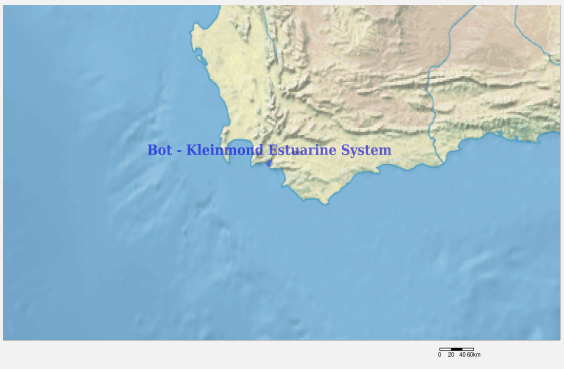
Ramsar Information Sheet

Published on 21 March 2017

South Africa

Bot - Kleinmond Estuarine System



Designation date	31 January 2017
Site number	2291
Coordinates	34°20'40"S 19°06'41"E
Area	1 349,78 ha

Color codes

Fields back-shaded in light blue relate to data and information required only for RIS updates.

Note that some fields concerning aspects of Part 3, the Ecological Character Description of the RIS (tinted in purple), are not expected to be completed as part of a standard RIS, but are included for completeness so as to provide the requested consistency between the RIS and the format of a 'full' Ecological Character Description, as adopted in Resolution X.15 (2008). If a Contracting Party does have information available that is relevant to these fields (for example from a national format Ecological Character Description) it may, if it wishes to, include information in these additional fields.

1 - Summary

Summary

The Bot - Kleinmond Estuarine System is recognized as one of the ten most significant wetlands for waterbirds in South Africa's winter-rainfall region, encompassing the south-western parts of the country (Harebottle 2012). The estuary is also important as a nursery area for fish, with 41 species from 24 families having been recorded, of which 19 (46 %) species are dependent on estuaries to complete their lifecycle (CSIR 2011). It was ranked in the Top 10 most important estuaries in South Africa due to its size, habitat importance, zonal type rarity and biodiversity (Turpie & Clark 2007), and has been allocated an overall national Estuarine Importance Score of 94 out of 100 (CSIR 2011).

The Bot-Kleinmond Estuarine System supports the following estuarine habitat types – water surface area; sand/mudflats/rock; macroalgae; submerged macrophytes; salt marsh; and reeds and sedges. The dominant macrophyte is Ruppia maritima, representing 87% of total submerged macrophyte area. The Ruppia beds are an important food source for fish and coots, and have diverse faunal communities associated with them. When the mouth breaches, 60 to 80 % of these beds are lost through exposure, but after mouth closure they proliferate and reach maximum biomass after 9 months. By contrast, salt marsh expands rapidly into exposed areas when water level drops, and dies back when inundated for more than three months under closed conditions. Their decomposition favours the growth of filamentous macroalgae, leading to localised blooms. Reeds and sedges expand at sites of freshwater seepage when water level is low and under nutrient input.

Of the 86 species of waterbirds recorded at the wetland, 33 are invertebrate-feeding waders, 18 are piscivores and 14 are waterfowl. There are 12 species of wading birds and 9 pursuit-swimming piscivores. Overall bird abundance is determined mainly by the presence and absence of Red-knobbed Coots (Fulica cristata), since these occur in extremely high numbers when present (CSIR 2011).

The estuary is used for both recreational fishing, and bait as well as an illegal gillnet fishery, it is also important for yachting, boating, swimming and birding, and is a tourism destination catering for South African and international visitors.

2 - Data & location

2.1 - Formal data

2.1.1 - Name and address of the compiler of this RIS

Compiler 1

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2.1.2 - Period of collection of data and information used to compile the RIS

From year	2002
To year	2010

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)	Bot - Kleinmond Estuarine System
Unofficial name (optional)	Bot - Kleinmond Estuarine System

2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image
<2 file(s) uploaded>

Former maps	0

Boundaries description (optional)

Starting on the coast in the south west corner, the western boundary follows the property boundary of the Rooisand Nature Reserve in a clockwise direction until it intersects with the shoreline of the estuary. Then continuing in a north easterly direction along the shoreline until the main R43 bridge. Then following the southern boundary of the bridge until it intersects with the north eastern boundary of the estuary shoreline. Then following the estuary shoreline in a south westerly direction along its eastern boundary until it intersects with the coast. The southern (seaward) boundary incorporates the surf zone in the marine environment.
Geographical coordinate:
Approximate Centre: 34°20'20.87"S 19° 6'26.19"E
The site lies between co-ordinates: 34°21'25.54"S 19° 4'46.60"E (SW corner) and
34°18'45.46"S 19° 8'52.77"E (NE corner)

2.2.2 - General location

a) In which large administrative region does the site lie?	Western Cape Province

b) What is the nearest town or population centre? Kleinmond and Hermanus

2.2.3 - For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries? Yes ○ No ◉

b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party? Yes ○ No ◉

2.2.4 - Area of the Site

Official area, in hectares (ha): 1349.78

Area, in hectares (ha) as calculated from GIS boundaries: 1349.78

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Marine Ecoregions of the World (MEOW)	Between Cape Point and Cape Agulhas
Marine Ecoregions of the World (MEOW)	Temperate Southern Africa Realm: Agulhas Province (51): Agulhas Bank (192).
WWF Terrestrial Ecoregions	Africotropical Realm: Fynbos Region: Lowland Fynbos and Renosterveld(Ecosystem code AT1202), and adjoining Montane Fynbos and Renosterveld (Ecosystem code AT1203).

Other biogeographic regionalisation scheme

Spalding et al. (2007) developed a global biogeographic system to classify the coastal and shelf regions of the world's oceans. The Bot-Kleinmond Estuarine System falls within the Realm: Temperate Southern Africa, the Province: Agulhas and the Ecoregion: Agulhas Bank, where there are no other estuarine systems with the same configuration.
Biogeographic systems identified for South Africa's coastline recognise three biogeographic regions, but the boundaries vary for different fauna (e.g. rocky shore biota versus intertidal fish). For estuaries the boundary between the cool temperate and warm temperate zone has been identified as Cape Point on the basis of hydrological parameters and marine biota (Day, 1981, Potter et al. 1990) and Cape Agulhas on the basis of estuarine fish communities (Harrison 2002). The Bot-Kleinmond Estuarine System lies approximately mid-way between Cape Point and Cape Agulhas, placing it in a transition zone between the cool temperate and warm temperate biogeographic zones.

