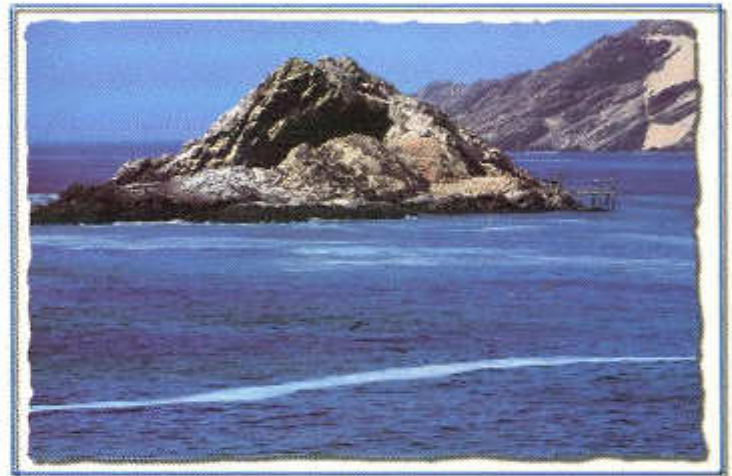


# *Preliminary Inventory of Namibia's Wetlands*



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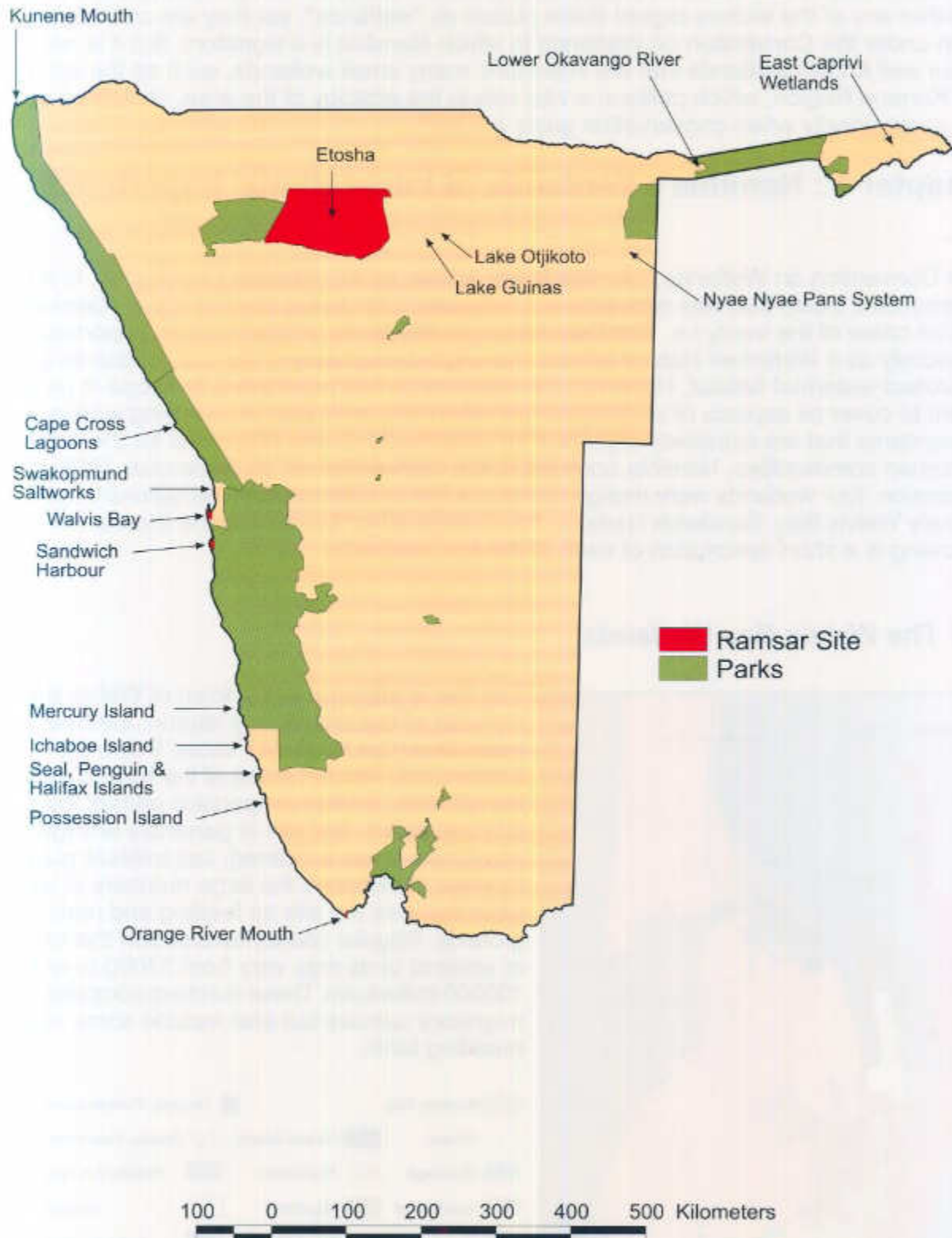
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**Directorate Scientific Services**  
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Figure 1: Ramsar Sites (listed and prospective) in Namibia



# Introduction

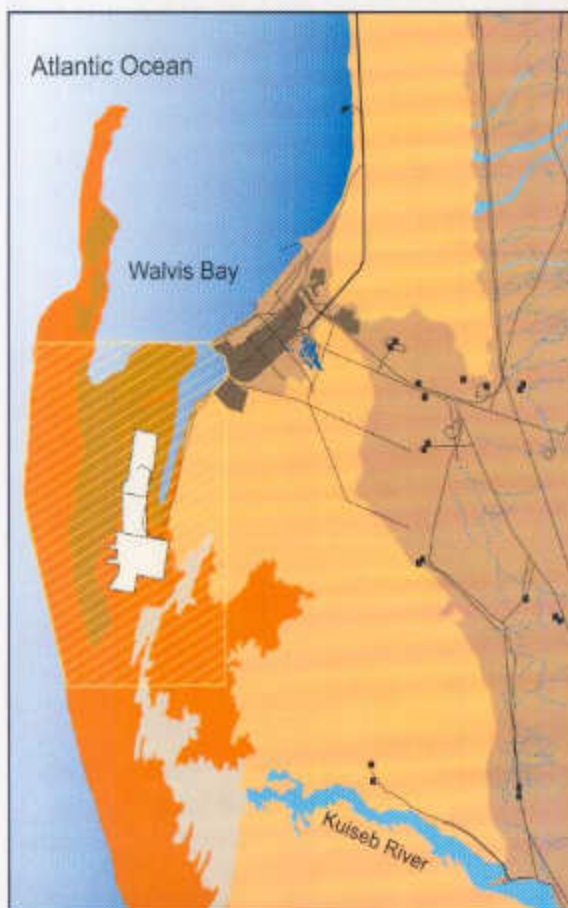
Namibia is one of the most arid countries in the world and the idea of wetlands in such a dry country strikes many people as paradoxical. However, Namibia can boast of some of the world's most spectacular and pristine wetlands. The Etosha Pan is world famous for its numbers of large animals; the Fish River Canyon is the second largest canyon in the world. Both these features attract thousands of visitors annually, however, it is doubtful whether any of the visitors regard these places as "wetlands", yet they are considered as such under the Convention on Wetlands to which Namibia is a signatory. But it is not only these well known wetlands that are important, many small wetlands, such as the springs of the Kunene Region, which perform a vital role in the ecology of the area, should be given the same priority when conservation goals are set.



## Chapter 1 : Namibia's Wetlands of International Importance

The Convention on Wetlands, perhaps better known as the Ramsar Convention, is an international treaty that was adopted on 2 February 1971 in the Iranian city of Ramsar. The official name of the treaty i.e. *The Convention on Wetlands of International Importance especially as a Waterfowl Habitat* reflects the original emphasis of the Convention as a treaty to protect waterbird habitat. However, the Convention has broadened its scope in recent years to cover all aspects of wetland conservation and wise use, recognising wetlands as ecosystems that are extremely important for biodiversity conservation and for the well-being of human communities. Namibia acceded to the Convention on 23 December 1995. Upon accession, four wetlands were designated to the *List of Wetlands of International Importance* namely Walvis Bay, Sandwich Harbour, the Orange River Mouth and the Etosha Pan. The following is a short description of each of the four wetlands.

### 1.1 The Walvis Bay Wetlands



The site is adjacent to the town of Walvis Bay and consists of the Walvis Bay lagoon, the beach and intertidal areas south of Pelican Point, the occasionally flooded areas of the Kuseb delta and the artificially flooded evaporation pans of the Walvis Bay saltworks. The site is generally unvegetated apart from a few scattered, salt tolerant plants. Its main attraction is the large numbers of wetland birds that use the site as feeding and resting grounds. Regular counts have shown that numbers of wetland birds may vary from 37000 to well over 100000 individuals. These numbers comprise mainly migratory species but also include some resident breeding birds.



Archaeological evidence indicates that people have used the lagoon as a source of shellfish and other marine products for a long period of time. When Walvis Bay was permanently settled in the nineteenth century, the lagoon area was largely ignored but in the past two decades, however, the lagoon has become a focus for residential and tourism development.

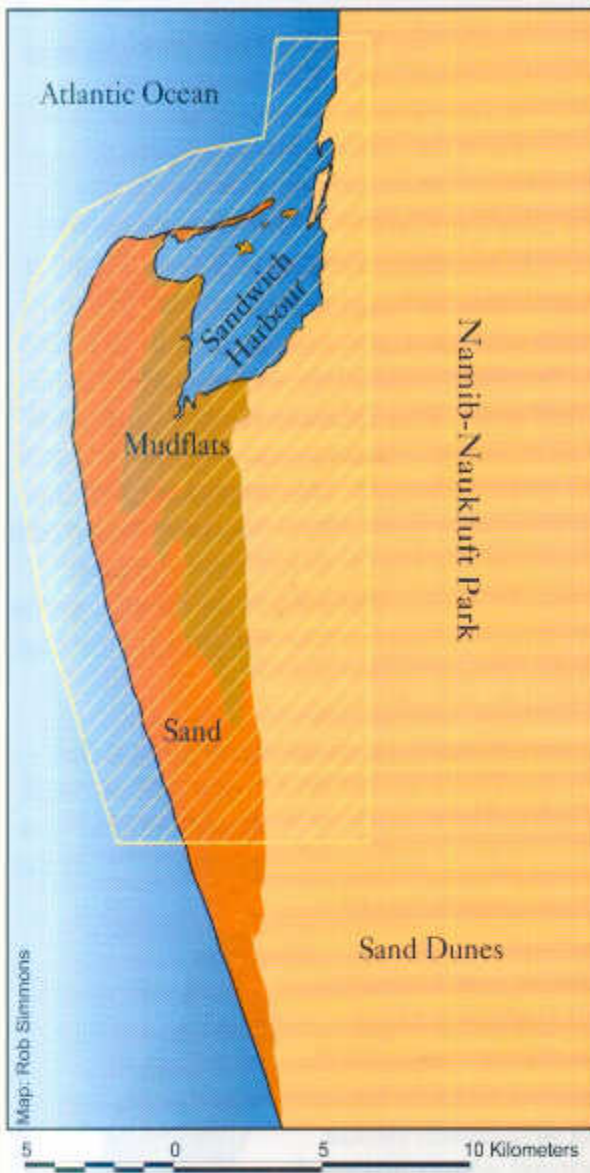
Residences, holiday accommodation and hotels have been built or are planned. The lagoon is widely used for recreational purposes such as sailing, windsurfing and kayaking. Many residents

also use the walkway along the eastern shore for jogging and to walk their dogs.

The Ramsar site covers 12600 ha and conforms to criteria 1, 2, 3, 5 and 6 (see Appendix I). Under South African rule the area fell within a proclaimed nature reserve but regrettably the legislation pertaining to the proclamation was not incorporated into the agreement when Walvis Bay was handed over to Namibia in 1994 and the site is thus without any protected status.



