



South African Red Data Book -Fishes

PH Skelton

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Author's address -

P H Skelton, Albany Museum, Somerset Street, Grahamstown 6140

PREFACE

The National Programme for Environmental Sciences is one of several cooperative scientific programmes administered by the CSIR. It is an undertaking involving scientists and scientific institutions in South Africa concerned with research related to environmental problems. The programme includes research designed to meet purely local needs as well as projects being undertaken in South Africa as contributions to international scientific activities.

The increasing threat to indigenous animal and plant species in South Africa posed by development pressure, by changing vegetation patterns, by habitat destruction, by the invasion of alien species and by commercial exploitation is an environmental problem of enormous magnitude. Steps have therefore been taken within the National Programme for Environmental Sciences to collect information relating to threatened species, to promote research into their biology and to assist in finding means for their conservation. The South African Red Data Book series is an attempt to collate available information on threatened species and is a part of this programme.

Two Red Data Books, on birds and small mammals, have been published in this series. Subsequent volumes will deal with large mammals, reptiles and amphibians.

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ABSTRACT

Data sheets are provided for 28 threatened South African fish species, of which five are considered to be endangered (*Barbus trevelyani*, *B phlegethon*, *B treurensis*, *Oreodaimon quathlambae* and *Clarias cavernicola*), one to be endangered in South Africa (*Sarotherodon placidus*), two vulnerable (*Hippocampus capensis* and *Barbus erubescens*), two vulnerable in South Africa (*Nothobranchius orthonotus* and *N rachovii*), 15 rare and three rare in South Africa.

UITTREKSEL

Databelle word voorsien vir 28 bedreigde Suid-Afrikaanse vissoorte, vyf waarvan as in gevaar beskou word (*Barbus trevelyani*, *B phlegethon*, *B treurensis*, *Oreodaimon quathlambae* en *Clarias cavernicola*), een as in gevaar in Suid-Afrika (*Sarotherodon placidus*), twee kwesbaar (*Hippocampus capensis* en *Barbus erubescens*), twee kwesbaar in Suid-Afrika (*Nothobranchius orthonotus* en *N rachovii*), 15 seldsaam en drie seldsaam in Suid-Afrika.

INTRODUCTION

Species considered for this list are those found in continental waters within the political boundaries of South Africa and the Transkei and, because of intimate river drainage association, also within Swaziland, Lesotho and Mozambique south of the Limpopo River. One species from South West Africa, *Clarias cavernicola*, has also been included.

Four peripheral forms from Tongaland in north-eastern Natal have been included. This region is well known as an important biogeographical subtraction zone and as a result must be considered a vital conservation area for species of both plants and animals in South Africa. A strong case for the conservation of the coastal waters of the region has been made in recent years and the inclusion of these species can only add weight to this cause.

Regarding marine species from South African waters, although there are many forms which are extremely scarce in terms of records and presence in collections, the consensus of opinion is that there is insufficient knowledge available at present to form a realistic assessment of status. A sheet has however been prepared for the Knysna seahorse which is, as far as is known, confined to a restricted continental locality.

As with previous South African Red Data books the present list must be considered provisional with the likelihood of additions, removals and changing status of the species as more information becomes available.

Format for the sheets is as for the most recent IUCN Red Data Book with the exception that the category "Distinguishing characteristics" has been retained. References are listed at the back and species considered "depleted" or of "indeterminate" status have been excluded.

The final report on Project Aqua in South Africa (Noble 1974) lists aquatic sites recommended for conservation and includes several proposed refuges for threatened fish species. Progress made by the relevant conservation bodies in implementing these proposals has not been spectacular but there is no doubt that certain developments have taken place.

In the Cape Province, which has the largest number of endemic species, the entire Clanwilliam Olifants River system has been declared a conservation area and is closed to further stockings with exotic species. A fish hatchery for indigenous species only (a notable first) is under construction on the banks of the Clanwilliam Olifants. Several other rivers in the Cape are designated sanctuaries to be kept free of exotic introductions and the province is drafting improved legislation to deal with fish conservation.

A distribution survey of indigenous fish has been initiated in the Cape. In the Orange Free State a similar survey is already partially completed and such a survey was completed by the Transvaal authorities during the 1960's. In this latter province a special study has been initiated which includes investigations into the distribution, status and ecological features of threatened species. Subsequent to a province wide survey on indigenous fish in the 1950's, collecting in Natal has been concentrated mainly in the Pongolo River floodplain and the Tongaland area, where University surveys have been conducted in recent years. With a depauperate indigenous ichthyofauna and consequent lack of sport fishes, many of

the rivers of the southern and eastern escarpment have been stocked with exotic predator species for angling purposes. Although largely unstudied in this country a deleterious effect of exotic introductions on local indigenous fauna is frequently evident. The so-called trout zone in the Cape and Natal occurs within a unique faunal area (research being conducted by the author indicates that this is true for the freshwater fishes) and as systematic investigations on the invertebrate fauna of these rivers is in its infancy, priority should be given to strictly protected exotic free and otherwise environmentally safe sanctuaries.

The National Parks Board have taken steps to conserve threatened indigenous freshwater fishes within areas under their jurisdiction. At least two species (*Serranochromis meridianus* and *Chetia brevis*) have been successfully translocated within the Kruger National Park and the indications are that they may well be removed from future lists. Two marginally occurring species (*Nothobranchius orthonotus* and *N. rachovii*) have also been translocated and their status is being monitored. The Board and the Transvaal Nature Conservation Division have had some success with fish ladders. There is an increasing need to give considerably greater research attention to the ecological implications of weir placement and design and the possible need for fish ladders.