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

☑ Criterion 1: Representative, rare or unique natural or near-natural wetland types

Hydrological services provided	The Bot-Kleinmond Estuarine System represents three wetland types according to the Ramsar classification. Primarily it can be considered Estuarine Waters, with the Bot section being marine-dominated when the mouth is open. However, since the mouth is predominantly closed, the Bot section more typically has the characteristics of a brackish Lagoon. The system has a double mouth, and the smaller Kleinmond section tends to be freshwater-dominated when the mouth is closed. According to the global classification system for estuaries and coasts proposed by Whitfield & Elliott (2011), the system is an estuarine lake, of which there are only 8 in South Africa. Spalding et al. (2007) developed a global biogeographic system to classify the coastal and shelf regions of the world's oceans. The Bot-Kleinmond Estuarine System falls within the Realm: Temperate Southern Africa, the Province: Agulhas and the Ecoregion: Agulhas Bank, where there are no other estuarine systems with the same configuration. Biogeographic systems identified for South Africa's coastline recognise three biogeographic regions, but the boundaries vary for different fauna (e.g. rocky shore biota versus intertidal fish). For estuaries the boundary between the cool temperate and warm temperate zone has been identified as Cape Point on the basis of hydrological parameters and marine biota (Day, 1981, Potter et al. 1990) and Cape Agulhas on the basis of estuarine fish communities (Harrison 2002). The Bot-Kleinmond Estuarine System lies approximately mid-way between Cape Point and Cape Agulhas, placing it in the transition zone between the cool temperate and warm temperate biogeographic regions. The Bot-Kleinmond Estuarine System is one of two estuarine lakes in this transition zone, the other being the neighbouring Klein River Estuary, which has different characteristics. The Bot-Kleinmond Estuarine System can therefore be considered a unique example of a wetland type in the region. The system is among the 10 largest estuaries in the country in terms of water area. It plays a major role in the ecological functioning of the coastal system by providing a large body of water for birds during the dry summer months, and by serving as a nursery area for marine fish species. It is hydrologically important as it promotes seasonal water retention in the adjacent Lamloch Swamps, which provide habitat for critically endangered and endangered species of amphibians. In addition, the system's configuration helps prevent flooding, since the adjoining Kleinmond section acts as an overflow when water levels in the Bot section reach 1.7 m above mean sea level. Together with a 25% reduction in mean annual runoff, this means that the Bot estuary rarely opens naturally, and the system sometimes requires artificial breaching to maintain estuarine functioning.
Other ecosystem services provided	The cyclic nature of the hydrological processes taking place in the Bot-Kleinmond Estuarine system during alternating closed (high water/full) and open (low water/empty) estuary mouth scenarios provides the following additional ecosystem services: ● Under closed mouth conditions the rising water level (in winter): groundwater is recharged; the water table in the adjacent Lamloch swamps is raised, which is important for sustaining habitat for amongst others, the critically endangered Microfrog; excess nutrients and other pollutants are diluted or removed; destructive flash flooding and losses of ecosystem functioning and species die off during the drier summer season is regulated. ● Under open mouth conditions the flushing of the estuary and sudden increase in salinity: flushing out of sediments that have built up under closed conditions occurs; flushing out and mass die off of alien fish species eg Carp (Cyprinus carpio) occurs; a die-back of the lower fringes of encroaching phragmitis reed beds takes place; there is an influx of estuarine dependent fish, wading birds and species which prefer the lower water and more saline conditions. ● Riparian vegetation cover: serves as a buffer along the banks of the wetland and estuary preventing soil erosion; breaks wave action in times of high waters driven by strong winds; attenuates floods; retains water during the drier summer season.

Other reasons: The proposed Ramsar site has also been identified as a Critical Biodiversity Area (CBA) in the Overberg Biodiversity Assessment 2010. The CBAs are areas of land as well as aquatic features which must be safeguarded in their natural state if biodiversity is to persist and ecosystems are to continue functioning. CBAs incorporate: (i) areas that need to be safeguarded in order to meet national biodiversity thresholds (ii) areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or (iii) important locations for biodiversity features or rare species.

☑ Criterion 2 : Rare species and threatened ecological communities

☑ Criterion 3 : Biological diversity

Justification: The predominant terrestrial ecosystem type within the proposed Ramsar site is Hangklip Sand Fynbos, listed as Endangered in the first national list of threatened terrestrial ecosystems for South Africa (Government Gazette 9 December 2011). Only 60% of the ecosystem's original area of 8 000 hectares remains, most of it situated in the Overstrand area. At least five endemic plant species and 32 Red Data List plant species occur in the ecosystem. The eastern shore of the Bot-Kleinmond Estuarine System supports the western-most extent of Elim Ferricrete Fynbos, which is Critically Endangered. It includes at least 72 Red Data plant species and 29 endemic plant species. Only 29% of the original 67 000 hectares remain. The north-eastern shore of the wetland system supports an isolated outlier of Critically Endangered Rûens Silcrete Renosterveld, which is known to include 13 endemic plant species and 26 Red Data List plant species. Only 14% of the original 21 000 hectares of this highly fragmented ecosystem remains. These ecosystem types fall within the Cape Sclerophyll biogeographic region which coincides with the Fynbos Biome of the Cape Floristic Region, recognised as one of the 34 terrestrial biodiversity hotspots identified worldwide. Their presence in the proposed Ramsar site clearly adds to its conservation value. Eight estuarine habitat types are recognised in South Africa – water surface area; sand/mudflats/rock; macroalgae; submerged macrophytes; salt marsh; reeds and sedges; mangroves; and swamp forest. All but mangroves and swamp forest occur in the Bot-Kleinmond Estuarine System (CSIR 2011), and their total area is the largest for all estuaries in the transition zone between the warm and cool temperate biogeographic zones (Van Niekerk & Turpie 2012). The wetland is therefore important for maintaining biological diversity of the region. Furthermore, 48% of the fish recorded in the Bot-Kleinmond Estuarine System are southern African endemics (Smith and Heemstra 1986).

