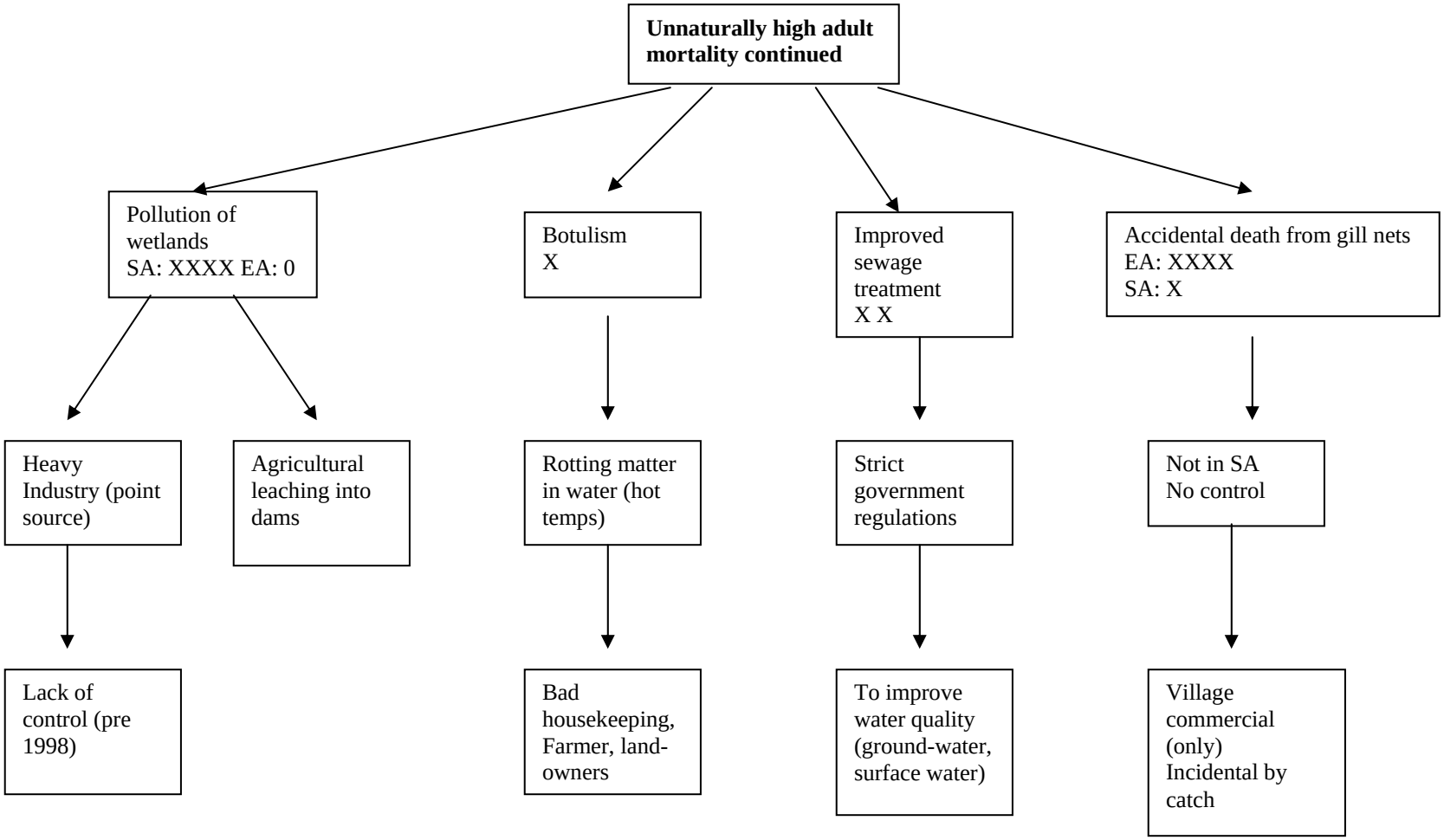



Unnaturally low breeding success
Low level (children)
Nest Predation
XXX (area specific)
Disturbance: sports & recreation
XXX
Pollution, may result in poor fertility
SA: XXXX, EA: 0
Food demands
Lack of awareness
Subsistence living
Recreation
Industrial
Domestic
Agriculture
Poverty
Increased population
Lack of control
Negligence
Lack of infrastructure
Intensification
Absence of legislation
Lack of legislation implementation
Ignorance
Poverty
Increased demand for food
Commercial purposes
Population increase
Population growth