Chutter's (1973) review of the past and future of South African rivers predicts a gloomy outlook for fish conservation. It is clear that overall environmental deterioration of our aquatic resources is the source of decline of our indigenous fish stocks. Much blame, partially justified, has been laid at the foot of exotic introductions, but this is merely one facet of the changes which have been wrought on this restricted and extremely sensitive environment, especially since the introduction of intensive agriculture. Unfortunately, the present water laws do not allow for effective conservation control by the authorities, a necessary prerequisite for future progress in this respect.

DEFINITIONS OF CATEGORIES

Threatened

Taxa included in the categories endangered, vulnerable and rare as defined below.

Endangered

Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Vulnerable

Taxa believed likely to move into the endangered category in the near future if the causal factors continue operating. Included are taxa of which most or all the populations are decreasing because of over-exploitation, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are under threat from serious adverse factors throughout their range.

Rare

Taxa with small populations that are not at present endangered or vulnerable, but are at risk. These taxa are usually localized within restricted geographical areas or habitats or are thinly scattered over a more extensive range. They may be reproductively isolated, or they may be relict forms with wide distribution. They may also be forms seldom recorded but which may be commoner than supposed although there is reasonably good evidence that their numbers are low.

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Asterisks indicate species endemic to South Africa. Common names are taken from Smith (1975) and Jackson (1975).

KNYSNA SEAHORSE

Hippocampus capensis Boulenger, 1900

Order GASTEROSTEIFORMES Family SYNGNATHIDAE

Status: Vulnerable.

Known only from Knysna estuary and lagoon which is prone to ecological disruption due to human population growth and development in area. Species represents desirable aquarium fishes which are easily exploited.

Distinguishing characteristics: Small, rarely exceeds 70 mm; curious highly modified fishes with head at right angles to trunk, body and tail enclosed in bony rings; snout tubular and relatively short, coronet rudimentary; tail coiled and prehensile.

Distribution: Recorded only from Knysna estuary and lagoon, southern Cape.

Habitat: Muddy, estuarine and well vegetated backwater creeks.

Breeding rate in wild: Unknown.

Conservation measures taken: Protected under Cape Provincial Nature Conservation Ordinance.

Conservation measures proposed: Impose ban on marketing of species for aquarium purposes.

Number in captivity: Unknown but probably held in private and larger public aquariums.

Breeding potential in captivity: Excellent. Verbal reports of successful aquarium breeding.

Remarks: Development of the town of Knysna adjacent to the estuary and lagoon definitely imposes greatest threat to these largely sedentary creatures. As small and attractive aquarium curiosities they are highly sought after and over-exploitation for this trade is a clear secondary threat to their continued survival in the wild. Penrith (*in litt*) has drawn attention to *Pendaka sylvana* as a second threatened species from this area.

References: Smith (1935, 1963, 1965).

SOUTHERN KNERIA

Kneria auriculata (Pellegrin, 1905)

Order GONORHYNCHIFORMES Family KNERIDAE

Status: Rare; possibly endangered in South Africa. Limited distribution and susceptible to exotic predation especially trout spp. Distribution further reduced by exotic predators and siltation.

Distinguishing characteristics: Slender small minnow-like fish with minute scales and a cup shaped process on the operculum of the male.

Distribution: Highveld tributaries of the Crocodile River, Incomati River system, Transvaal. Extralimitally in the Sabi-Lundi, Pungue, Buzi and Zambezi Rivers.

Populations: Unknown; for Rhodesian streams can be plentiful in suitable environments, however such waters occur infrequently (Bell-Cross 1976a).

Habitat: Clear, fast flowing rocky streams.

Breeding rate in wild: Unknown.

Conservation measures taken: Two fish refuge sites for this species were proposed by the Project Aqua working group (Pott 1970), but these proposals have not yet been implemented.

Conservation measurers proposed: As recommended by Pott (1970) viz :

- (1) That the section of the farm Zondagskraal 145 JT that contains Sondagskraalspruit be acquired by the state (ie Transvaal Provincial Administration). Alternatively that Farm Wachtenbeetjieshoek 327 II with stream refuge Wilgekraalspruit be acquired.
- (2) That no animal, bird, fish or plant species be introduced into the area unless it already occurs there, or unless it is deemed necessary by the Director of Nature Conservation to do so.
- (3) That the following activities be prohibited - the cutting or burning of vegetation; the catching of fish; the introduction of pollution materials into the stream; the alteration in any way of the flow of the stream and the jeopardization in any way of the fish life of the stream.
- (4) That access be denied to all unauthorized persons.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown. Mulder (*in litt*) reports that attempts to breed artificially have been unsuccessful. A successfully breeding population is being kept at Lydenburg Fisheries Institute (Anon, 1972).

STRIPED ROBBER

Alestes lateralis Boulenger, 1900

Order CYPRINIFORMES

Family CHARACIDAE

Status: Rare in South Africa; possibly endangered.
Only known in South Africa from a few specimens collected in a few localities.

Distinguishing characteristics: Moderate sized (up to 14 cm) streamlined characin; 2 rows of sharp multicuspid teeth in jaws; pronounced black lateral band on trunk extending onto caudal fin where it is flanked dorsally and ventrally by yellow.

Distribution: Within the Republic known from a few localities in north-eastern Natal. Known sites include a recent (1976) record from Mqgizweni Pan in the Umfolozi Game Reserve, a specimen from the Hluhluwe Game Reserve and a record from the eastern shores of Lake St Lucia. The species has not yet been recorded from the Pongolo River. Although Clay (1976) records the species from a tributary of the same system in Swaziland this record is somewhat dubious. Extralimitally known in the Upper Zambezi, Okavango, Cunene and Kafue Rivers as well as from further north in Africa.

Populations: Unknown. A shoaling species.

Habitat: The preferred habitat is generally associated with aquatic vegetation (Bell-Cross 1976a).

Breeding rate in wild: Unknown.

Conservation measures taken: At least two known records occur within sanctuary areas (Umfolozi and Hluhluwe Game Reserves).