## 1.2 Sandwich Harbour



Ramsar Site
  Mudflats
  Sand
  Sand Dunes

Sandwich Harbour is one of southern Africa's unique wetlands, consisting of two distinct portions. The northern wetland is sustained by potable water seeping from an aquifer beneath the dunes and is characterised by typical fresh-water vegetation. Just to the south of this freshwater wetland there is a large bay and expansive mudflats. Due to natural processes the northern freshwater wetland has diminished in size from one kilometre across 20 years ago to its present size of less than 200 metres across. This has led to a decrease in species diversity. The 20 square kilometres of mudflats at the southern end of Sandwich Harbour, too, are highly dynamic in nature due to the ocean currents and the wind. The site is virtually cut off from inland Namibia by the Namib Dune Sea and can only be reached by travelling south along the beach for some 55 kilometres from Walvis Bay.

Sandwich Harbour is a centre of concentration for migratory shorebirds, waders and flamingos. It regularly supports over 142 000 birds in summer and 50 000 in winter. Traditionally, the northern wetlands hold the highest species diversity, while the southern mudflats hold by far the largest numbers of birds.

Dominated by terns, sandpipers, flamingos and cormorants, shorebirds





occur here at densities exceeding 10 000 birds per square kilometre, amongst the highest recorded in the world.

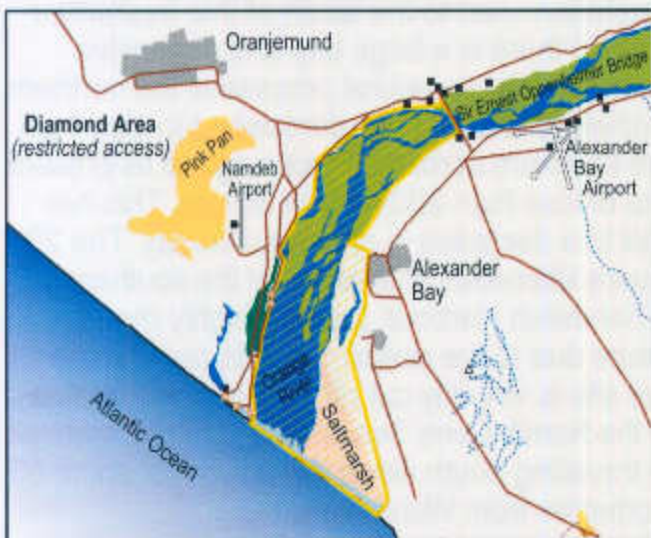
Before settlement by Europeans, local hunter-gatherer communities used the bay to obtain their source of protein in the form of fish and shellfish, and possibly seals and cetaceans as well. Shell middens and other artefacts found there indicate that it was occupied for a couple of thousand years. Later on, Sandwich Harbour was extremely valuable to seafarers because

it provided a natural deep-water anchorage with, most importantly, a supply of fresh water. Guano mining, sealing and fishing were the major commercial enterprises by the latter part of the nineteenth century at Sandwich Harbour. Contact with local pastoral communities was limited to the barter for slaughter animals and the hire of casual labour. Sandwich Harbour became a conservation area in August 1941, when it was incorporated into "Game Reserve No. 3", which later became the Namib-Naukluft Park. Today, Sandwich Harbour is a favourite destination for day visits by tourists.



The site of 16500ha conforms to Ramsar criteria 1, 2, 3, 5 and 6 (see Appendix I). The site falls within the Namib-Naukluft Park and hence enjoys full protected status.

### 1.3 The Orange River Mouth



0 10 Kilometers

Landmarks		
— Roads	■ Golfcourse	■ Floodplain
— Coast	■ Town	■ Island
■ Ramsar Site	■ Beach	■ Saltmarsh
	■ River	■ Saltpan

The Orange River is one of few perennial rivers in southern Africa. The river forms a linear oasis through the semi-arid and arid Karoo and southern Namib and thus forms an important habitat for all flora and fauna in that area. The Orange River Mouth and its associated estuary/lagoon is an integral part of that system. The importance of the site becomes even more apparent when one considers the fact that the next nearest wetlands are the Olifants River mouth, some 400km to the south, and Sandwich Harbour, 500km to the north.

Counts of wetland birds have shown the Orange River Mouth to be one of the most important wetlands in southern Africa. The site regularly supports more than 1% of the global population of Damara Terns (*Sterna balaenarum*) and Hartlaub's Gull

(*Larus hartlaubii*) and more than 1% of the southern African population of an additional six species, as well as fourteen species of birds listed in either or both of the Red Data books for Namibia and South Africa. The site also supports 33 species of mammal, amongst which are such unusual species as the straw-coloured fruit bat (*Eidolon helvum*) and Cape clawless otter (*Aonyx capensis*), 41 reptile species, including water





leguaan (*Varanus niloticus*) and the coastal legless skink (*Acontias littoralis*), and 16 amphibian species, one of the highest diversities in Namibia. The Namaqua barb (*Barbus hospes*) is a fish that is endemic to the lower Orange River and is one of three Red Data fish species found in the river.

The site conforms to Ramsar criteria 1, 2, 3 and 6 (see Appendix I) and is Namibia's smallest listed wetland at 500ha. The site falls within the restricted diamond area known as the *Sperrgebiet* and thus enjoys relatively good protection.



### 1.4 Etosha Pan



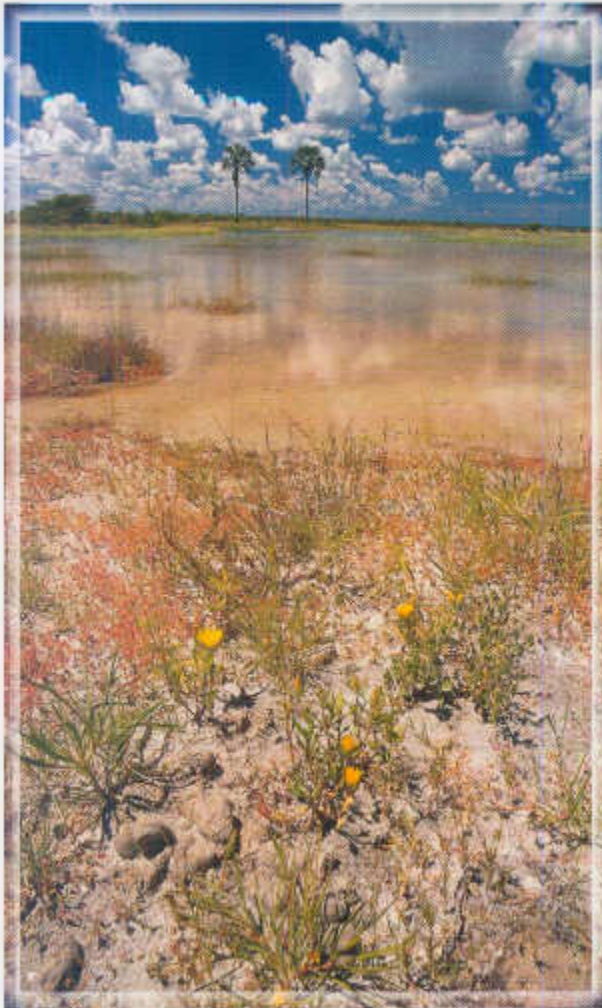
50 0 50 100 150 200 Kilometers

● Waterholes    ~ Tracks    \ Gravel Roads    / Tar Roads    \ Pans    ◻ Ramsar Site    □ Park Boundary

Central to the Etosha National Park, and from which it derives its name, is the vast open space of Etosha Pan. The Pan, originally a lake, gradually dried two to ten million years ago as climatic changes and movements of the earth's crust caused the river that once fed it to change course and flow into the Atlantic Ocean.

The name Etosha is derived from the Oshiwambo word *Etotha* meaning "bare place" and very aptly describes the immensity of this flat, clay plain. With an area exceeding 5000 square kilometres, it is almost one quarter of the total area of the park. It is the largest pan in Namibia and one of the largest in the southern African sub-region. Although it is



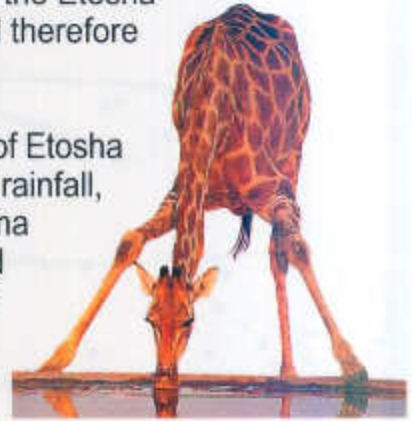


dry for most years, water in the form of natural fountains, can be found year-round along its southern edge. These provide an important source of water for Etosha's thriving wildlife. The pan is largely without vegetation, except for some salt tolerant grasses.

The original inhabitants of the area were Heil//om-people, hunter-gatherers who existed in harmony with huge numbers of wildlife. The Pan first became known to Europeans in 1851 when explorers Charles Andersson and Francis Galton reached a cattle post called Omutjamatunda, today known as Namutoni. They provided the first written account of the pan. At one stage the area was privately owned but was then proclaimed by the German governor in 1907 as "Game Reserve No. 2". Today, after two major boundary changes, only one quarter of that original area remains.

At 600 000 ha the site is Namibia's largest listed wetland and conforms to Ramsar criteria 1, 2, 3, 4, 5 and 6 (see Appendix I). The site is inside the boundaries of the Etosha National Park and therefore fully protected.

Although water reaches Fischer's Pan in the eastern extremity of Etosha Pan almost every year, it is only during seasons of exceptional rainfall, locally known as *efundja*, that the pan floods through the Ekuma river which has its origin in the Cuvelai drainage in Angola and northern Namibia. Sixty species of birds sporadically breed on the seasonal wetlands and it is the only known mass breeding ground for flamingos in Namibia. At times over one million flamingos congregate on the pan.



Etosha Pan is surrounded by sweetveld savanna plains, which sustain extraordinary numbers of wildlife. Etosha is home to 114 mammal and some 340 bird species. It houses large numbers of globally endangered or threatened species, most notably black rhinoceros (*Diceros bicornis*) and African elephant (*Loxodonta africana*). All large predators, such as lion and cheetah, occur in impressive numbers. Because of its size, the park serves as a genetic reserve for various species of animals and plants. Many animals breed in the park and it contains endemics such as the Etosha agama (*Agama etoshae*).





## Chapter 2 : Namibia's other wetlands qualifying for listed status

Several other wetlands qualify for the List of Wetlands of International Importance and will be added when Namibia has fulfilled all its obligations towards the four sites listed initially.



### 2.1 The Kunene River Mouth

The Kunene Mouth is situated in the northwestern corner of Namibia, on the border with Angola. The site consists of the river and its mouth, a shallow tidal lagoon and several more or less vegetated islands in the river. The site is important because it acts as a staging point for migrating waders and, in total, supports fourteen red data bird species. The Kunene mouth is also the only place in Namibia where green turtles (*Chelonia mydas*) are found in substantial numbers and it

is the southern-most limit of the distribution of Nile soft-shelled terrapins (*Trionyx triunguis*). This site lies within the Skeleton Coast Park and thus has full protected status.

### 2.2 Cape Cross Lagoons

The lagoons at Cape Cross have resulted from longshore drift of sediment, which has cut off a section of the Atlantic Ocean. The site is virtually featureless apart from a guano platform situated in the lagoon. Similarly to the Kunene mouth, the site supports substantial numbers of waterbirds.



### 2.3 Swakopmund Saltworks

The Swakopmund saltworks are the only man-made wetland in Namibia qualifying for Ramsar status. The site consists of several shallow evaporation ponds, used for commercial salt production and oyster farming. The owners of the saltworks have built a guano platform in one of the ponds and this is visited by thousands of seabirds. The site is a proclaimed private nature reserve.

### 2.4 Lakes Otjikoto and Guinas

These are two sinkhole lakes situated in northern Namibia. The lakes originated through karst processes and are special habitats for several endemic fish and invertebrate species.