Unnaturally low breeding success continued
Improved water quality in sewage works XX
Drainage of wetlands XXX
Bird trade (genetics, different populations) X
Conversion of wetlands to farmlands XXXX
Strict govt regulations
Agriculture
Development Housing, industrial, settlements
Financial gain
Hobby
Plenty water
Food Prod
Fertile soil
To improve water quality (ground-water, surface water)
Food
Increase in wealth
Population increase
Increasing population
Changing markets
Increased population


Fluctuating water levels
Water abstraction
Unpredictable rains
Commercial & Put Demand
Increased population
Floating vegetation reduces open water
Structural change of nesting habitat
Affects water level (quantity)
Unnaturally low breeding success continued
Alien Plants
Alter wetland and area surrounding the wetland
XXX
Brought in for forestry
Brought in accidentally
Brought in as ornamental
Brought in for drift-sand reclaim
No suitable local species
Insufficient control
No / Insufficient legislation
Commercial gain
No "suitable" local species
No "suitable" local species
War
Lack of funds, personnel, training
Ignorance & snobbery


Unnaturally high adult mortality
Disturbance XX X
Captive breeding
Commercial purposes
Hobby
Benthic feeding fish (Carp) XX
Commercial fishing
Recreational (sports)
Hybridization, Ruddy Duck & Maccoa Ducks from different regions X
Release and escape of captive-bred birds
Accidental & deliberate actions (they already exist in captivity)
Poaching Not commercial XX
Subsistence use only, small scale, children
Rural poverty
Ignorance
Sport hunting X
SA Highly commercialized
Tanzania Localised problem, resident hunting "recreation"?


Unnaturally high adult mortality continued
Pollution of wetlands
SA: XXXX EA: 0
Botulism
X
Improved sewage treatment
X X
Accidental death from gill nets
EA: XXXX
SA: X
Heavy Industry (point source)
Agricultural leaching into dams
Rotting matter in water (hot temps)
Strict government regulations
Not in SA
No control
Lack of control (pre 1998)
Bad housekeeping, Farmer, land-owners
To improve water quality (ground-water, surface water)
Village commercial (only)
Incidental by catch

4. Policies and legislation relevant for management

Table 5. International conservation and legal status of the species.

World Status	**African-Eurasian Migratory Waterbird Agreement**	**Convention on the International Trade in Endangered Species**
Least concern	Category A, column 1c	Not listed

National policies, legislation and ongoing activities

Table 6. National conservation and legal status

Country	Status in national Red Data Book	Legal protection from killing	Year of protection status	Penalties for illegal killing or nest destruction	Highest responsible authority
Ethiopia	No RDB	None			
Kenya	Endangered	None			
Tanzania	Endangered	None			
Angola	No RDB				
Namibia	Near-threatened Draft RDB				
Botswana	Listed in RDB Status?	None			
Zimbabwe	No RDB				
South Africa	Of least concern	Protected by provincial hunting regulations			
Lesotho	No RDB	?	?	?	?

Bennun, L. & Njoroge, P. (eds). 1996. Birds to watch in East Africa: A preliminary Red Data List. National Museums of Kenya, Centre for Biodiversity Research Reports: Ornithology No. 23.

Table 7. Site (and habitat) protection and research.

Country	Percentage of population included in IBAs	Percentage of population included in Ramsar sites	Percentage of population included in national protected areas	Research carried out in the last 5 years
Ethiopia	?	Nil	?	Nil
Kenya	80%?	70%	80%	Population monitoring
Tanzania	80%?	Nil	80%?	Population monitoring
Angola	100%	Nil	100%	Nil
Namibia	10%?	2%	10%?	Population monitoring
Botswana	>50%	Nil	0%	Nil
Zimbabwe	30%	Nil	30%	Nil
South Africa	30%?	20%?	20%?	Population monitoring in selected locations
Lesotho?	Nil	Nil	Nil	Nil

Table 8. Recent conservation action and attitude towards the species.