Conservation measures proposed: Periodic surveys of known localities required to confirm conservation status of the species and its habitats.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: The occurrence of this species in Natal is of considerable zoogeographical interest especially as it has not been found in the Pongolo River or in river systems northwards upto and including the Limpopo River system.

References: Anon (1970), Bell-Cross (1976a), Clay (1976), Coke and Pott (1970), Crass (1964, 1970), Jubb (1967a).

CLANWILLIAM YELLOWFISH

Barbus capensis A Smith, 1841

Order CYPRINIFORMES

Family CYPRINIDAE

Status: Rare.

Preliminary research indicates that exotic predation on juvenile yellowfish is probably a major reason for population decline; environmental alteration and deterioration via large impoundments and intensive agricultural use of water resources probably also are of major influence. Land erosion is of unknown but probable influence.

Distinguishing characteristics: A large *Barbus* species with longitudinally striated scales; last unbranched dorsal ray flexible and non-serrated; lip development variable; colour olive-yellow to brilliant golden yellow in breeding dress.

Distribution: Mainstream and major tributaries of the Olifants River system, Cape Province.

Populations: Population densities low, with some improvement in upstream localities.

Habitat: Clear, rocky pools and deeper river stretches; also in impounded river stretches.

Breeding rate in wild: Unknown.

Conservation measures taken: Protected under general Cape Provincial Nature Conservation Ordinance. Minimum angling size limit imposed. Olifants River system declared conservation area and further stockings of exotics species suspended. On site hatchery for artificial propagation of species is being constructed by provincial authorities.

Conservation measures proposed: Artificial breeding and stocking of natural waters; cease further stockings of exotic predatory species within Olifants River system.

Number in captivity: Unknown.

Breeding potential in captivity: Probably good.

Remarks: None.

References: Barnard (1943), Gaigher (1973a, 1973b), Jubb (1965, 1967a).

NAMAQUA BARB

Barbus hospes Barnard, 1938

Order CYPRINIFORMES

Family CYPRINIDAE

Status: Rare.

Distribution restricted to Orange River below Augrabies Falls. Effects of recently built large impoundments upstream and heavy silt load of rivers unknown.

Distinguishing characteristics: A small *Barbus* species with serrated unbranched ray with basal serration directed apically; scales poorly developed, deciduous; elongated caudal fin lobes.

Distribution: Orange River below Augrabies Falls, also lower reaches of Fish River (South West African tributary of Orange River).

Populations: Possibly occurs in shoals; numbers unknown (pers obs).

Habitat: Unknown. Has been caught in mainstream over sandy areas.

Breeding rate in wild: Unknown.

Conservation measures taken: Protection provided under general Cape Provincial Nature Conservation Ordinance.

Conservation measures proposed: Survey to determine correct status of species and an ecological study required.

Number in captivity: Unknown. Probably none or few at most.

Breeding potential in captivity: Unknown.

Remarks: Preliminary observations indicate that this is clearly a unique species in the southern African freshwater fish fauna. An ecological study is highly desirable. Gaigher (*in litt*) reports that the Cape Nature and Environmental Conservation Department have initiated a programme which will handle the above proposed conservation measures.

References: Barnard (1943), Jubb (1965, 1967a).

CLANWILLIAM REDFIN

Barbus calidus Barnard, 1938

Order CYPRINIFORMES

Family CYPRINIDAE

Status: Rare.

Populations have been severely depleted and, where contact has been made, invariably eliminated by introduced bass *Micropterus* spp. Environmental deterioration due to agricultural practices probably accessory, as is the smothering of habitat by sand/silt from land erosion.

Distinguishing characteristics: A small *Barbus* species with radiately striated scales and a bony serrated last unbranched dorsal ray; anal fin with six branched rays; two pairs of oral barbels; red patches about the bases of the fins and the dorsal surface of the trunk spotted.

Distribution: Tributaries of the Olifants River system, western Cape.

Populations: Occurs in groups and schools varying from a few to numerous individuals.

Habitat: Generally found in large, deep rocky pools that are invariably clear and running.

Breeding rate in wild: Unknown.

Conservation measures taken: Protected under general Cape Provincial Nature Conservation Ordinance. Olifants River system declared a conservation area and further stocking of exotic species suspended.

Conservation measures proposed: Cease all stockings of exotic predatory species especially *Micropterus dolomieu*; restrict established *Micropterus* populations in particular localities; establish sanctuary streams within Olifants system; establish breeding populations for restocking rivers.

Number in captivity: Unknown.

Remarks: Cape Department of Nature and Environmental Conservation are planning ecological studies on this species.

References: Barnard (1943), Gaigher (1973a, 1973b), Jubb (1965, 1967a), Van Rensburg (1966).

BORDER BARB

Barbus trevelyani Günther, 1877

Order CYPRINIFORMES

Family CYPRINIDAE

Status: Endangered.

Decline attributed to habitat deterioration due to silting from catchment soil erosion, damming, and water extraction; also accentuated by predation from exotic species and climatic irregularities of the area.

Distinguishing characteristics: A small *Barbus* species with radiately striated scales; smooth or serrated last unbranched dorsal ray; single pair of oval barbels; silvery with a thin lateral dark band ending as a spot on the caudal peduncle; lateral line tubercles outlined in black pigment.

Distribution: Keiskamma and Buffalo River systems, eastern Cape.

Populations: Occurs singly or in shoals up to 25 in number. The shoals are of mixed sexes.

Habitat: Clear perennial streams with a stony substratum. Particular habitat is in depressions about larger stones in or near midstream rapids. Also found in shallow pools of sandy or rocky nature and flowing water.

Breeding rate in wild: Males mature after first year, females after third year. Spawning probably occurs in midstream gravels, through summer months. Fecundity varies from about 900 in young females to between 4 000 and 5 000 in older females.