☑ Criterion 4 : Support during critical life cycle stage or in adverse conditions

☑ Criterion 5 : >20,000 waterbirds

Overall waterbird numbers: 23605

Start year: 2002

Source of data: Van Niekerk & Turpie 2012

☑ Criterion 6 : >1% waterbird population

☑ Criterion 7 : Significant and representative fish

Justification

Based on their distributional ranges given by Smith and Heemstra (1986), 20 (48 %) of the fish recorded in the Bot-Kleinmond Estuarine System are southern African endemics. Estuarine fish in South Africa are classified into five major categories of estuarine-dependence according to their life-history characteristics (Whitfield 1994). Representatives of all five categories occur in the Bot-Kleinmond Estuarine System (CSIR 2011). Since the system is an important nursery area, it supports a variety of life-history stages, and the fish species assemblage displays a range of reproductive strategies, including oviparous, ovoviviparous and viviparous, as well as mouth-brooding. The wetland is important for sustaining exploited fish stocks, which represents a significant wetland benefit. In South Africa there are 79 exploited fish species that have some association with estuaries (NBA 2011). Of these, 24 occur in the Bot-Kleinmond Estuarine System.

☑ Criterion 8 : Fish spawning grounds, etc.

Justification

A total of 41 fish species from 24 families have been recorded from the Bot-Kleinmond Estuarine System. Of these, 9 species breed in estuaries and 7 species are dependent on estuaries as nursery areas for their first year of life. The wetland accounts for 12% of the total estuarine fish nursery area along 900 km of coastline from False Bay to Port Alfred. A further three (3) catadromous eel Anguilla species require estuaries as transit routes between the marine and freshwater environment. In addition, two species of mullet Myxus capensis and Mugil cephalus may be regarded as facultative catadromous species. The Ecological Water Requirements study (CSIR 2011) for the Bot-Kleinmond Estuarine System, conducted according to the Resource Directed Measures methodology, allocated the following Functional Importance scores (out of 100) to the wetland: ● Nursery function for fish and crustaceans (marine/riverine) 90 ● Movement corridor for river invertebrates and fish breeding in sea 60

☑ Criterion 9 : >1% non-avian animal population

3.2 - Plant species whose presence relates to the international importance of the site

Scientific name	Common name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification
Agathosma hookeri	Not applicable	☐	☑	☐	CR	☐		National red list category
Babiana purpurea	Not applicable	☐	☑	☐	EN	☐		National red list category
Cyrtanthus leucanthus	Not applicable	☐	☑	☐	EN	☐		National red list category
Ixia patens patens	Not applicable	☐	☑	☐	EN	☐		National red list category
Lachnaea densiflora	Not applicable	☐	☑	☐	NT	☐		National red list category
Lampranthus bicolor	Not applicable	☐	☑	☐	VU	☐		National red list category
Leucadendron linifolium	Not applicable	☐	☑	☐	VU	☐		National red list category
Leucospermum prostratum	Not applicable	☐	☑	☐	VU	☐		National red list category
Moraea versicolor	Not applicable	☐	☑	☐	VU	☐		National red list category
Muraltia bolusii	Not applicable	☐	☑	☐	EN	☐		National red list category
Otholobium pungens	Not applicable	☐	☑	☐	EN	☐		National red list category
Phylica plumosa	Not applicable	☐	☑	☐	EN	☐		National red list category

The predominant terrestrial ecosystem type within the proposed Ramsar site is Hangklip Sand Fynbos, listed as Endangered in the first national list of threatened terrestrial ecosystems for South Africa (Government Gazette 9 December 2011). Only 60% of the ecosystem's original area of 8 000 hectares remains, most of it situated in the Overstrand area. At least five endemic plant species and 32 Red Data List plant species occur in the ecosystem. The eastern shore of the Bot-Kleinmond Estuarine System supports the western-most extent of Elim Ferricrete Fynbos, which is Critically Endangered. It includes at least 72 Red Data plant species and 29 endemic plant species. Only 29% of the original 67 000 hectares remain. The north-eastern shore of the wetland system supports an isolated outlier of Critically Endangered Rûens Silcrete Renosterveld, which is known to include 13 endemic plant species and 26 Red Data List plant species. Only 14% of the original 21 000 hectares of this highly fragmented ecosystem remains. These ecosystem types fall within the Cape Sclerophyll biogeographic region which coincides with the Fynbos Biome of the Cape Floristic Region, recognised as one of the 34 terrestrial biodiversity hotspots identified worldwide. Their presence in the proposed Ramsar site clearly adds to its conservation value.

3.3 - Animal species whose presence relates to the international importance of the site