Country	National protection plan for the species	Is there a national Maccoa Duck working group?	Is there a national survey/monitoring programme?	Is there a monitoring programme in protected areas?	Routines for informing the responsible authorities regarding nesting areas and nest sites	Conservation efforts over the last ten years	General attitude towards the species
Ethiopia	No	No	No	No	No	Not specific	Not a priority
Kenya	No	No	Yes?	No	No	Not specific	Not a priority
Tanzania	No	No	Yes	Yes	Yes?	Not specific	Not a priority
Angola	No	No	No	No	No	Not specific	Not a priority
Namibia	No	No	Yes	Partly	No	Not specific	Not a priority
Botswana	No	No	Yes?	Partly?	No	Not specific	Not a priority
Zimbabwe	No	No	No	No	No	Not specific	Not a priority
South Africa	No	No	Yes	Partly	No	Not specific	Not a priority
Lesotho	No	No	No	No	No	Not specific	Not a priority

5. Framework for Action

Aim

To stabilise or increase natural populations of Maccoa Duck as indicators of sustainable wetland management for the benefit of people in Africa by 2010.

Purpose

To define the threats and take mitigating action based on improved knowledge based on co-operative partnerships.

Objectives

Prevent accidental drawings in gill nets. To reduce the use of gill nets in critical sites through the use of legislation (national and local) and education.

Objectively Verifiable Indicators (OVI):	Quarterly report
Means of verification:	Provincial conservation reports – law enforcement actions and investigation reports.
Country:	All
Priority:	East Africa ****
	Southern Africa **
Risks:	Government may not wish to amend legislation
Opportunities:	Capacity building
	Changes in legislation
	Wetland management
	Reduction in bycatch

To stop wetland loss in key Maccoa Duck areas.

Objectively Verifiable Indicators (OVI):	Reports
Means of verification:	Remote sensing – (Satellite Application Centre – CSIR)
Country:	All
Priority:	SA and Kenya***
Risks:	No funds
	Political will
Opportunities:	Updated data and images
	Public support

To reduce disturbance at critical Maccoa Duck sites

Objectively Verifiable Indicators (OVI):	Quantitative progress report
Means of verification:	
Country:	All
Priority:	Disturbance must first be identified and quantified
Risks:	Political will
	Practicalities
	Increasing poverty
Opportunities:	Private ownership/protected areas

Sport hunting

Objectively Verifiable Indicators (OVI):	Data from hunting organisations
	Reduction of hunted Maccoa ducks
	Report accidental deaths
Means of verification:	Provincial officials to attend selected hunts (AGRED/NGF could advise)
Country:	All
Priority:	*
Risks:	Non-cooperation by hunting organisations
	Integrity of data
	Political will
	Developing sport hunting industry in east Africa
Opportunities:	Well-structured South Africa hunting organisations

To prevent poaching

Objectively Verifiable Indicators (OVI):	Political buy-in
	Site specific success
Means of verification:	No of cases handled by Conservation
Country:	All
Priority:	*
Risks:	Lack of political buy-in
	No community support
Opportunities:	Capacity building
	Govt support for Ramsar sites

Loss of habitat through upgrading sewage works.

Objectively Verifiable Indicators (OVI):	
Means of verification:	
Country:	Southern Africa
Priority:	?
Risks:	Political will
	Practicalities
	Increasing poverty
Opportunities:	Private ownership/protected areas

Eliminate alien plants

Objectively Verifiable Indicators (OVI):	Reduction in alien plants
Means of verification:	Working for Water/Wetlands progress reports in South Africa
Country:	All
Priority:	?
Risks:	Lack of funding
	No political buy-in
	Slow progress
Opportunities:	Improved co-operation
	Awareness

Reduce Botulism

Objectively Verifiable Indicators (OVI):	Fewer sites experiencing botulism
Means of verification:	
Country:	South Africa
Priority:	*
Risks:	Lack of funding
	Lack of practical solution
Opportunities:	

Manage water levels for optimal Maccoa Duck

Objectively Verifiable Indicators (OVI):	Successful breeding
	Length of stay longer than before
Means of verification:	Progress in ecological reserve determination and implementation of ecological sound water flow management (appropriate for rivers that feed dams and weirs)
Country:	Southern Africa, Kenya
Priority:	?