Conservation measures taken: Protected under general Cape Provincial Nature Conservation Ordinance. Tyume River (tributary of Keiskamma River system) below the escarpment is a declared sanctuary with stockings of exotic species prohibited. Buffalo River is listed as Project Aqua site 6 (Noble 1974).

Conservation measures proposed: Particular river sections to be proclaimed conservation or sanctuary areas; breeding populations to be established for restocking natural environments.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: None.

References: Gaigher (1975), Jubb (1965, 1967a), Noble (1974).

FIERY REDFIN

Barbus phlegethon Barnard, 1938

Order CYPRINIFORMES

Family CYPRINIDAE

Status: Endangered.

Threatened principally by exotic predatory fishes, especially *Micropterus* spp, but also by agricultural practices causing smothering of habitat by sand and silt.

Distinguishing characteristics: A small *Barbus* species with radiately striated scales and a flexible non-serrated last unbranched dorsal ray; a single pair of oral barbels; no pre-dorsal supraneural bones; males with small conical nuptial tubercles; red patches about the bases of the fins, silvery lateroventrally heavily blotched with deep pigment; mouth small.

Distribution: Tributaries of the Olifants River system, western Cape.

Populations: Groups varying from a few to numerous individuals.

Habitat: Evidently confined to rocky or stony, clear, flowing streams.

Breeding rate in wild: Unknown.

Conservation measures taken: Protected under general Cape Provincial Nature Conservation Ordinance. Olifants River system declared a conservation area and further stocking of exotic species suspended. The Cape Department of Nature and Environmental Conservation are planning ecological studies on this species.

Conservation measures proposed: Cease stocking exotic predatory species, especially *Micropterus dolomieu*; restrict established *Micropterus* populations in particular localities; establish sanctuary streams and breeding populations.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: None.

References: Barnard (1938), Gaigher (1973a, 1973b), Jubb (1965, 1967a), Van Rensburg (1966).

BURCHELL'S REDFIN

Barbus burchelli A Smith, 1841

Order CYPRINIFORMES

Family CYPRINIDAE

Status: Rare.

Predation from exotic species *Micropterus* spp and *Salmo gairdneri*. Deterioration of habitat from agricultural demand on water resources and from pollution have depleted the species. Poor environmental conditions are reflected in the high incidence of helminth parasites on majority of available museum samples of this fish.

Distinguishing characteristics: A small *Barbus* species with radiately striated scales and a flexible non-serrated last unbranched dorsal ray; two pairs of oral barbels, lacks pre-dorsal supraneural bones; males with large conical nuptial tubercles on head, scales and fins; bright red patches about the bases of fins, usually spotted with a prominent sub-triangular marking at the end of the caudal peduncle in juvenile stages.

Distribution: Tributaries of the Breede River system and adjacent independent smaller rivers.

Populations: Occurs in groups from few to numerous individuals.

Habitat: Known from clear, rocky pools in small streams and tributaries. Although not recently collected in the mainstream, the species may once have occurred in such environments.

Breeding rate in wild: Unknown.

Conservation measures taken: Protected under general Cape Provincial Nature Conservation Ordinance. Holsloot River of the Breede River system is Project Aqua site 2, however there are no museum records of *B burchelli* from this which is well stocked with trout.

Conservation measures proposed: Establish sanctuary stream(s) from which exotic predatory species are excluded; establish breeding populations at state fish hatcheries for restocking natural habitat.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: None.

References: Barnard (1943), Jubb (1965, 1967a), Noble (1974).

BERG RIVER REDFIN

Barbus burgii Boulenger, 1911

Order CYPRINIFORMES

Family CYPRINIDAE

Status: Rare.

Depletion due to deterioration of environment through pollution, agricultural demand on water resources, and extensive stocking of exotic predatory fishes (*Micropterus* spp and *Salmo* spp).

Distinguishing characteristics: A small *Barbus* species with radiately striated scales and a flexible non-serrated last unbranched dorsal ray; two pairs of oral barbels, the anterior pair minute and developing at a late stage in life; no pre-dorsal supraneural bones; red patches about the bases of the fin; males with conical nuptial tubercles on head, scales and fins.

Distribution: Berg River system and adjacent Eerste and Verloren Vallei Rivers; possibly extinct in the Eerste River.

Populations: Occurs in groups from few to numerous individuals.

Habitat: Habitat preferences unknown. It has been collected in shallow, muddy habitats that are well vegetated and semi-stagnant, although these are likely to be enforced conditions. Clear rocky pools are probably the preferred habitat.

Breeding rate in wild: Unknown.

Conservation measures taken: Protected under general Cape Provincial Nature Conservation Ordinance. Eerste River catchment a declared conservation area (Project Aqua site 1) but is heavily stocked with exotic trout.

Conservation measures proposed: Establish sanctuary streams from which exotic predatory species are excluded; establish breeding populations at state hatchery for restocking natural habitat.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: None.

References: Barnard (1943), Jubb (1965, 1967a), Noble (1974).

SMALLSCALE REDFIN

Barbus asper Boulenger, 1915

Order CYPRINIFORMES

Family CYPRINIDAE

Status: Rare.

Threatened by agricultural demand on water resources, locally exotic predator species, especially *Micropterus* spp, causing local extinction.

Distinguishing characteristics: A small *Barbus* species with radiately striated scales and a flexible non-serrated last unbranched dorsal ray; scales relatively small and a single pair of oral barbels; red patches about the fin bases; lacks pre-dorsal supraneural bones; males with conical nuptial tubercles on head, scales and fins.

Distribution: Larger tributaries of the Gouritz and Gamtoos River systems and coastal streams between these basins.

Populations: Occurs in large schools of mixed sexes and age classes, although tendency appears for juveniles to form separate schools. Tends to occur in smaller groups in smaller coastal rivers.

Habitat: Variable, in larger rivers found over open sandy stretches; in coastal rivers in rocky, pool-like habitats.

Breeding rate in wild: Unknown but probably high.