Phylum	Scientific name	Common name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
			2	4	6	9	3	5	7	8								
Birds																		
CHORDATA/ AVES	*Anas smithii*	Cape Shoveler	☐	☑	☑	☐	☐	☐	☐	☐	720	2002-2010	2.1		☐	☐		The southern African endemic Cape Shoveler, Anas smithii has been reported breeding at the estuary (Harebottle 2012).
CHORDATA/ AVES	*Anas undulata*	Yellow-billed Duck	☐	☐	☑	☐	☐	☐	☐	☐	2030	2002-2010	2.1	LC	☐	☐		See below
CHORDATA/ AVES	*Anthropoides paradiseus*	Blue Crane	☑	☐	☐	☐	☐	☐	☐	☐	200	2002-2010	2	VU	☐	☐		See below
CHORDATA/ AVES	*Charadrius pallidus*	Chestnut-banded Plover	☑	☐	☐	☐	☐	☐	☐	☐				NT	☐	☐	Nearly Threatened	The species is of national importance and it is nearly threatened nationally
CHORDATA/ AVES	*Circus maurus*	Black Harrier	☑	☐	☐	☐	☐	☐	☐	☐				VU	☐	☐		See below
CHORDATA/ AVES	*Circus ranivorus*	African Marsh Harrier	☑	☐	☐	☐	☐	☐	☐	☐				LC	☐	☐	Vulnerable	The species is threatened nationally which makes it to be vulnerable
CHORDATA/ AVES	*Fulica cristata*	Red-knobbed Coot	☐	☐	☑	☐	☐	☐	☐	☐	15352	2002-2010	1.5	LC	☐	☐		See below
CHORDATA/ AVES	*Haematopus moquini*	African Oystercatcher	☑	☐	☐	☐	☐	☐	☐	☐				NT	☐	☐	Nearly Threatened	The species is of national importance and it is nearly threatened nationally
CHORDATA/ AVES	*Hydroprogne caspia*	Caspian Tern	☐	☐	☑	☐	☐	☐	☐	☐	88	2002-2010	5.9	LC	☐	☐		See below
CHORDATA/ AVES	*Larus dominicanus*	Kelp Gull	☐	☐	☑	☐	☐	☐	☐	☐	867	2002-2010	1.2	LC	☐	☐		See below
CHORDATA/ AVES	*Pelecanus onocrotalus*	Great White Pelican	☑	☐	☑	☐	☐	☐	☐	☐	222	2002-2010	1.1	LC	☐	☑	Nearly Threatened	The species is listed under CMS. Nationally it is nearly threatened
CHORDATA/ AVES	*Phalacrocorax capensis*	Cape Cormorant	☑	☐	☑	☐	☐	☐	☐	☐	222	2002-2010	1.1	EN	☐	☐		See below
CHORDATA/ AVES	*Phalacrocorax carbo*	Great Cormorant	☑	☐	☑	☐	☐	☐	☐	☐	247	2002-2010	2.1	LC	☐	☐	Nearly Threatened	The species is of national importance and it is nearly threatened nationally
CHORDATA/ AVES	*Phalacrocorax neglectus*	Bank Cormorant	☑	☐	☐	☐	☐	☐	☐	☐	200	2002 - 2010	1	EN	☐	☐		See Below

Phylum	Scientific name	Common name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
			2	4	6	9	3	5	7	8								
CHORDATA/ AVES	*Phoenicopterus roseus*	Greater Flamingo	☐	☐	☑	☐	☐	☐	☐	☐	2884	2002-2010	3.8	LC	☐	☐	Nearly Threatened	The species is of national importance and it is nearly threatened nationally
CHORDATA/ AVES	*Plectropterus gambensis*	Spur-winged Goose	☐	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐		Species of National importance: feed in the surrounding agricultural croplands use the estuary as a safe daytime refuge and moult site.
CHORDATA/ AVES	*Podiceps cristatus*	Great Crested Grebe	☑	☐	☑	☐	☐	☐	☐	☐	356	2002-2010	3.7	LC	☐	☐	Nearly Threatened	The species is of national importance and it is nearly threatened nationally
CHORDATA/ AVES	*Podiceps nigricollis*	Black-necked Grebe; Eared Grebe	☐	☐	☑	☐	☐	☐	☐	☐	199	2002-2010	1.3	LC	☐	☐		See below
CHORDATA/ AVES	*Thalasseus bergii*	Great Crested Tern; Greater Crested Tern	☐	☐	☑	☐	☐	☐	☐	☐	704	2002-2010	3.5	LC	☐	☐		See below
CHORDATA/ AVES	*Thalasseus sandvicensis*	Sandwich Tern	☐	☐	☑	☐	☐	☐	☐	☐	2059	2002-2010	1.2	LC	☐	☐		See below
Fish, Mollusc and Crustacea																		
CHORDATA/ ACTINOPTERYGII	*Atherina breviceps*	Cape silverside; Cape silverside; Cape silverside	☐	☐	☐	☐	☐	☐	☐	☑	101000000				☐	☐		
CHORDATA/ ACTINOPTERYGII	*Caffrogobius nudiceps*	Barehead goby	☐	☐	☐	☐	☐	☐	☐	☑	412000				☐	☐		
CHORDATA/ ACTINOPTERYGII	*Clinus spatulatus*	Bot river klipfish; Botriver klipfish	☑	☐	☐	☑	☐	☐	☑	☐	1800000	2002-2010	12	EN	☐	☐		. Estuarine fish in South Africa are classified into five major categories of estuarine-dependence according to their life-history characteristics (Whitfield 1994).
CHORDATA/ ACTINOPTERYGII	*Hyporhamphus capensis*	Cape halfbeak; Cape halfbeak	☐	☐	☐	☐	☐	☐	☐	☑	30000				☐	☐		
CHORDATA/ ACTINOPTERYGII	*Lichia amia*	Leerfish; Leerfish; Leerfish; Leerfish	☐	☐	☐	☐	☐	☐	☐	☑	500			LC	☐	☐		
CHORDATA/ ACTINOPTERYGII	*Lithognathus lithognathus*	White steenbras	☑	☐	☐	☐	☐	☐	☐	☐				EN	☐	☐		See below
CHORDATA/ ACTINOPTERYGII	*Lithognathus mormyrus*		☐	☐	☐	☐	☐	☐	☐	☑	500			LC	☐	☐		
CHORDATA/ ACTINOPTERYGII	*Liza dumerili*	Grooved mullet	☐	☐	☐	☐	☐	☐	☐	☑	3000		1.22		☐	☐		
CHORDATA/ ACTINOPTERYGII	*Liza richardsonii*	Southern mullet; Southern mullet	☐	☐	☐	☐	☐	☐	☐	☑	11000000				☐	☐		
CHORDATA/ ACTINOPTERYGII	*Liza tricuspidens*	Striped mullet; Striped mullet	☐	☐	☐	☐	☐	☐	☐	☑	38000				☐	☐		
CHORDATA/ ACTINOPTERYGII	*Mugil cephalus*	Black true mullet	☐	☐	☐	☐	☐	☐	☐	☑	4000			LC	☐	☐		
CHORDATA/ ACTINOPTERYGII	*Myxus capensis*	Freshwater springer; Freshwater mullet	☑	☐	☐	☐	☐	☐	☐	☐				LC	☐	☐	Nearly Threatened	The species is of national importance and it is nearly threatened nationally
CHORDATA/ ACTINOPTERYGII	*Psammogobius knysnaensis*	Knysna sandgoby	☐	☐	☐	☐	☐	☐	☐	☑	22000000				☐	☐		