Risks:	Lack of funding Lack of manpower Lack of political will
Opportunities:	Overall improved aquatic biodiversity/ecological processes

Determine effect of pollution on breeding and abundance of Maccoa Duck

Objectively Verifiable Indicators (OVI):	Effects of pollution determined Mitigation measures in place
Means of verification:	
Country:	South Africa, Kenya (Naivasha)
Priority:	****
Risks:	Lack of funding No data available Lack of manpower Lack of political will
Opportunities:	Data gained Capacity building

Competition with alien benthic-feeding fish

Objectively Verifiable Indicators (OVI):	Confirmation of threat
Means of verification:	
Country:	All
Priority:	**
Risks:	Data does not exist
Opportunities:	Similar studies do exist

Obtain improved population estimates and distribution of Maccoa Duck

Objectively Verifiable Indicators (OVI):	Revised estimates of all parameters
Means of verification:	
Country:	All
Priority:	****
Risks:	Buy-in
Opportunities:	Outside funding

Re-introduction of birds into suitable sites in southern Tanzania

Objectively Verifiable Indicators (OVI):	No. of birds 2 years after release
Means of verification:	

Country:	Tanzania
Priority:	**
Risks:	Reasons for extirpation not fully known
	No source of birds for breeding
	Many risks in actual introduction
	No suitable partners
Opportunities:	Supportive community in re-introduction area
	Much already known
	New partners

Bird trade

Objectively Verifiable Indicators (OVI):	Known trade is controlled
Means of verification:	
Country:	All
Priority:	*
Risks:	Trade not detected
	Policy is not accepted
Opportunities:	Educate traders
	Creating awareness in conservation agencies

Hybridisation

Objectively Verifiable Indicators (OVI):	No hybrids known
Means of verification:	CWAC/BIRP/wing-shooters observations
Country:	All
Priority:	**
Risks:	Undetected populations of Ruddy Ducks
	Identification of hybrids
Opportunities:	Educate waterfowl breeders
	Uniform policy in South Africa

Upgrade threat status of Maccoa Duck internationally

Objectively Verifiable Indicators (OVI):	Species listed as Near-threatened by BirdLife International
Means of verification:	Listing on website and RDB
Country:	All
Priority:	***
Risks:	
Opportunities:	Increase international awareness of species at risk

6. Activities by country

Legend:

Cost: * 0 – 5,000 US$,
** 50001 – 10,000 US$,
*** 10,001 – 15,000 US$
**** 15,000 US$

Priority (for results): * low importance
** medium importance
*** high importance
**** critically important

Result (Objective)	Activity	Agencies	Timescale	Cost
To reduce the use of gill nets in critical sites through the use of legislation (national and local) and education.				
	1. Access existing legislation on gill nets	Govt reps, WCST	April 05 – Sep 05	**
	2. Is legislation being implemented?	Maccoa Duck Action Group	Oct 05 – Oct 07	**
	3. Discuss possible amendments with govt.	NGOs, Govt	Apr 05 – Apr 08	****
	4. Identify strategic sites	NGOs, Govt	Apr 05 – Apr 08	****
	5. Visit sites to discuss with stakeholders	NGOs, Govt	Apr 05 -2010	****
	6. Establish & implement site action plans	NGOs, Govt, community	Apr 05 -2010	****
	7. Monitor use of gill nets and duck populations	NGOs, Govt, community	Apr 05 - 2010	****
Stop wetland loss in key Maccoa Duck areas				
	1. Compile a comprehensive list of Maccoa Duck areas by 2006.	Govt, NGOs, NRF	Apr 05 – Apr 06	****
	2. Understand Maccoa Duck movement		Apr 05 – Apr 06	****
	3. Identify key sites where conversion of wetlands is a problem. Priority ***	Govt, NGOs	Apr 05 – Apr 06	****
	4. Form partnerships between IAAPs to prevent wetland loss/conversion and rehabilitate degraded wetlands. Priority **.	All	Ongoing	**
	5. Implement/enforce existing relevant legislation including EIAs. Priority ***.	Govt	Ongoing	**
	6. Monitor wetland loss and rehabilitation. Priority ***	Govt/NGOs, NRF	Ongoing	****
To reduce disturbance at critical Maccoa Duck sites				
	1. Assess level and forms of disturbance at critical Maccoa Duck sites. Priority ***	Maccoa Duck Action Group, WCST	Apr 06 – Apr 07	***