## 2.5 The Nyae-Nyae Pans System

The Nyae Nyae pans system is situated in the east of Namibia, near the border with Botswana. The system consists of a variety of wetland habitats ranging from open water to hygrophilous grasslands. These are flooded after good rains and provide a habitat for migratory birds and several species of mammals.

## 2.6 The lower Okavango River

This site consists of the Okavango River downstream of Mukwe, up to the Namibia - Botswana border. The river is generally flat and slow flowing, except for a section of about 22km from Mukwe to the Popa Rapids which is narrower and rocky. The floodplains may be up to 4km wide and there are areas of marsh and Papyrus swamp. The surrounding area consists of tree savanna and woodland. The river is an important source of water and food for the human and animal populations in the region and supports some of the richest bird diversity in Namibia.



## 2.7 The Zambezi River Floodplains, Linyanti Swamp and Lake Liambezi

The area is part of the eastern Caprivi wetland system, which forms part of Namibia's border with Angola, Botswana, Zambia and Zimbabwe. It is Namibia's largest semi-permanent wetland and stretches from the Kwando River in the west to the confluence of the Zambezi and Chobe Rivers in the east. Due to the completely flat nature of the terrain, the area has an interesting hydrological regime,

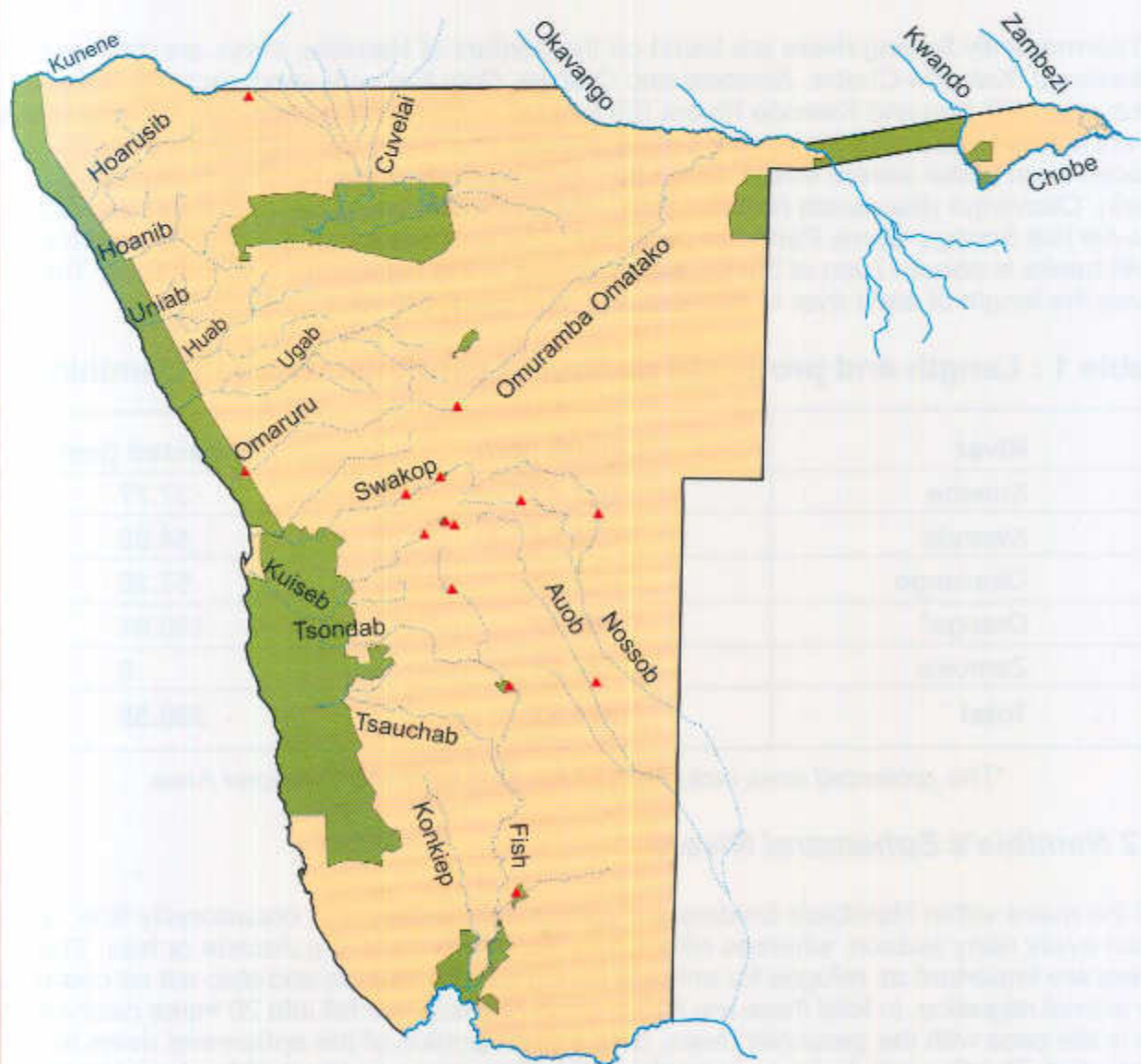
with some of the rivers reversing in flow during certain times of the year. Lake Liambezi is not a permanent lake, but goes through cycles of flooding and drought. Similarly to the lower Okavango, the area is important as a source of natural resources for the local inhabitants and animals, and also has a highly diverse avifauna.

## 2.8 The Islands

Mercury, Ichaboe and Possession are three islands in the vicinity of Lüderitz. Although very small, these islands are considered globally important bird areas because of the numbers of coastal seabirds that use the islands to breed. These include African Penguin (*Spheniscus demersus*), Cape Gannet (*Morus capensis*), Bank Cormorant (*Phalacrocorax neglectus*) and Crowned Cormorant (*P. coronatus*). The islands are permanently manned to prevent Cape fur seals from establishing themselves on the islands and thus disturbing the breeding birds. A further three very small islands within Lüderitz Bay (Seal, Penguin, Halifax) are also considered globally important bird areas for the same reasons and could thus also become Ramsar sites.



**Figure 5: Perennial and ephemeral rivers and large state impoundments.**



- ▲ State Impoundments
- ⋯ Ephemeral Rivers
- Perennial Rivers
- Parks
- ⋯ Border

100 0 100 200 300 400 500 Kilometers

## Chapter 3 : Rivers and other Wetlands

Namibia is the most arid country south of the Sahara, hence any source of water, no matter how small, must be considered important.

### 3.1 Namibia's Perennial Rivers

All permanently flowing rivers are found on the borders of Namibia; these are the Kunene, Okavango, Kwando-Chobe, Zambezi and Orange. Only two very short sections of the Okavango (57 km) and Kwando Rivers (55 km) fall entirely within Namibian territory. These rivers act as focal points for human settlement and thus the overexploitation of resources places them under severe threat. Only very short sections of the Kunene (Skeleton Coast Park), Okavango (Bwabwata National Park), Kwando (Bwabwata National Park) and Orange (Ai-Ais Hot Springs Game Park) are protected. The only section of river that is protected on both banks is about 17 km of the Okavango falling in the Bwabwata National Park. Table 1 gives the length of each river in Namibia and how much of that is protected.

**Table 1 : Length and protected portion of perennial rivers in Namibia.**

River	Length (km)	Protected (km)
Kunene	331.47	37.77
Kwando	414.54	54.88
Okavango	452.06	57.29
Orange*	582.17	186.64
Zambezi	144.97	0
<b>Total</b>	<b>1925.22</b>	<b>336.58</b>

*\*The protected area includes 110 km of river in the Diamond Area.*

### 3.2 Namibia's Ephemeral Rivers

All the rivers within Namibia's borders are ephemeral i.e. they only occasionally flow. Some flood every rainy season, whereas others may flood only once in a decade or less. These rivers are important as refuges for animals during the dry season and also act as corridors for animal migration. In total there are 702 rivers in Namibia that fall into 20 major catchments. As is the case with the perennial rivers, only a small portion of the ephemeral rivers is protected. The Cuvelai drainage in northern Namibia supports about 30% of the Namibian population yet is entirely unprotected. Table 2 gives the length of the major ephemeral rivers in Namibia and the size of their catchments.

**Table 2: Length and catchment area of ephemeral rivers in Namibia.**

Drainage	Length (km)	Catchment Area (km <sup>2</sup> )
Auob*	711.40	69690.67
Cuvelai*	994.99	25053.60
Etosha <sup>1</sup>	372.70	87295.43
Fish	1692.82	86684.06
Hoanib	433.15	15900.70
Hoarusib	453.62	14282.76
Huab	534.05	16175.62

Drainage	Length (km)	Catchment Area (km <sup>2</sup> )
Khumib	187.96	2138.77
Koichab	512.26	8292.29
Koigab	121.06	2415.52
Kuiseb	568.81	14751.95
Nossob*	827.04	33455.67
Omaruru	333.53	11724.78
Omatoko	799.82	64801.42
Swakop	701.29	29016.00
Tsaris	399.31	9475.35
Tsauchab	271.56	3549.00
Tsondab	126.27	3504.18
Ugab	908.35	29266.93
Uniab	341.17	4034.49
<b>Total</b>	<b>11291.16</b>	<b>531509.19</b>

*\*Length and catchment calculated only in Namibia.*

*\*This refers to rivers other than the Cuvelai drainage e.g. the Omuramba Omuthya*

### 3.3 Wetlands

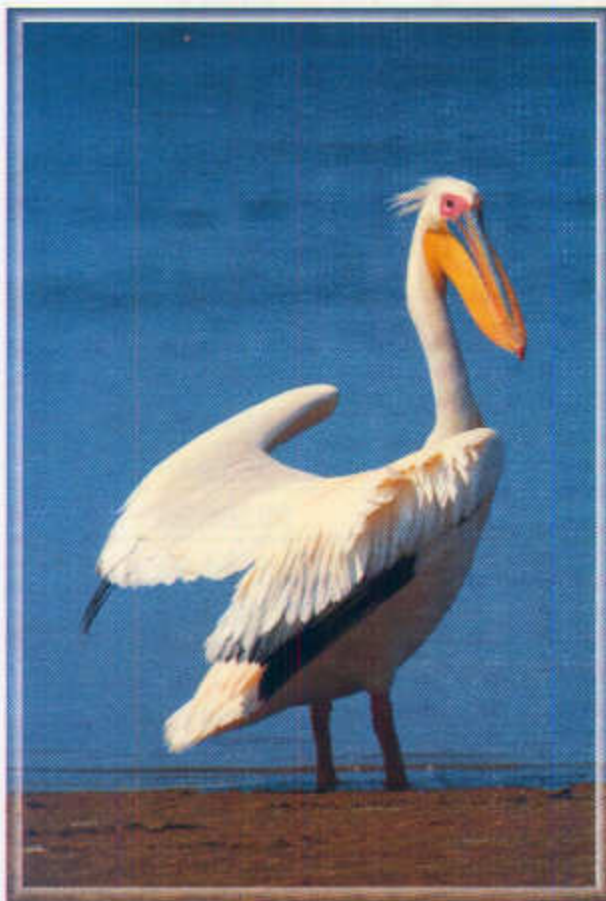
It is very difficult to identify and inventorise wetlands in Namibia because of the extremely periodic nature of most of them. Conventional methods of inventory, such as the use of remotely sensed images, often cannot be used because of the small size of many of the wetlands. For the purpose of this inventory the Ramsar definition of wetlands has been adopted (see Appendix II). The current database at the Ministry of Environment and Tourism contains 1628 records of wetlands plus 134 place names that make reference to a wetland (e.g. Grootpan, Mooifontein). The location of these sites has partly been gleaned from literature surveys and others are the result of fieldwork. The wetlands have been sorted into thirteen different categories according to their nature. The database shows a severe sampling bias toward the communal areas in the northwest of Namibia where a lot of work has been done by government agencies and NGOs. Only 166 (or 10.2%) of these sites fall within formally protected areas (183 or 11.24% if one adds the Sperrgebiet), warranting a closer look at priorities for conservation in Namibia.