Phylum	Scientific name	Common name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
			2	4	6	9	3	5	7	8								
CHORDATA/ ACTINOPTERYGII	*Rhabdosargus globiceps*	Stumpnose	☐	☐	☐	☐	☐	☐	☐	☐	500				☐	☐		
CHORDATA/ ACTINOPTERYGII	*Solea turbynei*		☐	☐	☐	☐	☐	☐	☐	☑	29000			LC	☐	☐		
CHORDATA/ ACTINOPTERYGII	*Tilapia sparrmanii*		☐	☐	☐	☐	☐	☐	☐	☑	12000			LC	☐	☐		
Others																		
CHORDATA/ AMPHIBIA	*Amietophrynus pantherinus*	Western leopard toad	☑	☐	☐	☐	☐	☐	☐	☐				EN	☐	☐		See below
CHORDATA/ AMPHIBIA	*Microbatrachella capensis*	Micro frog	☑	☐	☐	☑	☐	☐	☐	☐	200	2002-2020	1	CR	☐	☐		The surrounding wetlands supports more than 1% of the global population of the Critically Endangered micro frog Microbatrachella capensis, which occurs in only four isolated locations totalling an area of 7 km2 (Measey 2011).
CHORDATA/ AMPHIBIA	*Xenopus gilli*	Cape Platana	☑	☐	☐	☑	☐	☐	☐	☐	200	2002-2010	1	EN	☐	☐		See below

1) Percentage of the total biogeographic population at the site

Of the 86 bird species recorded from the Bot-Kleinmond Estuarine System (CSIR 2011), 3 are globally threatened, most notably the Bank Cormorant, which is Endangered (A2ace+3ce+4ace ver 3.1). In addition, 13 species are nationally threatened, three of which are considered Vulnerable (Bank Cormorant, African Marsh Harrier and Blue Crane), and nine as Near-Threatened (Great White Pelican, Cape Cormorant, Crowned Cormorant, Greater Flamingo, Black Harrier, African Black Oystercatcher, Chestnut-banded Plover, Caspian Tern and Half-collared Kingfisher). Great White Pelican, Greater Flamingo, African Black Oysercatcher and Caspian Tern are identified as estuary-dependent species in the National Biodiversity Assessment 2011 (Van Niekerk & Turpie 2012).

Few South African fish species have been categorised according to IUCN criteria. Of the 41 fish species recorded in the Bot-Kleinmond Estuarine System (CSIR 2011), the Bot River klipfish Clinus spatulatus is listed as Endangered (B1+2c ver 2.3) on the IUCN Red List, while the White steenbras Lithognathus lithognathus is listed as Lower Risk/conservation dependent (ver 2.3). Six other species - African mottled eel, Madagascar mottled eel, Estuarine roundherring, Lesser guitarfish Acroteriobatus annulatus, Flathead mullet Mugil cephalus and Freshwater mullet Myxus capensis- are ranked Least Concern (ver 3.1).The Freshwater mullet Myxus capensis is also listed as Vulnerable in the South African Red Data Book for Fishes (Skelton 1987).
Furthermore, of the exploited fish species in the system, all but one are either overexploited (below 40% of their historical reference point) or collapsed (<25%). Two of these – Dusky kob Argyrosomus japonicas and, white Steenbras, Lithognathus lithognathus are at critical levels (<5%). and together with zebra Diplodus cervinus have been ranked in the top 20 fish in South Africa in terms of conservation importance (Lamberth & Joubert, in press).

In the case of amphibians, the Lamloch Swamps that form part of the Bot-Kleinmond Estuarine System support the endemic Microfrog Microbatrachella capensis, listed as Critically Endangered (B2ab(ii,iii) ver 3.1) in the IUCN Red List, as well as the Endangered Cape platanna Xenopus gilli (B1ab(I,iii) + 2ab(I, iii) ver 3.1) and Western leopard toad Amietophrynus pantherinus (B1ab(ii, iii, iv + 2ab(ii, iii, iv) ver 3.1) (Measey 2011).

The Ecosystem Threat Status for the Bot-Kleinmond Estuarine System is listed as Critically Endanger

3.4 - Ecological communities whose presence relates to the international importance of the site

Name of ecological community	Community qualifies under Criterion 2?	Description	Justification
Estuarine lake	☑	The Bot-Kleinmond Estuarine System is classified as an estuarine lake (Van Niekerk & Turpie 2012) and represents a palaeo-valley drowned by sea level rise (Rogers 1985). The wetland is underlain by deeply weathered Bokkeveld Shales	The ecosystem threat status for the Bot-Kleinmond Estuarine System is listed as critically endangered in the South Africa's National Biodiversity Assessment 2011 (Van Niekerk & Turpie 2012)

4 - What is the Site like? (Ecological character description)

4.1 - Ecological character

The Bot-Kleinmond Estuarine System supports the following estuarine habitat types – water surface area; sand/mudflats/rock; macroalgae; submerged macrophytes; salt marsh; and reeds and sedges. The dominant macrophyte is Ruppia maritima, representing 87% of total submerged macrophyte area. The Ruppia beds are an important food source for fish and coots, and have diverse faunal communities associated with them. When the mouth breaches, 60 to 80 % of these beds are lost through exposure, but after mouth closure they proliferate and reach maximum biomass after 9 months. By contrast, salt marsh expands rapidly into exposed areas when water level drops, and dies back when inundated for more than three months under closed conditions. Their decomposition favours the growth of filamentous macroalgae, leading to localised blooms. Reeds and sedges expand at sites of freshwater seepage when water level is low and under nutrient input.

Of the 86 species of waterbirds recorded at the wetland, 33 are invertebrate-feeding waders, 18 are piscivores and 14 are waterfowl. There are 12 species of wading birds and 9 pursuit-swimming piscivores. The bird community changes markedly from year to year according to the estuarine cycle brought about by breaching. Overall bird abundance is determined mainly by the presence and absence of Red-knobbed Coots (Fulica cristata), since these occur in extremely high numbers when present (CSIR 2011).