Result (Objective)	Activity	Agencies	Timescale	Cost
	2. Formulate proper solution and mitigation measures. Priority***	Maccoa Duck Action Group, WCST	Apr 06 – Apr 07	***
To prevent any negative impacts of sport-hunting on Maccoa Duck				
	1. Contact all hunting organizations to request data on mortalities of Maccoa Duck due to hunting. Priority ** 2. Mitigate through education where necessary. Priority * 3. Alert Government to status & threats to Maccoa Duck through hunting. Identify species critical sites not to be hunted. Priority ***	Thirstland Safaris Thirstland Safaris, govt, media Neil Baker, WCST	Apr 05 – Sept 05 Apr 05 - 2010	* ** *
To minimize the impact of poaching on the Maccoa Duck				
	1. Implement village-based, site-specific awareness programmes ** 2. Monitor the effectiveness of programmes **	WCST, Govt, NGOs WCST, Govt, NGOs	Apr 05 - 2010 Apr 05 - 2010	** **
To determine the effect of water pollution on the breeding and abundance of Maccoa Ducks and possible mitigation measures				
	1. Desktop study of relevant pollution literature and unpublished data sources in SA by 2007. Priority ****. 2. Depending on outcome of desktop study. Conduct field work on specific pollution threats of necessary by 2010. Priority ****?. 3. Implement pollution mitigation measures where necessary, using national/provincial legislation. Priority ****.	Responsible research scientist (NW Univ, EWT) Responsible research scientist (NW Univ, EWT) All relevant govt agencies, private landowners, NGOs	Apr 05 – Dec 06 Jan 07 – Dec 2010 Jan 2011 - ongoing	**** *** *
Eliminate alien plants, restore natural vegetation in 10 key Maccoa Duck sites by 2010				
	1. Identify key Maccoa Duck sites where	Resp. gov. depts., NGOs (WFW)	Jan 06 – Dec 06	****

Result (Objective)	Activity	Agencies	Timescale	Cost
	alien plants are a problem. Priority ***.			
	2. Form partnerships with key institutions & landowners & IAAPs in order to eliminate alien plants + restore natural vegetation in key MD sites. Priority ****.	Resp. gov depts., NGOs, landowners	Jan 06 – ongoing	****?
	3. Implement relevant legislation concerning alien plant species where it exists. Priority ***	Resp. govt depts.	April 05 – ongoing	*?
	4. Monitor alien plant control and rehabilitation of natural vegetations. Priority ****	Resp. govt depts., universities	Apr 05 - ongoing	***
Manage water levels for optimum Maccoa Duck habitat in 5 sites by 2010				
	1. Identify key Maccoa Duck sites where water level fluctuations are a problem. Priority **.	Ornithological NGOs	Jan 06- Dec 06	***?
	2. Form partnerships with key institutions and IAAPs in order to manage water levels. Priority ***.	Resp. partners, NGOs, govt	Jan 06 – ongoing	***?
	3. Implement relevant legislation with regard to water. Priority ***.	Resp. Govt agencies	Apr 06 – ongoing	*?
	4. Monitor water levels at key Maccoa Duck sites. Priority ***.	Ornithol. govt dept, NGOs, bird clubs	Jan 06 -ongoing	****
To mitigate negative impact on Maccoa Duck habitat due to upgrading of sewage plants				
	1. Compile a report on dependence of MD on settling ponds in existing sewage ponds. Priority ***.	Responsible ornithologists & bird clubs.	Jan 06 – Dec 07	***
	2. To encourage provision of suitable habitat for Maccoa Ducks in modern sewage works. Priority *.	Provincial and local authorities, EIA consultants, NGOs	Jan 08 – ongoing	*
	3. EIAs for the upgrading of municipal sewage works must incorporate Maccoa Duck habitats. Priority ***.	National, provincial and local Govt, NGOs, EIA consultants	Apr 05 – ongoing	***
	4. Encourage catchments forums to become aware of Maccoa Duck habitat. Priority **.	Resp. ornithologist and NGOs	Jan 06 - ongoing	***