**Table 3: Numbers of wetlands represented in the MET database.**

Type	Count	Type	Count
Falls	10	Pools	218
Ford	5	Reservoir*	195
Irrigation	157	Saltworks	1
Lagoon	3	Spring	281
Lake	4	Waterhole	429
Marsh	11	"Wetland"	50
Pan	265		

*\*includes large state impoundments*

## Chapter 4: Conservation of Wetlands in Namibia



The Ministry of Environment and Tourism (MET) is the government agency responsible for the conservation of terrestrial natural resources in Namibia. Its sphere of responsibility covers not only the 21 proclaimed parks, but also all aspects of natural resource management in the rest of the country.

This is very important because, as can be seen in the foregoing text, most of Namibia's wetlands and rivers do not fall within protected areas. It is interesting to note that within Namibia most of the catchments of the ephemeral rivers start outside of parks and the parks are the "end-receivers" of the catchments. Bad management of the upper catchments will thus have a negative effect on the parks. This presents a tremendous opportunity for community based wetland conservation in Namibia. It is therefore in the interest of the MET to encourage and actively participate in catchment conservation and management outside of parks. Perhaps, consideration could even be given to strategically planning and proclaiming new protected areas that conserve vital parts of catchments. Important also, are partnerships and co-operation between government agencies so that already stretched

resources can be applied more efficiently.

All of Namibia's perennial rivers originate in neighbouring countries. This leads to the need for trans-boundary wetland and catchment management. Currently the Orange River Mouth is the only trans-boundary Ramsar site but there is potential for several more e.g. the Kunene River Mouth and the Okavango River. It is encouraging that Namibia is engaged in dialogue and negotiations with South Africa and Angola to establish trans-boundary conservation areas on the Orange and Kunene Rivers. The "Four Corners Natural Resource Management Project" addresses the need for the management of natural resources in the area centred on Namibia's Caprivi Strip. The successful implementation of this project will benefit conservation in Angola, Botswana, Namibia, Zambia and Zimbabwe.

For conservation of wetlands in Namibia to succeed, good communication and co-operation between governments, NGOs, communities and the private sector is essential. The diversity of people and areas involved necessitates a unique approach and this is what makes wetland conservation in Namibia a challenge.

**Wetlands are special places – let's make sure they are here to stay!**

### **Acknowledgements**

*I would like to thank the members of the Namibian Wetlands Working Group for their constructive criticism and input into previous drafts of this booklet. Thanks to Rob for the updated map of Sandwich Harbour, Dirk for the photos and Ursula for the layout and her patience. The production of this booklet was made possible by a generous grant from the Ramsar Small Grants Fund for Wetlands Conservation, my thanks go to the staff of the Ramsar Bureau for supporting this project. Finally, I would like to thank Claire for proofreading, moral support and the endless supply of cold beer!*

## **Appendix I : The Ramsar Criteria for Identifying Wetlands of International Importance**

The Criteria for Identifying Wetlands of International Importance as adopted by the 4th, 6th, and 7th Meetings of the Conference of the Contracting Parties to the Convention on Wetlands (Ramsar, Iran, 1971) to guide implementation of Article 2.1 on designation of Ramsar sites.<sup>1</sup>

### **Group A of the Criteria: Sites containing representative, rare or unique wetland types.**

#### **Criterion 1:**

A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

### **Group B of the Criteria: Sites of international importance for conserving biological diversity.**

#### **Criteria based on species and ecological communities**

#### **Criterion 2:**

A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

#### **Criterion 3:**

A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

#### **Criterion 4:**

A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

#### **Specific criteria based on waterbirds**

#### **Criterion 5:**

A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

#### **Criterion 6:**

A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

#### **Specific criteria based on fish**

#### **Criterion 7:**

A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.

#### **Criterion 8:**

A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

1 [Note: This is just a simple list of the Criteria themselves out of their explanatory settings. They should properly be used as part of the Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance adopted by COP7, 1999.]

## **Appendix II : The Ramsar Convention definition of "wetland" and classification system for wetland type**

### **II.1 Definition**

Under the Convention on Wetlands (Ramsar, Iran, 1971) "wetlands" are defined by Articles 1.1 and 2.1 as shown below:

#### Article 1.1:

"For the purpose of this Convention wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres."

#### Article 2.1 provides that wetlands:

"may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands".

### **II.2 Ramsar Classification System for Wetland Type**

The codes are based upon the Ramsar Classification System for Wetland Type as approved by Recommendation 4.7 and amended by Resolution VI.5 of the Conference of the Contracting Parties. The categories listed herein are intended to provide only a very broad framework to aid rapid identification of the main wetland habitats represented at each site.

#### **Marine/Coastal Wetlands**

- A Permanent shallow marine waters in most cases less than six metres deep at low tide; includes sea bays and straits.
- B Marine subtidal aquatic beds; includes kelp beds, sea-grass beds, tropical marine meadows.
- C Coral reefs.
- D Rocky marine shores; includes rocky offshore islands, sea cliffs.
- E Sand, shingle or pebble shores; includes sand bars, spits and sandy islets; includes dune systems and humid dune slacks.
- F Estuarine waters; permanent water of estuaries and estuarine systems of deltas.
- G Intertidal mud, sand or salt flats.
- H Intertidal marshes; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes.
- I Intertidal forested wetlands; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests.
- J Coastal brackish/saline lagoons; brackish to saline lagoons with at least one relatively narrow connection to the sea.
- K Coastal freshwater lagoons; includes freshwater delta lagoons.
- Zk(a) Karst and other subterranean hydrological systems, marine/coastal

#### **Inland Wetlands**

- L Permanent inland deltas.
- M Permanent rivers/streams/creeks; includes waterfalls.
- N Seasonal/intermittent/irregular rivers/streams/creeks.
- O Permanent freshwater lakes (over 8 ha); includes large oxbow lakes.
- P Seasonal/intermittent freshwater lakes (over 8 ha); includes floodplain<sup>2</sup> lakes.
- Q Permanent saline/brackish/alkaline lakes.
- R Seasonal/intermittent saline/brackish/alkaline lakes and flats.
- Sp Permanent saline/brackish/alkaline marshes/pools.
- Ss Seasonal/intermittent saline/brackish/alkaline marshes/pools.
- Tp Permanent freshwater marshes/pools; ponds (below 8 ha), marshes and swamps on inorganic soils; with emergent vegetation water-logged for at least most of the growing season.
- Ts Seasonal/intermittent freshwater marshes/pools on inorganic soils; includes sloughs, potholes, seasonally flooded meadows, sedge marshes.
- U Non-forested peatlands; includes shrub or open bogs, swamps, fens.
- Va Alpine wetlands; includes alpine meadows, temporary waters from snowmelt.
- Vt Tundra wetlands; includes tundra pools, temporary waters from snowmelt.

2 Note : "floodplain" is a broad term used to refer to one or more wetland types, which may include examples from the R, Ss, Ts, W, Xf, Xp, or other wetland types. Some examples of floodplain wetlands are seasonally inundated grassland (including natural wet meadows), shrublands, woodlands and forests. Floodplain wetlands are not listed as a specific wetland type herein.



- W Shrub-dominated wetlands; shrub swamps, shrub-dominated freshwater marshes, shrub carr, alder thicket on inorganic soils.
- Xf Freshwater, tree-dominated wetlands; includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils.
- Xp Forested peatlands; peatswamp forests.
- Y Freshwater springs; oases.
- Zg Geothermal wetlands.
- Zk(b) Karst and other subterranean hydrological systems, inland.

*Human-made wetlands*

- 1 Aquaculture (e.g., fish/shrimp) ponds.
- 2 Ponds; includes farm ponds, stock ponds, small tanks; (generally below 8 ha).
- 3 Irrigated land; includes irrigation channels and rice fields.
- 4 Seasonally flooded agricultural land (including intensively managed or grazed wet meadow or pasture).
- 5 Salt exploitation sites; salt pans, salines, etc.
- 6 Water storage areas; reservoirs/barrages/dams/impoundments (generally over 8 ha).
- 7 Excavations; gravel/brick/clay pits; borrow pits, mining pools.
- 8 Wastewater treatment areas; sewage farms, settling ponds, oxidation basins, etc.
- 9 Canals and drainage channels, ditches.
- Zk(c) Karst and other subterranean hydrological systems, human-made.