Conservation measures taken: Protected under general Cape Provincial Nature Conservation Ordinance. At least three coastal rivers in its range occur within conservation areas.

Conservation measures proposed: River catchments within the range of this species were included on the IBP South African Project Aqua list but it appears that little action beyond the proposal stage was taken. No practical solution for the survival of the species in the larger river habitats is possible at present due to the high demand and erratic supply of water resources within these areas.

Number in captivity: Unknown, probably negligible.

Breeding potential in captivity: Unknown.

Remarks: Systematic studies which may redefine species are at present in advanced stage.

References: Barnard (1943), Jubb (1965, 1967a).

SLENDER REDFIN

Barbus tenuis Barnard, 1938

Order CYPRINIFORMES

Family CYPRINIDAE

Status: Rare.

Probably due to heavy water utilization for agricultural and domestic purposes.

Distinguishing characteristics: A small *Barbus* species with slender shape; radiately striated scales; non-serrated flexible unbranched dorsal ray; single pair of oral barbels; lacks pre-dorsal supraneural bones; pharyngeal teeth in two rows; red patches about the bases of the fins; males with conical nuptial tubercles on head, fins and scales.

Distribution: Tributaries of the Gouritz River system, and also Keurbooms River, southern Cape.

Populations: Generally occurs in small groups.

Habitat: Small, clear, flowing streams with shallow pools.

Breeding rate in wild: Unknown.

Conservation measures taken: Protected under general Cape Provincial Nature Conservation Ordinance. The Groot River, a tributary of the Gouritz River system, and the Keurbooms River system are declared sanctuaries from which exotic species are being excluded.

Conservation measures proposed: Establish suitable sanctuary streams.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: None.

References: Barnard (1938), Jubb (1965, 1967a), Skelton (1976).

EASTERN CAPE REDFIN

Barbus afer Peters, 1864

Order CYPRINIFORMES

Family CYPRINIDAE

Status: Rare.

Threatened by introduction of exotic angling species, especially *Micropterus* spp, deteriorating environment due to agriculture, water utilization and pollution and possibly effects of exotic plants.

Distinguishing characteristics: A small *Barbus* species with radiately striated scales and a flexible non-serrated last unbranched dorsal ray; relatively large scales and a single pair of oral barbels; red patches about the fins' bases; lacks pre-dorsal supraneural bones; males with conical nuptial tubercles on head, scales and fins.

Distribution: Rivers of the eastern Cape, from Kromme River in the west to Sundays River in the east.

Populations: Occur in groups varying from a few to numerous individuals.

Habitat: Clear rocky pools in smaller streams; marginal vegetation present or absent.

Breeding rate in wild: Unknown.

Conservation measures taken: Protected under general Cape Provincial Nature Conservation Ordinance.

Conservation measures proposed: Establish suitable sanctuary streams where exotic species are absent and introduction can be prevented.

Number in captivity: Unknown, possibly few in local private aquariums.

Breeding potential in captivity: Unknown.

Remarks: Taxonomic status of this species at present under revision.

References: Barnard (1943), Jubb (1965, 1967a).

TREUR RIVER BARB

Barbus treurensis Groenewald, 1958

Order CYPRINIFORMES

Family CYPRINIDAE

Status: Endangered.

Its limited natural distribution is within a declared trout (exotic) area, and its catchment region is being planted with exotic pine trees of unknown effects on the habitat.

Distinguishing characteristics: A small *Barbus* species with flexible non-serrated dorsal unbranched ray; two well developed barbels and distinctive coloration; no lateral band; irregularly arranged lateral spots; relatively large scales.

Distribution: Known previously from two tributaries, the Blyde and Treur Rivers, of the Limpopo River system. Also originally reported from Sabie River, a tributary of the Incomati River system. At present known only from the Bendigospruit, a tributary of the Blyde River (Pott 1970).

Populations: Unknown.

Habitat: Perennial mountain streams with clear water and pools.

Breeding rate in wild: Unknown.

Conservation measures taken: Present distribution (Bendigospruit) proposed as an IBP conservation site in 1970, and as such given attention by Nature Conservation Division, Transvaal Provincial Administration. Reportedly the land owners are prepared to apply the conservation measures proposed (Pott 1970).

Conservation measures proposed: As originally proposed by the Nature Conservation Division, Transvaal Provincial Administration (Pott 1970) that :

- (1) Destruction or disturbance of fish life in the Bendigospruit be prohibited
- (2) No animal, bird, fish or plant species be introduced into the area unless it be deemed necessary by the Director of Nature Conservation
- (3) No alterations in any way of the stream and the strip of land two metres on either side of the stream are to be performed without prior permission of the Director of Nature Conservation
- (4) A barrier to be constructed immediately above the confluence with the Blyde River to prevent ingress of trout into the Bendigospruit and
- (5) These restrictions be binding, and shall survive the change of ownership of the Bendigospruit.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: Mulder (*in litt* February 1977) reports that research is currently being done into its ecology and conservation.

References: Groenewald (1958), Jubb (1967a, 1968a), Noble (1974), Pott (1970).

TWEE RIVER REDFIN

Barbus erubescens Skelton, 1974

Order CYPRINIFORMES Family CYPRINIDAE

Status: Vulnerable.

Confined to an extremely restricted natural range in which farming and mining activities present a potential environmental threat; active angling interest that depends on introducing exotic predators poses further potential threat.

Distinguishing characteristics: A small *Barbus* species with radiately striated scales with a soft smooth or at most weakly serrated last dorsal unbranched ray; anal fin with seven branched rays; two pairs of oral barbels; red patches about the bases of the fins; dorsal surface without markings.

Distribution: Confined to a single tributary complex of the Olifants River system, western Cape.

Populations: Occurs in groups and schools varying from a few to numerous individuals.

Habitat: Generally found in clear pools or pool-like stretches of the river, over gravel based with rocks, in running water.