Result (Objective)	Activity	Agencies	Timescale	Cost
To minimize occurrence of botulism and therefore impact on Maccoa Duck				
	1. Get specialist (veterinary?) input on impact and mitigation of botulism in wetlands	Veterinary consultant	Jan 06 – Dec 06	***
Re-introduction of birds in suitable sites in southern highlands of Tanzania				
	1. Identify suitable sites	Tanzania Bird Atlas Project	Jan 06 - Jul 06	*
	2. Understand reasons for extirpation	Tanzania Bird Atlas Project	Jan 06 – Jul 06	*
	3. Ensure previous threats no longer exist	Tanzania Bird Atlas Project	Jan 06 – Jul 06	*
	4. Identify source of eggs/adults of same genetic stock	Tanzania Bird Atlas Project	Jan 06 – Jul 06	*
	5. Desktop study of previous programmes/techniques	Tanzania Bird Atlas Project	Jan 06 – Jul 06	*
	6. Collaboration with suitable partners	Tanzania Bird Atlas Project, others	Jan 06 – Jul 06	*
	7. Re-introduction	Tanzania Bird Atlas Project, others	Jan 06 – Jul 06	*
Competition with alien benthic feeding fish				
	1. Identify key Maccoa Duck sites where exotic benthic-feeding fish occur	University	Jan 7 – Dec 07	*
	2. Conduct desktop study on literature and unpublished data on the impact of alien fish on Maccoa Duck food sources.	University	Jan 06 – Jul 06	*
	3. Publish	University	07	*
	4. Based on Desktop study undertake further appropriate action if necessary.	?	?	?
Obtain improved population estimates and distribution of Maccoa Duck				
	1. Identify all Maccoa Duck breeding and non-breeding sites	CWAC, BirdLife partners	Present – Dec 06	****
	2. Co-ordinated Maccoa Duck count at non-breeding sites	CWAC, volunteers, NGOs, conservation agencies	07 – ongoing	**
	3. Expand CWAC and other counts to include more Maccoa Duck sites	CWAC	07 – ongoing	**
	4. List all sites where species used to occur and why they no longer occur there	Universities/consultants	Jan 07-Dec 09	***
	5. Determine movement patterns	Universities	Jan 07 – Dec 09	***
	6. Maccoa Duck genetics to determine genetics of captive and wild birds	Universities	Jan -6-Dec 06	**

Result (Objective)	Activity	Agencies	Timescale	Cost
To prevent hybridization of wild populations of Maccoa Duck				
	1. Identify captive populations (by end of 2006).	Conservation agencies/NGOs	Jan 06 –Jul 06	*
	2. Alert provincial authorities to ensure compliance (re captive populations) with legislation.	Maccoa Duck Action Group	Jan 06 –Jul 06	*
	3. Alert bird-watchers to report sightings of the Ruddy Duck.	AGRED plus Maccoa Duck Action Group	Jan 06 –Jul 06	*
To control trade of collection of *Oxyura* ducks and eggs in Africa				
	1. Determine extent of Maccoa Duck adult and egg trade by 2006.	Conservation agencies/NGOs	Jan 06 – Jul 06	*
	2. Write a policy document on *Oxyura* duck importation and collections for national and provincial governments.	AGRED/conservation agencies/NGOs	Apr 05 – Dec 05	*
	3. Dispatch policy documents and advocacy for adoption in each range state/province.	AGRED/conservation agencies/NGOs	Apr 05 – Dec 05	*
	4. Create awareness of possible dangers of hybridization	AGRED/conservation agencies/ NGOs/ AEWA	Jan 06 – ongoing	*
	5. Get other *Oxyura* species listed as invasive in South Africa and elsewhere	AGRED/conservation agencies/NGOs	Apr 05 – Dec 05	*
To upgrade the threat status of the Maccoa Duck internationally				
	1. Contact BirdLife International and provide information on Maccoa Duck numbers.	AGRED	Sept 05	*
	2. Provide information as requested by BLI for upgrade	AGRED/conservation agencies/NGOs	Oct 05-Dec 05	*

7. Implementation

During the Workshop, AGRED (African Gamebird Research Education and Development Trust) offered to act as the lead organisation for the implementation of the Action Plan, and this offer was accepted by the workshop participants.