## Appendix III : Selected Bibliography

- Afrikaner, C. 1998 *The investigation of fog frequency and occurrence patterns in the central Namib as a possible alternative source of water supply to the Topnaar community along the Kuisseb River in the Namib Desert*. BA(Hons) thesis, Department of Geography, University of Namibia
- Anonymous 1972 *The extent and degree of occurrence of Salvinia molesta (Kariba weed) in the Chobe-Linyanti-Kwando river system*. Report of the joint Botswana/South African survey, CSIR Pretoria/Botswana Ministry of Agriculture, Gaborone, Botswana.
- Archibald, T.J. & Nott, T.B. 1987 The breeding success of flamingoes in Etosha National Park, 1986. *Madoqua* 15(3):269-270
- Ashley, C. 1994 *Water resources and population growth: population growth and renewable management - the challenge of sustaining people and the environment*. Directorate of Environmental Affairs Research Discussion Paper 1:22-29
- Auer, C. 1997 Chemical quality of water at waterholes in the Etosha National Park. *Madoqua* 20:121-128
- Austen, M.M. 1993 Thousand and thousand - the Walvis wetland count. *Birding in southern Africa* 45(2):35-36
- Barnard, K.H. 1948 Report on a collection of fishes from the Okavango River with notes on Zambezi fishes. *Annals of the South African Museum* 36:407-458.
- Bell-Cross, G. 1982 *The biogeography of the Zambezi River fish fauna*. MSc thesis. University of Natal, South Africa.
- Berry, H.H. 1972 Flamingo breeding on the Etosha Pan, South West Africa, during 1971. *Madoqua* Ser 1(5):5-31
- Berry, H.H. 1975 History of the guano platform on Bird Rock, Walvis Bay, South West Africa. *Bokmakierie* 27:60-64
- Berry, H.H. 1976 Physiological and behavioural ecology of the Cape Cormorant *Phalacrocorax capensis*. *Madoqua* 9:5-55
- Berry, H.H. & Berry C.U. 1975 A checklist and notes on the birds of Sandvis, South West Africa. *Madoqua* 9(2):5-18
- Berry, H.H. & Lenssen, J. 1997 Cape fur seal predation by brown hyaena in the Namib-Naukluft Park, Namibia. *Madoqua* 19(2):115-116
- Berry, H.H., Seely, M.K. & Fryer, R.E. 1974 The status of the Jackass Penguin *Spheniscus demersus* on Halifax island off South West Africa. *Madoqua* Ser II(3):27-29
- Berry, H.H., Stark, H.P. & van Vuuren, A.S. 1973 White Pelicans *Pelecanus onocrotalus* breeding on the Etosha Pan, South West Africa, during 1971. *Madoqua* 1(7):17-31
- Bethune, S. 1987 *A limnological baseline survey of the Okavango River in South West Africa/Namibia 1984-1986*. Unpublished report of the Water Quality Division, Department of Water Affairs.
- Bethune, S. 1987 *The limnological baseline survey of the impoundments. Von Bach, Omatako and Swakoppoort dams on the Eastern National Water Carrier*. Report 87/8:1-62, Department of Water Affairs, Windhoek
- Bethune, S. 1991 Kavango River wetlands. *Madoqua* 17(2):77-112
- Bethune, S. 1992 *An updated review of the limnological baseline survey of the Okavango River in Namibia: 1984-1986*. Unpublished report of the Department of Water Affairs.
- Bethune, S. 1995 Environmental concerns related to the Epupa hydro-electric scheme. *Roan News*, Wildlife Society of Namibia, Windhoek
- Bethune, S. 1996 *Biological control of Salvinia molesta in the eastern Caprivi; progress report, 1980-1995*. Report no. RR/96/1. Department of Water Affairs, Windhoek, Namibia. 51pp
- Bethune, S. 1998 Wetland habitats. In: Barnard, P. (ed) *Biological diversity in Namibia - a country study*, Ministry of Environment and Tourism, Windhoek pp60-66
- Bethune, S. 2000 *Five aquatic weeds and their control*. SADC Aquatic Weeds Subcommittee Report, Windhoek
- Bethune, S. & Roberts, K. 1991 Checklist of the fishes of Namibia for each wetland region. *Madoqua* 17(2):193-199
- Binzouli, F. 1997 *Assessment and zonation of the 1989 flood along the Zambezi River for environmental management in eastern Caprivi, NE Namibia, using multi-temporal remote sensed imagery and GIS*. MSc thesis, International Institute for Aerospace Survey and Earth Sciences, the Netherlands
- Branfield, A. 1989 A birding experience in the eastern Caprivi. *Bokmakierie* 41(2):38-40.
- Branfield, A. 1990 New bird records for the East Caprivi, Namibia. *Lanioturdus* 25:4-21.
- Breen, C.M. 1991 Are intermittently flooded wetlands of arid environments important conservation sites? *Madoqua* 17(2):61-65
- Breen, C.M., Quinn, N.W. & Mander, J.J. (eds) 1997 *Wetlands conservation and management in southern Africa - challenges and opportunities*. Ch.10 pp82-89. Summary of the SADC wetlands conservation survey report, IUCN
- Brown, A.C. 1958 The ecology of south African estuaries. Part 9: notes on the estuary of the Orange River. *Transactions of the Royal Society of South Africa* 35:463-473
- Brown, C.J. 1986 Walvis Bay's wetlands conservation project. *Ikundla* Jan:15-16
- Brown, C.J. 1987 Walvis Bay's wetlands conservation project: a progress report. *Ikundla* Jan:30
- Brown, C.J. 1990 Birds of the west Caprivi Strip, Namibia. *Lanioturdus* 25:22-37
- Brown, C.J. 1991 A checklist of the birds of Owambo. In: *Report on a preliminary biological survey of the Owambo Region*. Ministry of Wildlife, Conservation and Tourism, unpublished report pp. 20-37
- Brown, C.J. 1991 Wetland birds of the Swakop River estuary. *Lanioturdus* 26:16-21
- Brown, C.J. 1992 The status of cranes in Namibia. In: Porter, D.J., Craven, H.S., Johnson, D.N. & Porter, M.J. (eds) *Proceedings of the first South African crane conference*. Southern African Crane Foundation, Durban, South Africa. Pp. 73-78.
- Brown, C.J. 1993 The birds of Owambo, Namibia. *Madoqua* 18:147-161
- Brown, C.J. & Jones, B.T.B. (eds.) 1994 *Results of a socio-ecological survey of the west Caprivi strip, Namibia: a strategic community-based environment and development plan*. Directorate of Environmental Affairs, Windhoek, Namibia. 205 p.
- Brown, D.S., Curtis, B.A., Bethune, S. & Appleton, C.C. 1992 Freshwater snails of east Caprivi and the lower Okavango River basin in Namibia and Botswana. *Hydrobiologia* 246:9-40
- Cashman, A., Harris, M., Plettenberger, H. & Volkman, B. 1986 *Preliminary reconnaissance report on irrigation possibilities along the Okavango River in the Kavango*. Department of Water Affairs, Windhoek report 2500/2/29/p2
- Channing, A. 1989 New frog records from the eastern Caprivi strip, South West Africa/Namibia. *Madoqua* 16(1):1-4.
- Channing, A. 1991 An illustrated key to the frogs of Namibia. *Madoqua* 17(2):227-232
- Channing, A. & Griffin, M. 1993 An annotated checklist of the frogs of Namibia. *Madoqua* 18(2):101-116.
- Chivell, C. (et al) 1991 *Investigation into surface water resources of Owambo*. Department of Water Affairs, Windhoek
- Chutter, F.M. 1997 *A report on the application of the SASS4 method for the assessment of river quality to the Zambezi, Okavango and Kwando/Linyanti Rivers in northern Namibia*. Afridev report to the Department of Water Affairs, Windhoek
- Clancey, P.A. 1980 On birds from the mid-Okavango valley on the South West Africa/Angola border. *Durban Museum Novitates* 12:87-127
- Clarke, N.V. 1998 *Baseline study of the ecology of the oshanas 1996/97 (with recommendations for monitoring)*. Department of Water Affairs, Windhoek
- Clarke, N.V. 1998 *Guide to the common plants of the Cuvelai wetlands*. SABONET, Windhoek
- Clarke, N.V. 1999 Flora of the Cuvelai wetlands - northern Namibia. *Cimbebasia* 15:99-115
- Clarke, N.V. & Rayner, N.A. 1999 Freshwater crustacea (Ostracoda, Copepoda, Branchiopoda, Cladocera) of the Cuvelai wetlands in northern Namibia. *Cimbebasia* 15:117-126

- Cooper, J., Robertson, H.G. & Shaughnessy, P.D. 1980 Waders (Charadrii) and other coastal birds of the diamond coast and the islands off South West Africa. *Madoqua* 12(1):51-57
- Council for Scientific and Industrial Research 1991 *Environmental rehabilitation: Orange River Mouth saltmarshes*. CSIR report EMA-C 91165, Stellenbosch, South Africa
- Council for Scientific and Industrial Research 1996 *Environmental study of the Kunene River mouth*. CSIR, Stellenbosch, South Africa
- Crerar, S.E. 1984 *Second annual report on the hydrology of the eastern Caprivi*. report 2400/3/1/H2 Department of Water Affairs, Ministry of Agriculture, Water and Rural Development
- Crerar, S.E. 1985 *Third annual report on the hydrology of the eastern Caprivi*. report 2400/3/1/H3 Department of Water Affairs, Ministry of Agriculture, Water and Rural Development
- Crerar, S.E. 1986 *Fourth annual report on the hydrology of the eastern Caprivi*. report 2400/3/1/H4 Department of Water Affairs, Ministry of Agriculture, Water and Rural Development
- Crerar, S.E. 1992 *Combined Namibian / Botswana Okavango gauging and Kwando/Linyanti/Chobe investigation, 15 - 21 October 1991* unpublished report, Hydrology Division, Department of Water Affairs, Windhoek, Namibia
- Crerar, S.E. 1992 *Hydrology of the Kwando/Linyanti/Chobe and Zambezi river systems. Proposals on future joint Namibian/Botswana co-operation*. Internal report of the Department of Water Affairs, Ministry of Agriculture, Water and Rural Development.
- Crerar, S. 1997 Specialist report on the hydrology of the Okavango River system upstream of the Okavango delta. In: Department of Water Affairs and Water Transfer Consultants *Feasibility study on the Okavango River to Grootfontein link of the Eastern National Water Carrier* Volume 4, Part 3, Appendix A
- Crerar, S. & Bethune, S. 2000 *Feasibility study on the rehabilitation of lake Liambezi*. Windhoek Consulting Engineers for Ministry of Fisheries and Marine Resources, Windhoek
- Curtis, B. 1990 *Investigation into the distribution of freshwater snails and snail borne diseases in Namibia and the possibility of spreading these diseases, with special reference to the potential role of the Eastern National Water Carrier*. Unpublished report. State Museum, Windhoek.
- Curtis, B.A. 1991 Freshwater macro-invertebrates of Namibia. *Madoqua* 17(2):163-187
- Curtis, B.A. & Appleton, C.C. 1987 The molluscs of the Okavango River in South West Africa/Namibia. *Journal of the SWA Scientific Society* 40/41:47-53.
- Curtis, B., Roberts, K.S., Griffin, M., Bethune, S., Hay, C.J. & Kolberg, H. 1998 Species richness and conservation of Namibian freshwater macro-invertebrates, fish and amphibians. *Biodiversity and Conservation* 7(4):447-466
- Davison, E. 1950 A maze of reeds: the home of the sitatunga. *African Wildlife* 4:57-59.
- Day, J.A. 1997 *The status of freshwater resources in Namibia*. Directorate of Environmental Affairs Research Discussion Paper 22 Ministry of Environment and Tourism.
- Day, J.H. 1981 Summaries of current knowledge of 43 estuaries in southern Africa. In: Day, J.H. (ed) *Estuarine ecology - with particular reference to southern Africa*, A.A. Balkema, Cape Town, South Africa pp251-330
- De Sousa Correia, R.J. & Bredenkamp, G.J. 1987 A reconnaissance survey of the vegetation of the Kavango, South West Africa. *Journal of the SWA Scientific Society* XL/XLI:29-45
- De Wet, J.S. 1991 Artificial wetlands and artesian waters of Namibia. *Madoqua* 17(2):159-160
- Department of Water Affairs 1977 *Hydrology report: hydrology of the eastern Caprivi*. report no. 2400/1 Ministry of Agriculture, Water and Rural Development
- Department of Water Affairs 1983 *First annual report on the hydrology of the eastern Caprivi*, internal report, Ministry of Agriculture, Water and Rural Development
- Department of Water Affairs 1984 *Preliminary reconnaissance report on irrigation possibilities along the Okavango River in the Kavango*. report no. 2500/2/29/P1 Windhoek
- Department of Water Affairs 1991 *Environmental Assessment of the Okavango River basin by Angola, Botswana and Namibia*. Internal report WR/91/12/2. Ministry of Agriculture, Water and Rural Development
- Department of Water Affairs 1992 *Feasibility study into a regulating structure on the Chobe river at Ngoma gate in the eastern Caprivi*. internal report 13/1/3 Ministry of Agriculture, Water and Rural Development
- Department of Water Affairs 1992 *Hydrology of the Kwando/Linyanti/Chobe and Zambezi river systems - proposals on future joint Namibian/Botswanan co-operation*. Ministry of Agriculture, Water and Rural Development
- Department of Water Affairs 1994 *Investigation into the surface water resources of the Okavango Region with special reference to the Okavango River*. report no.2500/3/1/H1 Ministry of Agriculture, Water and Rural Development
- Department of Water Affairs 1996 *A baseline environmental investigation in the Ugab River*. Department of Water Affairs, Windhoek
- Desert Research Foundation of Namibia 1994 *Understanding the oshana environment*. Gamsberg Macmillan Publishers. 50pp.
- DHV Consult (in association with Stewart Scott, Willem van Riet, Grant Thornton Kessel Feinstein) 1999 *Preliminary project scan for scoping assessment for the Okavango Upper Zambezi International Tourism study (OUZIT)*. Development Bank of southern Africa, Department of Trade and Industry (Spatial Development Initiatives), Midrand, South Africa
- Dillmann, O.O. 1983 Die Entstehung des Otjikotesees. *Newsletter of the SWA Scientific Society* 24:2-4
- Dixon, J.E.W. & Blom, M.J. 1974 Some aquatic vertebrates from the Namib Desert, South West Africa. *Madoqua* Ser. II(3):31-32
- Du Plessis, W. 1991 Preliminary vegetation map of Owambo. In: Ministry of Wildlife, Conservation and Tourism *Report on a preliminary biological survey of the Owambo region*. Appendix 3 pp. 11-19 unpublished report, Windhoek
- Du Preez, J.S. & Grobler, I.D. 1977 Drinking times and behaviour at waterholes of some game species in the Etosha National Park. *Madoqua* 10(1):61-69
- Edwards, D. (et al) 1972 *Report on a joint Botswana - South Africa survey of the extent and degree of occurrence of Salvinia molesta (Kariba weed) in the Chobe-Linyanti-Kwando River system*. Unpublished report to the Botswana and South Africa governments
- Edwards, D. & Thomas, P.A. 1977 The *Salvinia molesta* problem in northern Botswana and eastern Caprivi area. In: Annecke, D. (ed) *Proceedings of the Second National Weeds Conference of South Africa*. A.A. Balkema, Cape Town, South Africa. 221-239.
- El Obeid, S. & Mendelsohn, J. 2001 *A preliminary profile of the Kavango Region in Namibia*. Namibia Nature Foundation, Windhoek, Namibia
- Environmental Action Committee Walvis Bay 1997 *Towards an integrated management and development plan for the Walvis Bay lagoon and environs*. Proceedings of workshop on 22 July 1997, Walvis Bay
- Fisch, M. 1987 Die Hydrographie des Kavangoflusses. *Journal of the SWA Scientific Society* XL/XLI:55-74.
- Fox, V.E., Lindeque, P.M., Simmons, R.E., Berry, H.H., Brain, C. & Braby, R. 1997 Flamingo rescue in Etosha National Park, Namibia, 1994: technical, conservation and economic considerations *Ostrich* 68:71-75
- Gaerdes, F. 1960 Ausflug nach Sandwich Hafen. *Der Kreis* 3(10/11):366-369
- Gebhardt, L. 1973 Sandwich Harbour: a sanctuary in the dunes. *SWA Annual* 1973:97-103
- Gilliomce, J.H. 1986 The biological control of Kariba weed in the eastern Caprivi *African Wildlife* 40:189-195
- Girvan, L., Maasdorp, M., Pomuti, A., van Rooy, G. & Tvedten, I. 1994 *Freshwater fisheries and fish management in Namibia: a socio-economic background study*. Research Report no 12, Social Sciences Division, University of Namibia, Windhoek