The fish assemblage of the wetland is dominated numerically by estuary-breeders and subject to highly variable recruitment by estuary-dependent marine species. Survival of the latter has been severely compromised by illegal netting, so their contribution to the fish assemblage remains low (CSIR 2011). However, the wetland's contribution to marine fisheries in terms of its nursery function has been valued at an estimated R20-50 million per year. The illegal netfish catch, which predominantly comprises the harder or southern mullet Liza richardsonii, accounts for the wetland being ranked the 6th most important temperate estuary in the country in terms of subsistence value, estimated at R0.1-0.5 million per year (Turpie and Clark 2007).

The surrounding communities of Kleinmond, Fisherhaven and Hawston have a close relationship with the Bot River Estuary. Many residents and holiday makers utilize the estuary for various reasons, ranging from fishing, to swimming to launching of boats at Fisherhaven slipway.

4.2 - What wetland type(s) are in the site?

Marine or coastal wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
F: Estuarine waters	Bot-Kleinmond Estuarine System	1	1348.78	Rare

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Scientific name	Common name	Position in range / endemism / other
Acrodon subulatus		National endangered
Xiphochaeta aquatica		National endangered

Invasive alien plant species

Scientific name	Common name	Impacts
Acacia cyclops	Rooikraans	Actually (major impacts)

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Common name	Pop. size	Period of pop. est.	%occurrence	Position in range /endemism/other
CHORDATA/AVES	Actitis hypoleucos	Common Sandpiper	66	2002-2010		
CHORDATA/AVES	Calidris alba	Sanderling	64	2002-2010		
CHORDATA/AVES	Calidris ferruginea	Curlew Sandpiper	263	2002-2010		
CHORDATA/AVES	Calidris minuta	Little Stint	554	2002-2010		
CHORDATA/AVES	Charadrius hiaticula	Common Ringed Plover	72	2002-2010		
CHORDATA/AVES	Numenius phaeopus	Whimbrel	34	2002-2010		
CHORDATA/ACTINOPTERYGII	Gilchristella aestuaria	Gilchrist's round herring;Estuarine round-herring	100	2002-2010	1	Endemic
CHORDATA/MAMMALIA	Aonyx capensis	African Clawless Otter	200	2002-2010	1	Least threatened
CHORDATA/MAMMALIA	Caracal caracal	Lynx	100	2002-2010	1	Least Threatened
CHORDATA/MAMMALIA	Mellivora capensis	Honey Badger	200	2002-2010	1	Least Threatened

Invasive alien animal species

Phylum	Scientific name	Common name	Impacts
CHORDATA/ACTINOPTERYGII	Cyprinus carpio	Carp	Actually (minor impacts)
CHORDATA/ACTINOPTERYGII	Micropterus floridanus	largemouth bass	Actually (minor impacts)
CHORDATA/ACTINOPTERYGII	Oreochromis mossambicus	African mouthbrooder;Common tilapia;Mozambique mouthbrooder;Mozambique cichlid;Mozambique cichlid	Actually (minor impacts)
CHORDATA/AMPHIBIA	Xenopus laevis	African Clawed Frog	Actually (major impacts)

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
C: Moist Mid-Latitude climate with mild winters	Csa: Mediterranean (Mild with dry, hot summer)

4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres): -4

a) Maximum elevation above sea level (in metres): 20

- Entire river basin ☐
- Upper part of river basin ☐
- Middle part of river basin ☐
- Lower part of river basin ☑
- More than one river basin ☐
- Not in river basin ☐
- Coastal ☑

Please name the river basin or basins. If the site lies in a sub-basin, please also name the larger river basin. For a coastal/marine site, please name the sea or ocean.

Bot River, Indian Ocean

4.4.3 - Soil

- Mineral ☑
- Organic ☐
- No available information ☐

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)? Yes ○ No ◉

4.4.4 - Water regime

Water permanence

Presence?
Usually permanent water present

Source of water that maintains character of the site

Presence?	Predominant water source
Water inputs from rainfall	☐
Water inputs from surface water	☑
Marine water	☐
Water inputs from groundwater	☐

Water destination

Presence?
Marine

Stability of water regime

Presence?
Water levels fluctuating (including tidal)

Please add any comments on the water regime and its determinants (if relevant). Use this box to explain sites with complex hydrology.

Connectivity between Estuary and ocean is dependent on the mouth management protocol - see estuary management plan.

4.4.5 - Sediment regime

- Significant erosion of sediments occurs on the site ☐
- Significant accretion or deposition of sediments occurs on the site ☑
- Significant transportation of sediments occurs on or through the site ☑

Sediment regime is highly variable, either seasonally or inter-annually ☑

Sediment regime unknown ☐

Please provide further information on sediment (optional):

Sediment carried down from catchment and ocean. Dependent on mouth condition (open/closed)

(ECD) Water turbidity and colour: Varies with mouth condition - clear when open and turbid when closed.

(ECD) Water temperature: Varies between

4.4.6 - Water pH

Acid (pH<5.5) ☐

Circumneutral (pH: 5.5-7.4) ☑

Alkaline (pH>7.4) ☐

Unknown ☐

Please provide further information on pH (optional):

pH is monitored - Pierre has details

4.4.7 - Water salinity

Fresh (<0.5 g/l) ☐

Mixohaline (brackish)/Mixosaline (0.5-30 g/l) ☑

Euhaline/Eusaline (30-40 g/l) ☑

Hyperhaline/Hypersaline (>40 g/l) ☑

Unknown ☐

(ECD) Dissolved gases in water

Oxygen levels are monitored.

4.4.8 - Dissolved or suspended nutrients in water

Eutrophic ☐

Mesotrophic ☐

Oligotrophic ☐

Dystrophic ☐

Unknown ☑

4.4.9 - Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the site itself: i) broadly similar ○ ii) significantly different ◉

Surrounding area has greater urbanisation or development ☑

Surrounding area has higher human population density ☑

Surrounding area has more intensive agricultural use ☑

Surrounding area has significantly different land cover or habitat types ☑

Please describe other ways in which the surrounding area is different:

The site is surrounded by mountainous terrain.