Breeding rate in wild: Unknown. Mass congregation of males witnessed during mid-summer months.

Conservation measures taken: Protected under general Cape Provincial Nature Conservation Ordinance. Olifants River system declared a conservation area and stocking of exotic species suspended.

Conservation measures proposed: Twee River and its source tributaries should be declared a sanctuary stream, and all stockings of exotic predatory species be strictly excluded; land management practices within the catchment to be checked and reviewed.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: The Cape Department of Nature and Environmental Conservation are planning ecological studies of this species.

References: Jubb (1975a), Skelton (1974b).

DRAKENSBERG MINNOW

Oreodaimon quathlambae (Barnard, 1938)

Order CYPRINIFORMES Family CYPRINIDAE

Status: Endangered.

Current status may be due to introduction of exotic competitive and predatory trout species *Salmo gairdneri* and *Salmo trutta*; may also be due to deterioration of environment as a result of siltation from serious soil erosion in catchment areas.

Distinguishing characteristics: Minnow with extremely small radiately striated scales, red patches about the bases of the fins; males with nuptial tubercles, pharyngeal teeth in two rows; females with gonads apparently fused proximally for the greater part of their length; pre-dorsal supraneural bones absent.

Distribution: At present known from only three localities from high altitude tributaries of the Orange River system in Lesotho. These tributaries are the Tsoelikana, Moremoholo and Senqu Rivers. Type locality given as Umkomazana River in Natal.

Populations: Has been observed in small groups with as few as two or three individuals.

Habitat: Generally clear rocky mountain streams, preferably towards the head of pools with good rocky cover.

Breeding rate in wild: Unknown. Breeding apparently throughout summer months.

Conservation measures taken: Much of Tsoelikana River occurs within the Sehlabathebe National Park, a conserved area. The biology of the species at present being investigated in this locality.

Conservation measures proposed: Sanctuary streams be declared beyond the influence of agriculture and from which exotic trout species can be effectively excluded. Introduction of species to other suitable localities should be considered.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: Lesotho fisheries authorities are undertaking research into biology and ecology of this species. Authoritative opinion is divided as to former existence of the species in Natal rivers.

References: Barnard (1938), Greenwood and Jubb (1967), Pike and Tedder (1973), Rondorf (1976), Skelton (1974a).

CLANWILLIAM ROCK CATFISH

Gephyroglanis gilli Barnard, 1943

Order SILURIFORMES

Family BAGRIDAE

Status: Rare.

Deterioration of environment due to agricultural use of water resources and side effects such as soil erosion and silting of riverine environment. Exotic predators probably have detrimental effect.

Distinguishing characteristics: Small scaleless bagrid with caudal fin but shallowly forked; relatively broad snout; epiphyal articulating with inter-operculum; interhyal absent.

Distribution: Tributaries of the Olifants River system, western Cape.

Populations: May occur in fair numbers in favoured habitats.

Habitat: Clear rocky stretches of smaller tributaries. Indications are that the species is narrowly restricted to a flowing rocky environment.

Breeding rate in wild: Unknown.

Conservation measures taken: Protected under general Cape Provincial Nature Conservation Ordinance. Olifants River system recently declared conservation area and all stockings of exotic species suspended.

Conservation measures proposed: Establish sanctuary streams. Restrict stockings of exotic predatory fish species. Research required into biology and ecology of this species.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: The Cape Department of Nature and Environmental Conservation are planning ecological studies of this species.

References: Barnard (1943), Gaigher (1973a), Jubb (1967a), Petrick (1973).

CAVE CATFISH

Clarias cavernicola Trewavas, 1936

Order SILURIFORMES Family CLARIDAE

Status: Endangered.

This species is restricted to a single locality and depends on a vulnerable food supply of baboon and bat faeces. Furthermore, the water supply is being exploited (Penrith *in litt* 1976).

Distinguishing characteristics: Small clariid, devoid of pigment; eyes degenerate.

Distribution: Known only from an underground water body within a cave on the farm Aigamas 471, near Otavi, Grootfontein district, South West Africa.

Populations: Unknown, but probably restricted to a few hundred individuals (Gaigher *in litt* 1976).

Habitat: Subterranean waters.

Breeding rate in wild: Unknown.

Conservation measures taken: It is believed that the South West African Department of Nature Conservation and Tourism has prohibited interference with the species (Jubb pers comm). Farm owners are apparently sympathetic to its conservation (Gaigher *in litt*).

Conservation measures proposed: Constant monitoring of habitat to guarantee water and food availability. Develop legislation to guarantee protection of habitat and species. Investigate suitable translocation sites.

Number in captivity: Unknown, possibly a few individuals.

Breeding potential in captivity: Unknown.

Remarks: Penrith (*in litt*) reports that there are no known suitable translocation sites which combine the required water quality, darkness and natural food.

References: Jubb (1967a), Trewavas (1936).

INCOMATI ROCK CATLET

Chiloglanis bifurcus Jubb & Le Roux, 1969

Order SILURIFORMES

Family MOCHOKIDAE

Status: Rare.

Province-wide survey by Gaigher (1969) recorded that this species was only found at few localities in the Incomati River system.

Distinguishing characteristics: Small scaleless catlet with unserrated dorsal spine and a large ventral disc like mouth with few well spaced teeth; maxillary barbels relatively short; caudal fin forked with large lobes.

Distribution: As far as is known, endemic to Incomati River system, eastern Transvaal.

Habitat: Rocky rapids in perennial streams.

Breeding rate in wild: Unknown.

Conservation measures taken: Short-listed on Transvaal Provincial Administration Nature Conservation list of rare and possibly endangered fishes as part of a study programme on these species (Mulder *in litt* February 1977).

Conservation measures proposed: Subject to results of above mentioned programme. Recommended that sanctuary streams for extant populations be established as soon as possible.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: Difficult to keep in captivity due to strict ecological demands.