- Graz, F.P. 1996 *Freshwater fish distribution maps, eastern Caprivi: data processing and map production*. Technical Notes NRSC no.6. National Remote Sensing Centre, Windhoek, Namibia.
- Griffin, M. 1993 *Annotated checklist and conservation status of mammals, reptiles and amphibians of the Sperrgebiet, southern Namib desert, Namibia*. unpublished report, Ministry of Environment and Tourism, Windhoek
- Griffin, M. 1995 Review of Namibian anuran diversity. *Madoqua* **19(1)**:31-32
- Griffin, M. & Channing, A. 1991 Wetland-associated reptiles and amphibians of Namibia - a national review *Madoqua* **17(2)**:221-225
- Griffin, M. & Grobler, H.J.W. 1991 Wetland-associated mammals of Namibia - a national review *Madoqua* **17(2)**:233-237
- Grindley, J.R. 1959 Birds of the Orange River estuary. *Ostrich* **30**:127-129
- Grobler, H.J.W. 1986 *Bepaling van 'n moontlike tendens in die visbevolking na tien jaar van ontginning in die Liambezi-meer. Tweede vorderingverslag*. Department of Nature Conservation and Tourism.
- Grobler, H.J.W. 1987 *A fish ecology study of lake Liambezi in the Caprivi, South West Africa*. MSc thesis, Rand Afrikaans University, Johannesburg. (in Afrikaans).
- Grobler, H.J.W. 1991 *An ecological study of the Nkasa-Lupala island ecosystem within the Mamili National Park with special reference to management practices*. Ministry of Environment and Tourism.
- Grobler, M. & Ferreira, J. 1990 The drying of lake Liambezi. *Custos* **19(6)**:40-44.
- Haacke, W.D., Rautenbach, I.L. & Kemp, A.C. 1971 The Transvaal Museum expedition to the eastern Caprivi strip: observations on mammals of the eastern Caprivi strip; observations on birds of the eastern Caprivi strip. *Transvaal Museum Bulletin* **11**:4-8.
- Harrison, T.D., Cooper, J.A.G., Ramm, A.E.L. & Singh, R.A. 1995 *Health of South African estuaries: Orange - Buffels (Oos)*. Coastal and Catchment Environmental Programme, CSIR, Congella, South Africa
- Hay, C.J. 1991 The distribution of fish in the Fish River, Namibia. *Madoqua* **17(2)**:211-215
- Hay, C.J., van der Bank, F.H. & Ferreira, J.T. 1997 Aspects of the ecology of *Barbus hospes* from the Fish River, Namibia. *Madoqua* **19(2)**:95-97
- Hay, C.J., van der Bank, F.H. & Ferreira, J.T. 1997 The effect of the artificial linkage between the Kunene River and the Cuvelai system on the fish fauna in Owambo, Namibia. *Madoqua* **19(2)**:99-105
- Hay, C.J., van Zyl, B.J., van der Bank, F.H., Ferreira, J.T. & Steyn, G.J. 1997 A survey of the fishes of the Kunene River, Namibia. *Madoqua* **19(2)**:129-141
- Hellwig, D.H.R. 1974 *A water quality study of the freshwater found around the Sandwich lagoon - a repetition of a survey carried out in January 1968*. National Institute for Water Research, Windhoek
- Hellwig, D.H.R. 1974 *A water quality study of the freshwater found around the Sandwich lagoon may 1968 and October 1974*. National Institute for Water Research, Windhoek
- Hellwig, D.H.R. 1988 Challenging the Namib dune sea. *Journal of the Limnological Society of Southern Africa* **14**:35-40
- Heyns, P. 1991 Guidelines for the utilisation of water resources and protection of wetlands in Namibia. *Madoqua* **17(2)**:249-251
- Heyns, P., Montgomery, S., Pallett, J. & Seely, M. (eds) 1998 *Namibia's water - a decision makers' guide*. Department of Water Affairs & Desert Research Foundation of Namibia, Windhoek
- Hines, C.J.H. 1987 The birds of eastern Kavango, SWA/Namibia. *Journal of the SWA Scientific Society* **40/41**:115-148.
- Hines, C.J.H. 1989 The birds of north-eastern Namibia. *Birding in southern Africa* **41**:89-92
- Hines, C.J.H. 1991 Temporary wetlands of Bushmanland and Kavango, northeast Namibia. *Madoqua* **18(2)**:57-69.
- Hines, C.J.H. 1992 *An ecological study of the vegetation of eastern Bushmanland (Namibia) and its implications for development*. MSc thesis, University of Natal, South Africa
- Hines, C.J.H. 1996 Cranes in Namibia. In: Beilfuss, R.D., Tarboton, W.R. & Gichuki, N.N. (eds) *Proceedings of 1993 African crane and wetland training workshop*. International Crane Foundation, Baraboo, WI, USA. Pp. 305-306.
- Hines, C.J.H. 1996 Namibia's Caprivi Strip. *Bulletin of the African Bird Club* **3(2)**:113-128
- Hines, C.J.H., Schlettwein, C.H.G. & Kruger, W. 1985 Invasive alien plants in Bushmanland, Owambo, Kavango and Caprivi. In: Brown, C.J., MacDonald, I.A.W. & Brown, S.E. (eds) *Invasive alien organisms in South West Africa/Namibia*. South African National Scientific Programmes no. 119. CSIR, Pretoria, South Africa. Pp. 6-12.
- Hockey, P.A.R. 1982 Waders (Charadrii) and other coastal birds in the Lüderitz region of South West Africa. *Madoqua* **13(1)**:27-33
- Hocutt, C.H. & Johnson, P.N. 1993 *Fisheries resource assessment of the Kavango and Caprivi provinces, Namibia*. Department of Fisheries, Windhoek, Namibia. 138 pp.
- Holtzhausen, J.A. 1991 Freshwater fishes of Namibian wetlands - a review. *Madoqua* **17(2)**:189-191
- Irish, J. 1991 Conservation aspects of Karst waters in Namibia. *Madoqua* **17(2)**:141-146
- Jacobson, P.J., Jacobson, K.M. & Seely, M.K. 1995 *Ephemeral rivers and their catchments - sustaining people and development in western Namibia*. Desert Research Foundation of Namibia, Windhoek
- Jamieson, I.G., McRae, S.B., Simmons, R.E. & Trewby, M. 2000 High rates of conspecific brood parasitism and egg recognition in coots and moorhens breeding in ephemeral wetlands in Namibia. *Auk* **117**:250-255
- Jubb, R.A. 1958 A preliminary report on the collections of freshwater fishes made by the Bernard Carp expeditions to the Caprivi strip, 1949, the lower Sabi river, 1950 and to Barotseland, 1952. *Occasional Paper of the National Museums of Southern Rhodesia* **22b**:177-189.
- Jurgens, J.D. 1979 The anura of the Etosha National Park. *Madoqua* **11(3)**:185-208
- Kemp, A.C. 1971 Observations on birds of the eastern Caprivi Strip. *Bulletin of the Transvaal Museum* **3**
- Kensley, B.F. 1970 Some decapod crustacea from northern South West Africa, including a new species of hippolyte *Cimbebastia* **AI(8)**:179-188
- Koch, H. & Schlettwein, C.H.G. 1983 The history of the *Salvinia molesta* problem in the eastern Caprivi Zipfel of South West Africa/Namibia from 1948-1981. In: *Proceedings of the 20th Annual Congress of the Limnological Society of Southern Africa*. Limnological Society, South Africa.
- Koen, J.H. 1988 Birds of the eastern Caprivi. *Southern Birds* **15** Witwatersrand Bird Club, Benmore, South Africa. 73 pp.
- Kolberg, H. 2000 *and a River runs through it... - an information document on the Ai-Ais Hot Springs Game Park*. unpublished report, Division Specialist Support Services, Ministry of Environment and Tourism, Windhoek
- Kolberg, H., Griffin, M. & Simmons, R. 1996 The ephemeral wetland systems of central northern Namibia. In: Hails, A.J. (ed) *Wetlands biodiversity and the Ramsar Convention*. pp40-42, Ramsar Convention, Gland, Switzerland
- Le Roux, C.J.G., Grunow, J.O., Morris, J.W., Bredenkamp, G.J. & Scheepers, J.C. 1988 A classification of the vegetation of the Etosha National Park. *South African Journal of Botany* **54(1)**:1-10
- Lenssen, J., Tarr, P. & Berry, H.H. 1991 An assessment of visitor statistics and line fishing along the Sandwich shoreline, Namib-Naukluft Park, Namibia. *Madoqua* **18**:33-36
- Leppan, A.W. 1944 Birds of the eastern Caprivi Zipfel. *Ostrich* **15**:20-30
- Lindeque, M. & Archibald, T.J. 1991 Seasonal wetlands in Owambo and the Etosha National Park. *Madoqua* **17(2)**:129-133
- Loutit, R. 1991 Western flowing ephemeral rivers and their importance to wetlands in Namibia. *Madoqua* **17(2)**:135-140