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Provisioning Services

Ecosystem service	Examples	Importance/Extent/Significance
Food for humans	Sustenance for humans (e.g., fish, molluscs, grains)	Medium
Wetland non-food products	Other	Medium

Regulating Services

Ecosystem service	Examples	Importance/Extent/Significance
Maintenance of hydrological regimes	Groundwater recharge and discharge	High
Erosion protection	Soil, sediment and nutrient retention	Medium
Pollution control and detoxification	Water purification/waste treatment or dilution	Medium
Hazard reduction	Coastal shoreline and river bank stabilization and storm protection	High
Hazard reduction	Flood control, flood storage	High

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Water sports and activities	High
Recreation and tourism	Recreational hunting and fishing	High
Recreation and tourism	Picnics, outings, touring	High
Recreation and tourism	Nature observation and nature-based tourism	Medium
Spiritual and inspirational	Spiritual and religious values	High
Spiritual and inspirational	Inspiration	Medium
Spiritual and inspirational	Contemporary cultural significance, including for arts and creative inspiration, and including existence values	High
Spiritual and inspirational	Aesthetic and sense of place values	High
Scientific and educational	Educational activities and opportunities	High
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	High
Scientific and educational	Long-term monitoring site	High
Scientific and educational	Major scientific study site	Medium

Supporting Services

Ecosystem service	Examples	Importance/Extent/Significance
Biodiversity	Supports a variety of all life forms including plants, animals and microorganizms, the genes they contain, and the ecosystems of which they form a part	High
Soil formation	Sediment retention	High
Soil formation	Accumulation of organic matter	Low
Nutrient cycling	Storage, recycling, processing and acquisition of nutrients	High
Nutrient cycling	Carbon storage/sequestration	Low
Pollination	Support for pollinators	Medium

Within the site: 1000

Outside the site: 10000

Have studies or assessments been made of the economic valuation of ecosystem services provided by this Ramsar Site? Yes ◉ No ○ Unknown ○

Where economic studies or assessments of economic valuation have been undertaken at the site, it would be helpful to provide information on where the results of such studies may be located (e.g. website links, citation of published literature):

Lamberth et al

4.5.2 - Social and cultural values

i) the site provides a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland ☑

Description if applicable

refer to estuary management plan and coastal committee management structure.

ii) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland ☑

Description if applicable

Culturally subsistence fishing has been taking place on the site for many years.

iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples ☑

Description if applicable

refer to estuary management plan and associated management processes.

iv) relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland ☐

4.6 - Ecological processes

(ECD) Primary production: algae

(ECD) Nutrient cycling: catchment and ocean

(ECD) Carbon cycling: minimal

(ECD) Animal reproductive productivity: high fisheries production

(ECD) Vegetational productivity, pollination, regeneration processes, succession, role of fire, etc.: fire driven terrestrial ecosystem, high salt marsh productivity

(ECD) Notable species interactions, including grazing, predation, competition, diseases and pathogens	species interactions including grazing, predation, competition, diseases and pathogens
(ECD) Notable aspects concerning animal and plant dispersal	marine and estuarine species dependent on mouth condition for dispersal.
(ECD) Notable aspects concerning migration	Mouth management protocol needs to be implemented to facilitate migration.
(ECD) Pressures and trends concerning any of the above, and/or concerning ecosystem integrity	Implementation of estuary management plan needs to address pressures.

5 - How is the Site managed? (Conservation and management)

5.1 - Land tenure and responsibilities (Managers)

5.1.1 - Land tenure/ownership

Public ownership

Category	Within the Ramsar Site	In the surrounding area
Provincial/region/state government	☑	☑
Local authority, municipality, (sub)district, etc.	☐	☑

Private ownership

Category	Within the Ramsar Site	In the surrounding area
Commercial (company)	☐	☑
Other types of private/individual owner(s)	☐	☑

5.1.2 - Management authority

Please list the local office / offices of any agency or organization responsible for managing the site: CapeNature and Overstrand Municipality

Provide the name and title of the person or people with responsibility for the wetland: Reserve Manager - Kogelberg Nature Reserve Complex

Postal address: CapeNature, Private bag X1, Kleinmond, 7195, RSA
Overstrand Municipality, PO Box 20, Hermanus, 7200, RSA

E-mail address: mjohns@capenature.co.za

5.2 - Ecological character threats and responses (Management)

5.2.1 - Factors (actual or likely) adversely affecting the Site's ecological character

Human settlements (non agricultural)

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Housing and urban areas	Medium impact	High impact	☐	☑
Commercial and industrial areas	Low impact	High impact	☐	☑
Tourism and recreation areas	Low impact	Low impact	☑	☑

Water regulation

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Water abstraction	Low impact	Medium impact	☑	☑
Canalisation and river regulation	Medium impact	High impact	☐	☑

Agriculture and aquaculture

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Annual and perennial non-timber crops	unknown impact	Medium impact	☐	☑
Livestock farming and ranching	Low impact	Medium impact	☐	☑

Energy production and mining

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Renewable energy	unknown impact	High impact	☑	☑
Mining and quarrying	unknown impact	unknown impact	☐	☑

Transportation and service corridors

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Roads and railroads	unknown impact	Low impact	☐	☑
Utility and service lines (e.g., pipelines)	Low impact	High impact	☑	☑
Aircraft flight paths	Low impact	Medium impact	☑	☑

Biological resource use

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Fishing and harvesting aquatic resources	Medium impact	High impact	☑	☑
Gathering terrestrial plants	Low impact	Low impact	☐	☑

Human intrusions and disturbance

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Recreational and tourism activities	Low impact	Medium impact	☑	☑

Natural system modifications

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Fire and fire suppression	Medium impact	High impact	☐	☑
Dams and water management/use	Medium impact	High impact	☐	☑
Vegetation clearance/ land conversion	High impact	High impact	☐	☑

Invasive and other problematic species and genes

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Problematic native species	Low impact	Low impact	☑	☑
Invasive non-native/ alien species	Medium impact	High impact	☑	☑
Introduced genetic material	Low impact	Medium impact	☐	☑

Pollution

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Household sewage, urban waste water	Low impact	Medium impact	☐	☑
Agricultural and forestry effluents	Low impact	High impact	☐	☑
Garbage and solid waste	Low impact	Medium impact	☐	☑
Air-borne pollutants	Low impact	unknown impact	☐	☑

Climate change and severe weather

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Droughts	Low impact	High impact	☑	☑
Habitat shifting and alteration	Low impact	High impact	☑	☑
Temperature extremes	Low impact	High impact	☑	☑
Storms and flooding	Low impact	Medium impact	☑	☑