References: Gaigher (1969), Jubb and Le Roux (1969).

PONGOLA ROCK CATLET

Chiloglanis emarginatus Jubb & Le Roux, 1969

Order SILURIFORMES

Family MOCHOKIDAE

Status: Rare.

Recorded by Gaigher (1969) from only two localities in the Incomati River. Considered as uncommon in Rhodesia (Bell-Cross 1976a).

Distinguishing characteristics: Small scaleless catlet with non-serrated dorsal spine; emarginate caudal fin; large ventral disc like mouth with few widely spaced mandibular teeth; relatively well developed oral barbels.

Distribution: Recorded from Pongolo, Incomati River systems. Extralimitally from Pungwe River and the tributaries of the middle and lower Zambezi. Also recorded from Umbuluzi River, Swaziland.

Habitat: Rocky perennial streams. Usually associated with shallow flowing water as in rapids (Bell-Cross 1976a).

Breeding rate in wild: Unknown.

Conservation measures taken: Short-listed by Transvaal Provincial Administration Nature Conservation Division on a list of rare and possibly endangered freshwater fishes of that Province. Forms part of a study programme on these species (Mulder *in litt* February 1977).

Conservation measures proposed: Pending results of above mentioned programme, recommended that sanctuary streams for known extant populations be established as soon as possible.

Number in captivity: Unknown.

Breeding potential in captivity: Unknown.

Remarks: None.

References: Bell-Cross (1976a), Gaigher (1969), Jubb and Le Roux (1969), Pott (1969).

SPOTTED KILLIFISH

Nothobranchius orthonotus (Peters, 1844)

Order Atheriniformes

Family Cyprinodontidae

Status: Vulnerable in South Africa.

Recorded from only few localities in South Africa. However area represents marginal distribution of species and there is no danger of extinction.

Distinguishing characteristics: Small fishes with dorsal fin set well back, caudal fin truncate; mouth well toothed directed upward; coloration distinctive; males an iridescent bluish green with maroon or liver-red scale margins and cheeks, dorsal, anal and ventral fins heavily dotted with maroon spots; females uniformly pale olive without any spots.

Distribution: Recorded only from series of temporary pools along eastern border of Kruger National Park, the Ndumu Game Reserve and Mkuzi River in Natal. Known distribution is along eastern Lowveld as far north as Lake Malawi.

Habitat: Temporary pools in pans or swampy areas. Partial to still, well vegetated habitats.

Breeding rate in wild: One generation per year.

Conservation measures taken: Known locality occurs within boundaries of Kruger National Park (Project Aqua site 18). Pienaar (*in litt* February 1977) reports attempt to introduce species to additional localities within park. Some Natal populations occur within Ndumu Game Reserve.

Conservation measures proposed: Present conservation programme (Pienaar *in litt*) of introduction to further localities in Kruger National Park adequate active measures at present.

Number in captivity: Unknown but almost certain to be present.

Breeding potential in captivity: Good.

Remarks: Demand for specimens for aquarium trade possibly greatest threat to this and other *Nothobranchius* species.

References: Bell-Cross (1976a), Crass (1964), Gaigher (1969), Jubb (1969, 1975b), Noble (1974), Pienaar (1968).

BLUEBAND KILLIFISH

Nothobranchius rachovii Ahl, 1926

Order ATHERINIFORMES

Family CYPRINODONTIDAE

Status: Vulnerable in South Africa.

Distinguishing characteristics: Small fishes with dorsal fin set well back; caudal fin rounded; mouth well toothed turned upward. Males brilliantly coloured with greenish golden lateral surface, golden iris and throat and chest suffused with crimson; usually a series of irregular slanting crimson bars over the lateral surface; caudal fin has distinctive bright red crescent bordered distally by a marginal deep blue band; dorsal and anal fins spotted with irregular indigo blotches. Females olive to yellowish brown.

Distribution: Recorded only from few pans on eastern border of Kruger National Park. Extralimitally known from around Beira in Mozambique.

Habitat: Shallow natural pans with sandy or pebbly substratum and dense aquatic vegetation.

Breeding rate in wild: One generation per year.

Conservation measures taken: Locality occurs within boundaries of Kruger National Park (Project Aqua site 19). Pienaar (*in litt* February 1977) reports attempt to introduce species to additional localities within Kruger Park.

Conservation measures proposed: Present conservation programme of introduction to further localities in Kruger National Park adequate (Pienaar *in litt*).

Numbers in captivity: Unknown but probably numerous.

Breeding potential in captivity: Good.

Remarks: Aquarist interest in this species is high and it is thus unlikely to become extinct. However such interest may place severe demands on natural populations and the continued protection of these is essential.

References: Jubb (1967a), Noble (1974), Pienaar (1968).

BLACK TILAPIA

Sarotherodon placidus (Trewavas, 1941)

Order PERCIFORMES Family CICHLIDAE

Status: Endangered in South Africa.

Known only from the small Mgobezeleni Lake system in north-eastern Zululand. This habitat is adjacent to a developing recreational area and has already been damaged to a certain extent.

Distinguishing characteristics: Superficially close to *S mossambicus* but distinguished typically by the presence of four spines in the anal fin (a relatively high proportion of Sodwana *S placidus* have only 3 such spines); uniformly dark as adult, juveniles with vertical bars; head relatively short and body relatively deep.

Distribution: Recorded from the mangrove swamp and Lakes Mgobezeleni and Shazibe at Sodwana in north-east Zululand. Extralimitally known from Mozambique north of the Save River, eastern Rhodesia as far north as the Zambezi River system.

Habitat: Pools, small lakes and slower flowing parts of streams and rivers.

Breeding rate in wild: Unknown, but probably produces multiple broods during summer months. Mouthbrooder.

Conservation measures taken: Locality occurs adjacent to Sodwana Bay National Park. Permits required for gill net fishing in Lake Mgobezeleni.