- Malan, O.G. & Koch, H.W.R. 1985 *Die kartering van Salvinia molesta in Liambesi met behulp van Landsat MSS-cyferdata*. WNNR kontrak verslag C-FIS 66 pp 1-3
- Marais, F. & Irish, J. 1997 Cave investigations in Namibia IV: Aikab hemicenote, and other karst phenomena in the Etosha National Park *Madoqua* 20:81-90
- Marsh, A. & Seely, M. 1992 *Oshanas: sustaining people, environment and development in central Owambo, Namibia*. Desert Research Foundation of Namibia, Windhoek, 56pp
- Mendelsohn, J. & Roberts, C.S. 1997 *An environmental profile and atlas of the Caprivi*. Directorate of Environmental Affairs, Windhoek, Namibia.
- Mendelsohn, J., El Obeid, S. & Roberts, C. 2000 *A profile of north-central Namibia*. Ministry of Environment and Tourism, Windhoek
- Merron, G.S. 1989 A checklist of fishes of the Kwando River, Selinda spillway, lake Liambesi and Chobe river system with notes on their biology and distribution. *Botswana Notes and Records* 21:135-151
- Merron, G.S. & Bruton, M.P.J. 1989 The completion of the Okavango fisheries programme *African Wildlife* 43:223-225
- Ministry of Environment and Tourism 1996 *Management and development plans for the Okavango National Park*. 3 Volumes, Ministry of Environment and Tourism, Windhoek
- Ministry of Environment and Tourism 1999 *North East Parks Project - Khaudum National Park*. Vol.2 (management plan) and Vol.3 (integrated development plan), Ministry of Environment and Tourism, Windhoek
- Ministry of Environment and Tourism 1999 *North East Parks Project - Kwando Core Area*. Vol. 2 (management plan) and Vol. 3 (integrated development plan), Ministry of Environment and Tourism, Windhoek
- Ministry of Environment and Tourism 1999 *North East Parks Project - Mamil National Park*. Vol. 2 (management plan) and Vol.3 (integrated development plan), Ministry of Environment and Tourism, Windhoek
- Ministry of Environment and Tourism 1999 *North East Parks Project - Mangetti Game Camp*. Vol.2 (management plan) and Vol.3 (integrated development plan). Ministry of Environment and Tourism, Windhoek
- Ministry of Environment and Tourism 1999 *North East Parks Project - Mudumu National Park*. Vol. 2 (management plan) and Vol. 3 (integrated development plan). Ministry of Environment and Tourism, Windhoek
- Ministry of Environment and Tourism 1999 *North East Parks Project - background and inventory*. Vol. 1, Ministry of Environment and Tourism, Windhoek
- Ministry of Wildlife, Conservation and Tourism 1991 *Masterplan for Mudumu National Park*.
- Morant, P.D. & O'Callaghan, M. 1990 Some observations on the impact of the March 1988 flood on the biota of the Orange River Mouth. *Transactions of the Royal Society of South Africa* 47:295-305
- Mostert, A.C. & van Langenhoven, G. 1994 *Preliminary assessment of Linyanti River*. internal report 11/6/3/1 Department of Water Affairs, Windhoek
- Mursch, A. & Steffan, A.W. 1997 Subfossile Gliederfuesser von Salzsee-ufem im Owamboland, Namibia (Arthropoda, Solifugae, Scorpiones, Chilopoda, Diplopoda, Insecta). *Verhandlungen, westdeutscher Entomologentag, Düsseldorf* pp. 1-14
- Myburgh, R.J. 1966 *Report on inspection visit to Angola from 3 -12 January 1966 in connection with the hydrology of the Cunene development*. Department of Water Affairs, Windhoek
- Namibian/Botswana Co-operation 1991 *Hydrology of the Kwando/Linyanti/Chobe and Zambezi river systems*. Namibian Department of Water Affairs, Windhoek & Botswana Department of Water Affairs, Gaborone
- Noli-Peard, K.R. & Williams, A.J. 1991 Wetlands of the Namib coast *Madoqua* 17(2):147-153
- Nordenstam, B. 1970 Notes on the flora and vegetation of Etosha pan, South West Africa. *Dinteria* 5: 3-18.
- Orange River Environmental Task Group 1990 *Orange River ecology, assessment of environmental water requirement for the Orange River Mouth*. Department of Water Affairs, Pretoria, South Africa
- Pallet, J. (ed) 1995 *The Sperrygebiet - Namibia's least known wilderness*. Desert Research Foundation of Namibia and Namdeb, Windhoek
- Pallett, J., Heyns, P., Falkenmark, M., Lundqvist, J. Seely, M., Hyden, L., Bethune, S., Dranger, O-J. & Kemper, K. 1997 *Sharing water in southern Africa*. Desert Research Foundation of Namibia, Windhoek
- Paulsmeier, H.J.C. 1941 *Der Kalaharisee, eine Darstellung, wie die Wasser der Flüsse Okavango, Chobe und Zambezi zum unendlichen Vorteil für Süd-Afrika verwendet werden könnten*. John Meinert, Windhoek
- Penney, A.J. (et al) 1989 Guinas lake. *Bulletin of the South African Speleological Association* 29:6-10
- Penrith, M.J. 1978 Ojikoto lake *SWA Annual* 1987:138-139
- Penrith, M.J. 1982 Notes on marine fishes collected in the vicinity of bosluisbaai *Madoqua* 13(2):159-168
- Penrith, M.S. 1970 *Trionix trianguis* (Forsk.) a reptile new to the South West African fauna. *Madoqua* 3:71-73
- Prozesky, O.P.M. 1960 Birdlife at Sandwich Harbour. *Bulletin of the Transvaal Museum* 4:2-3
- Prozesky, O.P.M. 1963 Ornithological results of the Transvaal Museum Namib expedition May 1959 and subsequent trip to Sandwich Harbour during January 1960. *Ostrich* 1963:78-91
- Rayner, N.A., Silberbauer, M.J. & Bethune, S. 1995 Zooplankton diversity and abundance in three Namibian impoundments. *Cimbebasia* 14:43-51
- Robinson, E.R. 1976 *Phytosociology of the Namib Desert Park, South West Africa*. MSc thesis, University of Natal, Pietermaritzburg, South Africa
- Rodwell, T.C., Tagg, J. & Grobler, M. 1995 *Wildlife resources in the Caprivi, Namibia: the results of an aerial census in 1994 and comparisons with past surveys*. Directorate of Environmental Affairs Research Discussion Paper 9, Ministry of Environment and Tourism, Windhoek, Namibia. 29 pp.
- Ryan, P.G. & Cooper, J. 1985 Waders (Charadrii) and other coastal birds of the northwestern Cape Province, South Africa. *Bontebok* 4:1-8
- Ryan, P.G., Cooper, J. & Stutterheim, C.J. 1984 Waders (Charadrii) and other coastal birds of the Skeleton Coast, South West Africa. *Madoqua* 14(1):71-78
- Schlettwein, C.H.G. 1984 *Preliminary report on the biological control of Salvinia molesta in the eastern Caprivi*. internal report, Department of Water Affairs file 10/12/2/2/2 Windhoek
- Schlettwein, C.H.G. 1984 *The chemical quality of lake and river water in the eastern Caprivi*. Department of Water Affairs. Research report
- Schlettwein, C.H.G. 1984 The control of *Salvinia molesta* in the eastern Caprivi Zipfel *SWA Annual* 1984:49-51
- Schlettwein, C.H.G. 1985 *Chemical water quality of the rivers of the eastern Caprivi and lake Liambesi*. Department of Water Affairs W85/6
- Schlettwein, C.H.G. 1985 Distribution and densities of *Cyrtobagous singularis* Hustache (Coleoptera: Curculionidae) on *Salvinia molesta* Mitchell in the eastern Caprivi Zipfel. *Madoqua* 14(3):291-293.
- Schlettwein, C.H.G. 1985 *The biological control of Salvinia molesta*. Internal report no. W85/5 Department of Water Affairs Windhoek
- Schlettwein, C.H.G. & Bethune, S. 1992 Aquatic weeds and their management in southern Africa - biological control of *Salvinia molesta* in the eastern Caprivi In: Matiza, T. & Chabwela, H.N. (eds) *Wetlands conservation conference for southern Africa: proceedings of the southern African development coordination conference held in Gaborone, Botswana, 3-5 June 1991*. IUCN, Gland, Switzerland, Pp. 173-187.
- Schlettwein, C.H.G. & Koch, H.W.R. 1982 *Some chemical qualities of lake and river waters in the eastern Caprivi Zipfel*. Department of Water Affairs, research report 6

- Schlettwein, C.H.G. & Koch, H.W.R. 1983 Growth and mortality rates of *Salvinia molesta* in the eastern Caprivi Zipfel. In: *Proceedings of the 20th Annual Congress of the Limnological Society of Southern Africa*. South Africa. 20 pp.
- Schlettwein, C.H.G., Simmons, R.E., MacDonald, A. & Grobler, H.J.W. 1991 Flora, fauna and conservation of east Caprivi wetlands. *Madoqua* 17(2):67-76
- Schneider, M.B. 1987 Notes on terrace soils of the Kavango River, northern SWA/Namibia. *Journal of the SWA Scientific Society* 40/41:199-213
- Schrader, H.J. 1985 Invasive alien fishes in South West Africa/Namibia. In: Brown, C.J., MacDonald, I.A.W. & Brown, S.E. (eds.) *Invasive alien organisms in South West Africa/Namibia*. South African National Scientific Programmes Report no 119:35-40
- Schrader, H.J. 1987 Die produksievermoe van *Oreochromis mossambicus* in drywende nethokke in Hardapdam, Suidwes Afrika/Namibie. *Madoqua* 15(3):229-235
- Schrader, H.J. 1991 Approach of the Ministry of Wildlife, Conservation and Tourism to wetlands in Namibia. *Madoqua* 17(2):253-254
- Schrader, H.J. & Ferreira, J.T. 1991 Growth of Mozambique tilapia, *Oreochromis mossambicus* on natural food in floating cages, Hardap Dam, Namibia. *Madoqua* 17(2):217-220
- Scott, W.E., Seaman, M., Walmsley, R.D. & Toerien, D.F. 1975 *An investigation of lake Liambezi and its surroundings*. Part ii. Project report no. 3: advisory services and ad hoc studies: file no. W6/151/3 project no. 151 code no. 6201/6151, CSIR, National Institute for Water Research, Pretoria, South Africa.
- Seaman, M.T., Scott, W.E., Walmsley, R.D., van der Waal, B.C.W. & Toerien, D.F. 1978 A limnological investigation of lake Liambezi, Caprivi. *Journal of the Limnological Society of Southern Africa* 4(2):129-144.
- Seely, M. & Burger, L. 1998 *Draft Walvis Bay lagoon integrated environmental management plan*. Desert Research Foundation of Namibia and Environmental Evaluation Unit, University of Cape Town, South Africa
- Shaw, P.A. & Thomas, D.S.G. 1988 Lake Caprivi: a late quaternary link between the Zambezi and middle Kalahari drainage systems. *Zeitschrift für Geomorphologie* 32(3):329-337.
- Simmons, R.E. 1991 Namibian wetland counts. In: *African waterbird census 1991*. Wetlands International, Netherlands
- Simmons, R.E. 1991 Wading birds of the Sandwich Harbour wetlands, February 1991: preliminary estimates and alternative counting methods. *Lanioturdus* 26:4-15
- Simmons, R.E. 1992 Namibian wetland counts. In: *African waterbird census 1992*. Wetlands International, Netherlands
- Simmons, R.E. 1992 The status of coastal wetlands in Namibia. In: Matiza, T. & Chabwela, H. (eds) *Wetlands conservation conference for southern Africa, Gaborone, Botswana* IUCN, Gland, Switzerland.
- Simmons, R.E. 1993 Namibian wetland counts. In: *African waterbird census 1993*. Wetlands International, Netherlands
- Simmons, R.E. 1993 The costs of damming the mighty Cunene. *Rössing Magazine* April 1993:1-5
- Simmons, R.E. 1994 Namibian wetland counts. In: *African waterbird census 1994*. Wetlands International, Netherlands
- Simmons, R.E. 1995 Namibian wetland counts. In: *African waterbird census 1995*. Wetlands International, Netherlands
- Simmons, R.E. 1996 Namibian wetland counts. In: *African waterbird census 1996*. Wetlands International, Netherlands
- Simmons, R.E. 1996 Population declines, viable breeding areas, and management options for flamingos in southern Africa. *Conservation Biology* 10(2):504-514.
- Simmons, R.E. 1997 Ecological factors promoting large bird populations in Walvis bay. *Integrated management and development plan for Walvis Bay, July 1997*, environmental action committee
- Simmons, R.E. 1997 Namibian wetland counts. In: *African waterbird census 1997*. Wetlands International, Netherlands
- Simmons, R.E. 1997 The Lesser Flamingo in southern Africa - a summary. In: *Conservation of the lesser flamingo in eastern Africa and beyond*. Pp50-61 IUCN workshop, August 1997, Lake Bogoria, Kenya
- Simmons, R.E. 1998 Namibian wetland counts. In: *African waterbird census 1998*. Wetlands International, Netherlands
- Simmons, R.E. 1999 Sandwich Harbour: an all-Africa record for terns? *Africa Birds and Birding* Feb/Mar 1999:60-62
- Simmons, R.E. 1999 The desert-breeding Damara Tern *Sterna balaenarum*: a case study. In: Beintema, A. & van Vesseem, J. (eds) *Strategies for conserving migratory waterbirds - proceedings of workshop 2 of the 2nd International Conference on Wetlands and Development*. Wetlands International publication 55:48-52
- Simmons, R.E. 2000 Declines and movements of Lesser Flamingos in Africa. In: Baldassarre, G. et al (eds) *Conservation biology of flamingos*. *Waterbirds* 23:40-46
- Simmons, R.E. 2000 Namibian wetland counts. In: *African waterbird census 2000*. Wetlands International, Netherlands
- Simmons, R.E. 2000 What is the world population of chestnut banded plovers? *Bird Numbers* 9:45
- Simmons, R.E. 2001 A survey of African black oystercatchers in the diamond coast. *Lanioturdus*
- Simmons, R.E. & Allan, D.G. 2001 The orange river avifauna: abundance, richness and comparisons. *Ostrich*
- Simmons, R.E. & Bethune, S. 1998 Freshwater fish diversity. In: Barnard, P. (ed) *Biological diversity in Namibia - a country study*, Ministry of Environment and Tourism, Windhoek pp140-144
- Simmons, R.E. & Borello, W. 1999 Flamingo migration routes - a challenge for Mozambique. *Bird Numbers* 8:13-15
- Simmons, R.E. & Cordes, I. 2000 Why is shorebird density so high in Walvis Bay? Delayed blooming and Benguela upwellings. *African Journal of Aquatic Sciences* 25:229
- Simmons, R.E., Boix-Hinzen, C., Barnes, K.N., Jarvis, A.M. & Robertson, A. 1998 Important bird areas of Namibia. In: Barnes, K.N. (ed) *The important bird areas of southern Africa*, Birdlife South Africa, Johannesburg, pp 295-332
- Simmons, R.E., Braby, R. & Braby, S.J. 1993 Ecological studies of the Cunene river mouth: avifauna, herpetofauna, water quality, flow rates, geomorphology and implications of the Epupa dam. *Madoqua* 18:163-180
- Simmons, R.E., Brown, C.J. & Griffin, M. 1991 The status and conservation of wetlands in Namibia. Special wetlands edition. *Madoqua* 17(2):53-254.
- Skelton, P.H. 1988 The Okavango river - a fish and fishing paradise. *Tight Lines* January:42-46.
- Skelton, P.H. 1990 The status of fishes from sinkholes and caves in Namibia. *Journal of the Namibia Scientific Society* 42:75-83
- Skelton, P.H. & Merron, G.S. 1984 *The fishes of the Okavango river in South West Africa, with reference to the possible impact of the E.N.W.C. on fish distribution*. Investigational report #9. J.L.B. Smith Institute of Ichthyology.
- Skelton, P.H. & Merron, G.S. 1985 *A second survey of the fishes of the Okavango river in South West Africa with reference to the possible impact of the E.N.W.C.* Investigational report #14. J.L.B. Smith Institute of Ichthyology.
- Skelton, P.H. & Merron, G.S. 1987 *A third survey of the fishes of the Okavango river in South West Africa with reference to the possible impact of the E.N.W.C.* Investigational report #24. J.L.B. Smith Institute of Ichthyology.
- Skelton, P.H., Bruton, M.N., Merron, G.S. & van der Waal, B.C.W. 1985 The fishes of the Okavango drainage system in Angola, South West Africa and Botswana: taxonomy and distribution. *Ichthyology Bulletin of the J.L.B. Smith Institute of Ichthyology* 50:1-21.
- Skinner, J.D., Lindeque, M., van Aarde, R.J. & Dickmann, R.C. 1980 The prey of owls in Koichab pan in the southern Namib desert. *Madoqua* 12(3):181-182
- Smith, P.A. 1969 *Report on: a herbicide spraying experiment and other measures to control the Salvinia infestation at Shaile on the Linyanti river in northern Botswana*. unpublished report
- Smith, P.A. 1969 *Report on: a search for the aquatic weed Salvinia molesta in the Kwando, Linyanti and Savuti rivers and the Selinda spillway*. unpublished report
- Smith, P.A. 1976 An outline of the vegetation of the Okavango drainage system. *Proceedings of the symposium on the Okavango delta and its future utilisation*. The Botswana Society, Gaborone, Botswana. Pp. 93-112.