This Workshop group comprised representatives of national or provincial government (the latter in the case of South Africa), individual experts and representatives of NGOs. This could form the basis of an International Species Working Group (ISWG), which is envisaged as being comprised of representatives of national Species Working Groups, government representatives, representatives of relevant interest groups including relevant treaties. AGRED would as described above, take on the role as co-ordinator and disseminator of information and act as the driving institution in terms of establishing an International Species Working Group. However, National Species Working Groups will often comprise only one or two individuals, because capacity and expertise is lacking in most, if not all, Range States. In addition, because the Maccoa Duck is not presently rated as highly threatened, it is less likely to achieve significant support from national governments, international and national NGOs and international treaties. Clarification will be sought from the AEWA Technical Committee in terms establishing an ISWG, or a less formal structure (e.g. Maccoa Duck Action group) will develop through a transitional stage of action and achievement towards the status and structure of an ISWG.

It is perceived that initially, the group would firstly focus on obtaining a better understanding of population sizes and trends, secondly on increasing awareness amongst conservationists and executive authorities that this species is at best Near-threatened.

The activities of this group would focus on:

- Guidelines for population censusing and monitoring
- Annual national counts of Maccoa Ducks
- Inclusion in national and international RDB status, and upgrading (i.e. higher levels of threat categorisation) of national and international conservation status as appropriate
- Improved definition of annual cycles and movement
- Improved understanding of habitat usage in relation to breeding activities
- Guidelines for habitat management practices
- Improved definition and evaluation of threats
- Collect country data for and annual reports on the implementation of the Action Plan
- Monitor implementation through submission of an annual report
- Prepare and organise a triennial meeting with range states
- Prepare and submit a triennial review to the triennial range states meeting

Time frame for monitoring evaluation and communication.

Time path	**1st year**	**2nd year**	**3rd year**	**4th year**	**5th year**
Actions	AEWA Technical committee	Working Group	Working Group	Working Group	Working Group
	Range States	Range States	Range States	Range States	Range States
Products					

8 – References and the most relevant literature

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ANNEX 1. Important Bird Areas (IBAs) of relevance for the Maccoa Duck *Oxyura maccoa*. Data from Fishpool & Evans (2001), N. Baker (this workshop), M.J. Wheeler (this workshop), Simmons & Brown *in prep*. and Taylor *et al*. (1999).

Country	**International name**	**Area (ha)**	**Location**		**Population**		**Year**	**Season**	**Accur -acy**	**Protection status**	**Protected area name**	**Type of protected area**
			Lat	**Long**	**Min**	**Max**						
Ethiopia	Sululta plains ET024	?	09 12	38 43						Unprotected		
	Bishoftu ET032	93	08 48	39 00						Unprotected		
	Chelekleka lake & swamp ET033	?	08 51	38 58						Unprotected		
	Abijatta-Shalla Lakes National Park ET048	88 700	07 30	38 30						Proposed national park	Abijatta-Shalla Lakes	National Park
Kenya	Lake Naivasha KE048	23 600	00 46	36 21						Ramsar		
	Lake Nakuru National Park	18 800	00 22	36 05						National park Ramsar	Lake Nakuru	National Park
Tanzania	Arusha National Park TZ001	13 700	03 15	37 00						National Park Forest reserves	Arusha	National park Forest reserves
	Eluanata TZ022	1100	03 23	36 18						Unprotected		
	Singida Lakes TZ034	1100	04 18	34 42						Unprotected		
Angola	Bicuari National Park AO 001	790 000	15 08	14 56						National Park	Bicuari	National Park
Zimbabwe	Robert Macilwaine Recreation Park ZW 013	6 180	17 52	30 46						Recreational park	Robert Macilwaine Recreation Park	Recreation-al park
	Hwange National Park ZW009	1 460 000	19 00	26 30						National Park	Hwange	National Park
Botswana	Bokaa Dam? BW009	620	24 28	25 55						Unprotected		
	Phakalane Sewage lagoons BW010	100	24 34	25 58						Unprotected		