5.2.2 - Legal conservation status

Global legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
UNESCO Biosphere Reserve	Kogelberg Biosphere Reserve	www.kogelbergbiosphere.co.za	whole
World Heritage site	Cape Floristic Kingdom	www.unesco.org	partly

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Provincial Nature Reserve	Rooisand Nature Reserve	www.capenature.co.za	partly

Non-statutory designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Important Bird Area	Cape Whale Coast	www.birdlifesa.org	whole

5.2.3 - IUCN protected areas categories (2008)

Ia Strict Nature Reserve ☑

Ib Wilderness Area: protected area managed mainly for wilderness protection ☐

II National Park: protected area managed mainly for ecosystem protection and recreation ☐

III Natural Monument: protected area managed mainly for conservation of specific natural features ☐

IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention ☐

V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation ☑

VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems ☐

5.2.4 - Key conservation measures

Legal protection

Measures	Status
Legal protection	Partially implemented

Habitat

Measures	Status
Catchment management initiatives/controls	Implemented
Improvement of water quality	Implemented
Habitat manipulation/enhancement	Implemented
Hydrology management/restoration	Partially implemented
Land conversion controls	Partially implemented
Faunal corridors/passage	Implemented

Species

Measures	Status
Threatened/rare species management programmes	Partially implemented
Control of invasive alien plants	Implemented
Control of invasive alien animals	Proposed

Human Activities

Measures	Status
Management of water abstraction/takes	Implemented
Regulation/management of wastes	Implemented
Livestock management/exclusion (excluding fisheries)	Partially implemented
Fisheries management/regulation	Implemented
Harvest controls/poaching enforcement	Partially implemented
Regulation/management of recreational activities	Partially implemented
Communication, education, and participation and awareness activities	Implemented
Research	Proposed

5.2.5 - Management planning

Is there a site-specific management plan for the site? Yes

Has a management effectiveness assessment been undertaken for the site? Yes ○ No ◉

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning processes with another Contracting Party? Yes ○ No ◉

5.2.6 - Planning for restoration

Is there a site-specific restoration plan? No need identified

5.2.7 - Monitoring implemented or proposed

Monitoring	Status
Water regime monitoring	Implemented
Water quality	Implemented
Plant community	Implemented
Animal community	Implemented
Animal species (please specify)	Implemented
Birds	Implemented

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

CSIR 2011. Rapid assessment of the Ecological Water Requirements for the Bot Estuary. Report No. CSIR/NRE/CO/ER/2011/0035/B

Day JH 1981. The nature, origin and classification of estuaries. In: Day, J.H. (ed.), Estuarine Ecology: with particular reference to Southern Africa. Balkema, Cape Town 147-178

Harebottle DM & Delport M 2000. Waterbird responses to management decisions at Botriviervlei, Western Cape Province. Bird Numbers 9: 39–44.

Harebottle DM 2012 Assessing the conservation value of wetlands and waterbirds with a focus on the winter rainfall region of South Africa, PhD Thesis, University of Cape Town, South Africa

Harrison TD 2002 Preliminary assessment of the biogeography of fishes in South African estuaries. Mar. Freshwater Res. Vol 53 : 479 - 490

Koop P 1982. Estuaries of the Cape. Part II: Synopses of available information on individual systems. Report No. 18 Bot/Kleinmond system (CSW 13). CSIR Research Report 417. Stellenbosch.

Lamberth SJ & Joubert JR (in prep). Prioritizing species for research, conservation and management: a case study of exploited fish species. Unpublished manuscript. Cape Town: Marine and Coastal Management, South Africa.

Measey GJ (ed.) 2011. Ensuring a future for South Africa's frogs: a strategy for conservation research. SANBI Biodiversity Series 19. South African National Biodiversity Institute, Pretoria

National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection G 34809, GoN 1002, 9 December 2011

Norton OB 2005. The Population Structure of Two Estuarine Fish Species, Atherina breviceps (Pisces: Atherinidae) and Gilchristella aestuaria (Pisces: Clupeidae), along the Southern African Coastline. MSc thesis, Rhodes University: 90 pp

Potter IC, Beckley LE, Whitfield AK & Lenanton RCJ 1990. Comparisons of the roles played by estuaries in the life cycles of fishes in temperate western Australia and southern Africa. Environ. Biol. Fishes 28: 143-178.

Rogers J 1985. Geomorphology, offshore bathymetry and quaternary lithostratigraphy around the Bot River Estuary. Trans. Roy. Soc. S. Afr. 45: 211-237.

Skelton PH 1987. South African Red Data Book – Fishes. South African National Scientific programmes Report no 137

There is not enough space for the complete reference list - please see the most recent uploaded version of the RIS for the remainder under reference (section 34).

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)
<1 file(s) uploaded>

ii. a detailed Ecological Character Description (ECD) (in a national format)
<1 file(s) uploaded>

iii. a description of the site in a national or regional wetland inventory
<1 file(s) uploaded>

iv. relevant Article 3.2 reports
<no file available>

v. site management plan
<2 file(s) uploaded>

vi. other published literature
<5 file(s) uploaded>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:

Panoramic of Bot/Kleinmond Estuarine System (*SD Gildenhuys, 02-09-2016*)

Bot/Kleinmond Estuarine System (*Sd Gildenhuys, 30-08-2008*)

images of breaching of the Bot River Estuary including pre and post breaching. (*Sd Gildenhuys, 30-08-2008*)

Images of breaching of the Bot River Estuary including pre and post breaching. (*Sd Gildenhuys, 30-08-2008*)

Images of breaching of the Bot River Estuary including pre and post breaching. (*Sd Gildenhuys, 30-08-2008*)

Images of breaching of the Bot River Estuary including pre and post breaching. (*Sd Gildenhuys, 30-08-2008*)

Images of breaching of the Bot River Estuary including pre and post breaching. (*Sd Gildenhuys, 30-08-2008*)

Images of breaching of the Bot River Estuary including pre and post breaching. (*Sd Gildenhuys, 30-08-2008*)

6.1.4 - Designation letter and related data

Designation letter

<1 file(s) uploaded>

Date of Designation: 2017-01-31