- Smithers, R.H.N. 1964 *A check list of the birds of the Bechuanaland protectorate and the Caprivi strip*. Trustees of the National Museums of Southern Rhodesia, Harare, Zimbabwe. 18 pp.
- Steffan, A.W. 1997 Physiographische und biozoenotische Bewertung permanenter Quellgewässer im südwestlichen Afrika (Namibia, Damaraland and Kaokoveld) *Journal of Namibia Scientific Society* 45:13-44
- Steffan, A.W. 1999 Floodplain saltcrusts of groundwater-fed salt pans as actual fossilisation sites for arthropods (in preparation)
- Steffan, A.W. 1999 Taphocoenoses of arthropods on salt pan floodplains of the Oshana Region, Namibia - arthropoda, solifugae, scorpiones, chilopoda, diplopoda, insecta *Entomol gener* 23(4):281-304
- Stengel, H.W. 1962 Flüsse und Trockenflüsse in Südwestafrika und ihre Nutzung für die Wirtschaft des Landes. *Der Kreis* 213:45-77.
- Stuart, C.T. 1975 A short note on the diet of *Tyto alba* at Sandwich Harbour, Namib Desert Park, South West Africa. *Madoqua SerII(4)*:103
- Stuart, C.T. 1975 Marine fauna collected at Sandwich Harbour, Namib Desert Park, South West Africa. *Madoqua SerII(4)*:101-102
- Swart, D.H., Crowley, J.B., Moller, J.P. & de Wet, A. 1990 Nature and behaviour of the flood at the river mouth. *Transactions of the Royal Society of South Africa* 47:217-245
- Swart, D.H., Morant, P., Moller, J., Crowley, J. & de Wet, A. 1988 A record of events at the Orange River Mouth during the March 1988 flood. *South African Journal of Science* 84:881-889
- Tarr, J. 1994 A man-made wetland where industry and nature coexist. *Namibia Yearbook* 3:32-34
- Tarr, P.W. 1987 Non-nesting emergence by green turtles *Chelonia mydas* at the Cunene River Mouth, SWA/Namibia. *Madoqua* 15(3):267-268
- Taylor, E.D. 1997 *The status of Salvinia molesta infestation in the eastern Caprivi wetlands - 1996 report update and recommendations*. internal report WE/97/1, Department of Water Affairs, Windhoek
- Taylor, E.D. & Bethune, S. 1999 Management, conservation and research of internationally shared watercourses in southern Africa - Namibian experience with the Okavango river and rivers of the eastern Caprivi. *Southern African Journal of Aquatic Science* 24(1&2):36-46
- Terblanche, D.J. 1980 The man-made island of Sandwich Harbour. *SWA Annual* 1980:89-95
- Theron, G.K. 1980 Vegetation of the lower Kuiseb river. *Madoqua* 2(4)
- Tinley, K.L. 1971 The case for saving Etosha. *African Wildlife Supplement* 25: 1-16.
- Toerien, D.F., Wiltshire, C.H., Schlettwein, C.H.G. & Koch, H.W.R. 1984 Chemical composition of *Salvinia molesta* from the eastern Caprivi strip. *Madoqua* 14:91-93
- Tvedten, I., Girvan, L.A., Masdoorp, M., Pomuti, A. & van Rooy, G. 1994 *Freshwater fisheries and fish management in Namibia: a socio-economic background study*. Unpublished report. Multi-disciplinary Research Centre, University of Namibia, Windhoek, Namibia.
- Twentyman-Jones, V. 1988 Expedition to lake Guinas, lake Otjikoto and Otavifontein (SWA/Namibia). *Ichthos* 20:12-13
- Van Bruggen, A.C. 1970 A contribution to the knowledge of non-marine mollusca of South West Africa. *Zool. Meded. Leiden* 45:43-73.
- Van Bruggen, A.C. 1980 A note on some molluscs from the Caprivi strip, South West Africa (Namibia). *Basteria* 44:81-84
- Van der Merwe, L. 1988 *River mouth surveys of the west and south west Cape coast (Orange, Olifants, Berg, Diep, Palmiet and the Klein river)*. CSIR report EMA-D 8802, Stellenbosch, South Africa
- Van der Waal, B.C.W. 1976 'n Visekologiese studie van die Liambezimeer in die oos-Caprivi met verwysing na visontginning deur die bantoebevolking. DSc thesis, Rand Afrikaans University, Johannesburg, South Africa. 192 pp.
- Van der Waal, B.C.W. 1979 *Report on the occurrence of Salvinia molesta in Caprivi*. unpublished report
- Van der waal, B.C.W. 1980 Aspects of the fisheries of lake Liambezi, Caprivi. *Journal of the Linnological Society of Southern Africa* 6(1):19-31.
- Van der Waal, B.C.W. 1985 Aspects of the biology of larger fish species of lake Liambezi, Caprivi, South West Africa. *Madoqua* 14(2):101-144.
- Van der Waal, B.C.W. 1990 Aspects of the fishery of the eastern Caprivi, Namibia. *Madoqua* 17(1):1-16.
- Van der Waal, B.C.W. 1991 A survey of the fisheries in Kavango, Namibia. *Madoqua* 17(2):113-122
- Van der Waal, B.C.W. 1991 Fish life of the oshana delta in Owambo, Namibia, and the translocation of Cunene species. *Madoqua* 17(2):201-209
- Van der Waal, B.C.W. & Skelton, P.H. 1984 Check list of fishes of Caprivi. *Madoqua* 13(4):303-320.
- Van Heerden, I. 1986 Fluvial sedimentation in the ebb-dominated Orange estuary. *South African Journal of Science* 82:141-147
- Van Langenhove, G. 1995 *Re-evaluation of the potential for large dams in the Cuvetlai delta*. Department of Water Affairs, Windhoek
- Van Zyl, B.J. 1991 The lower Orange River. *Madoqua* 17(2):155-157
- Van Zyl, B.J. 1991 Wetlands of the Cunene River. *Madoqua* 17(2):125-128
- Van Zyl, B.J. 1997 Sex and growth rate of *Oreochromis andersii* x *Oreochromis mossambicus* hybrids using high-protein pellets in an intensive production unit. *Madoqua* 19(2):91-93
- Van Zyl, B.J., Hay, C.J. & Steyn, G.J. 1997 The successful introduction of *Oreochromis mossambicus* in salt pans along the Namib coast. *Madoqua* 19(2):87-89
- Venter, A. & van Veenen, M. 1996 *Refinement of the instream flow requirements for the Orange River and Orange River Mouth*. Department of Water Affairs and Forestry, Pretoria, South Africa
- Welsh, H. 1965 A contribution to our knowledge of the blue-green algae of South West Africa and Bechuanaland. *Nova hedwigia* 9:131-162.
- Whitelaw, D.A., Underhill, L.G., Cooper, J. & Clinning, C.F. 1978 Waders (Charadrii) and other birds on the Namib coast: counts and conservation priorities. *Madoqua* 11(2):137-150
- Williams, A.J. 1986 Wetland birds at the Orange River Mouth and their conservation significance. *Bontebok* 5:17-23
- Williams, A.J. 1987 Conservation management of the Walvis Bay wetland with particular reference to coastal bird numbers and their conservation significance. *Walvis Bay Round Table* 36
- Williams, A.J. 1988 Walvis Bay and other coastal gems. *African Wildlife* 42(2):82-85
- Williams, A.J. 1990 Crowned cranes and other wetland birds of the Ekuma river and Etosha National Park. *Lanioturdus* 25(1/2):61-63
- Williams, A.J. 1991 Numbers and conservation importance of coastal birds at the Cape Cross Lagoons, Namibia. *Madoqua* 17(2):239-243
- Williams, A.J. 1991 Wetland birds and conservation in Namibia: an overview. *Madoqua* 17(2):245-248
- Williams, A.J. no date *Popular checklist of the birds of South West Africa/Namibia*. Unpublished report. Department of Agriculture & Nature Conservation, Windhoek, Namibia.
- Williams, J. 1987 Wattled crane survey in Caprivi. *Quagga* 18:22-23.
- Winter, C.T. 1985 The water quality of water-holes utilised by game in the Etosha National Park. *Madoqua* 14(2):145-153
- Wiss, H.J. 1981 Wasserpflanzen in Südwestafrika. *SWA Wissenschaftliche Gesellschaft Botanische Mitteilungen* 71:239-253.
- Wiss, H.J. 1987 Die biologische Bekämpfung der Wasserunkräuter und ihre Erfolge im Ost-Caprivi. *Journal of the SWA Scientific Society* 28(6-7):9-12