Namibia	Etosha National Park NA004	2 291 200	18 59	14 45						National Park Ramsar	Etosha	National Park Ramsar
	Bushman Pan System NA 007	120 000	19 37	20 37						Unprotected		
	Sandwich harbour NA014	8 500	23 20	14 30						Park Ramsar	Namib Naukluft	National Park
South Africa	Nyl River Floodplain SA008	50 270	28.41	24.93						Partially Protected	Nylsvley Nature Reserve	Provincial reserve, Ramsar
	Steenkamsberg SA016	4431	30.02	25.37						Partially Protected	Lakenvlei Reserve?	Provincial Reserve?
	Amersfoort-Bethal-Carolina District SA018	347 381	26 32	29 50						Unprotected		
	Chrissie Pans SA019	98 122	26 19	30 15						Unprotected		
	SA020 Grassland Biosphere Reserve	1 053 740	27 15	30 01						Partly reserves, Ramsar	Wakker-stroom, Seekoeivlei	Provincial reserves
	Nyl River Floodplain SA008	50 270	28.41	24.93						Partially Protected	Nylsvley Nature Reserve	Provincial reserve, Ramsar
	Blesbokspruit SA021	1932	28.30	26.16						Partially Protected	Marievale Bird Sanctuary	Provincial reserve, Ramsar
	Spitzkop Dam SA028	13 131	24.33	28.04						Unprotected	Unprotected	
	Orange River Mouth Wetlands SA030	2311	28 36	16 28						Unprotected Ramsar		Ramsar
	Kamfers Dam SA032	1176	24.46	28.40						Partially Protected	?	?
	Platberg-Karoo Conservancy SA037	1 248 164	24.18	30.38						Unprotected		
	Sandveld & Bloemhof Nature Reserve SA039	49 310	25.40	27.41						Fully Protected	Sandveld & Bloemhof Nature Reserve	Provincial Reserve
	Karoo Nature Reserve SA090	16 865	24.32	32.13						Partially Protected	Karoo Nature	Provincial Reserve?

											Reserve?	
	Swartkops Estuary & Chatty Saltpans SA096	2878	25.36	33.52						Partially Protected	?	?
	Verlorenvlei SA103	1448	18.25	32.20						Unprotected		Ramsar
	Lower Berg River Wetlands SA104	23 949	32 47	18 16						Unprotected		
	Overberg Wheatbelt SA115	904 760	20.00	34.24						Unprotected		
	Rietvlei Wetland Reserve SA111	619	18.30	33.50						Fully Protected	Rietvlei Wetland Reserve	Provincial Reserve
	Wilderness-Sedgefield Lakes Complex SA114	19 854	34 00	22 44						Partially Protected National Park, Nature reserve	Wilderness National Park, Goukamma reserve	National park, provincial reserve Ramsar
	False Bay Park (Proposed) SA116	893	34 05	8 31						Unprotected		
	Botriviervlei & Kleinmond Estuary SA118	26 642	19.06	34.21						Unprotected		
	De Hoop Nature Reserve SA119	18 256	20.23	34.26						Fully Protected Ramsar	De Hoop Nature Reserve	Provincial Reserve Ramsar
Lesotho	None											

ANNEX 2. Signatory Countries for International Conventions relevant for conservation of the Maccoa Duck.

Country	Presence of Maccoa Duck	Ramsar	CMS	AEWA	CBD	CITES
Angola	Breeding?				X	
Botswana	Breeding	X			X	
Burundi	Historical	X			X	X
Ethiopia	Breeding				X	X
Kenya	Breeding	X	X	X		
Lesotho	Breeding?					
Namibia	Breeding	X			X	X
Rwanda	Absent?				X	X
South Africa	Breeding	X	X	X	X	X
Uganda	Absent?	X	X	X	X	X
Tanzania	Breeding	X	X	X	X	X
Zimbabwe	Breeding				X	X