Conservation measures proposed: Complete protection of Lake Shazibe as a wilderness area in the enlarged Sodwana Bay National Park; strict control of fishing in the Sodwana mangrove swamp and in Lake Mgobezeleni.

Numbers in captivity: Unknown, probably nil.

Breeding potential in captivity: Unknown.

Remarks: At present fairly heavily exploited by a single African using gill nets in Lake Mgobezeleni. There is an indication that his catches have recently declined. Protection at Shazibe should ensure that sufficient stock is conserved. Severe disruption of the hydrology in the Sodwana mangrove swamp during the period 1972-1976 caused a deterioration of the environment in that area but recent reconstruction may result in the habitat returning to normal. This population is a geographical relic and differs from the Mozambique population in several ways. It thus is of considerable scientific interest as well as providing a small but constant source of protein for the local African population. Sheet prepared by M N Bruton.

References: Bell-Cross (1976b), Bruton (1975), Jubb (1967a), Jubb and Skelton (1974).

LOWVELD LARGEMOUTH

Serranochromis meridianus Jubb, 1967

Order PERCIFORMES

Family CICHLIDAE

Status: Rare.

Threatened environmental changes through human agency and a restricted natural distribution qualify this species for consideration here. Species considered safe for conservation purposes (Pienaar *in litt* February 1977).

Distinguishing characteristics: A large cichlid species with large protractile mouth; small unicuspid close set teeth; colour varies but generally olive brown to silvery with lemon yellow fins with small red spots on dorsal caudal and anal fins, dorsal fin edged with orange.

Distribution: Sabie and Sand River tributaries of Incomati River system. Possible specimen of this species reported from Mgobezeleni Lake system in Zululand (Bruton and Appleton 1975).

Habitat: Permanent sandy substrate rivers. Does well in dams.

Breeding rate in wild: Breeds prolifically in suitable environment. Mouthbrooder with approximately 150 eggs per brood (Pott and Le Roux 1968).

Conservation measures taken: IBP Project Aqua site 17 detailed as conservation site for this species. Sabie River as site 17 is partly confined within Kruger National Park and other conservation areas. Species successfully translocated to dams off main river course within Kruger Park (Pienaar *in litt* February 1977).

Conservation measures proposed: Species considered reasonably safe (Pienaar *in litt* February 1977) and would only require periodical monitoring.

Numbers in captivity: Unknown at present. Species has been kept at Provincial Fisheries Institute in Lydenburg.

Breeding potential in captivity: Excellent. Successful breeding has been reported (Pott and Le Roux 1968).

Remarks: In view of the success recorded in translocating species the species could well be removed from the threatened list.

References: Gaigher (1969), Jubb (1967b), Noble (1974), Pienaar (1968).

ORANGE FRINGED LARGEMOUTH

Chetia brevis Jubb, 1968

Order PERCIFORMES

Family CICHLIDAE

Status: Rare.

Pollution and man-made alteration of environment of the restricted natural distribution of the species qualifies it for consideration here.

Distinguishing characteristics: Relatively small cichlid species with large mouth and slender body; one to four orange ocellate spots on the anal fin.

Distribution: Lomati and Komati tributaries of the Incomati River system as well as coastal pans in Mozambique. Recently translocated to dams in Crocodile River catchment within Kruger National Park (Pienaar *in litt* February 1977).

Habitat: Has an apparent preference for pools and quiet river stretches (Gaigher 1969), flourishes in dams.

Breeding rate in wild: Known to breed in high numbers in dams. Mouth-brooder.

Conservation measures taken: Given attention by Kruger National Park authorities (Pienaar *in litt* February 1977) and successfully translocated to dams within the park.

Conservation measures proposed: Monitor status periodically.

Numbers in captivity: Unknown.

Breeding potential in captivity: Unknown but probably good.

Remarks: Some doubt exists on the generic placement of this species and that it should possibly be referred to the genus *Haplochromis*.

References: Gaigher (1969), Jubb (1968b).

BURROWING GOBI

Croilia mossambica Smith, 1955

Order PERCIFORMES

Family GOBIIDAE

Status: Rare.

Distinguishing characteristics: Cryptic, elongated and cylindrical fishes without scales; eyes dorsal and relatively large; large terminal mouth with projecting lower jaw; body nearly transparent with dark flecks anterior to the pectoral fins.

Distribution: Confined to the coastal lakes and lagoons of north-eastern Zululand and southern Mozambique : Lake Sibaya (freshwater), and the brackish lakes Nhlange, Sifungwe, Piti and Poelela. Not found within ebb and flow reaches.

Habitat: Sandy areas protected from wave action, from shallows to about 27 metres depth.

Breeding rate in wild: A summer breeder with a protracted spawning period from October to March (Blaber and Whitfield 1976).

Conservation measures taken: Fishing in South African localities requires permit from various authorities. Lake Piti occurs within Maputo Elephant Reserve, Mozambique.

Conservation measures proposed: Inclusion of Lakes Sibaya, Nhlange and Sifungwe within proposed Tongaland coastal park and marine reserve.

Numbers in captivity: Unknown, probably none.

Breeding potential in captivity: Poor.

Remarks: Although at present these fishes are not threatened their continued survival depends upon the adequate management of their restricted habitats. Sheet prepared by M N Bruton.

References: Allanson *et al* (1974), Blaber and Whitfield (1976), Boltt *et al* (1969), Hill *et al* (1975), Smith (1959).

SIBAYI GOBI

Silhouettea sibayi Farquharson, 1970

Order PERCIFORMES

Family GOBIIDAE

Status: Rare.

Distinguishing characteristics: Small cryptic fishes with height of dorsal fin twice body depth in males, breast without scales in both sexes; large dorsal eyes; protruding lower jaw; coloration pale with reddish brown flecks on dorsal surface and four or five transverse rows of spots across body behind pectorals.

Distribution: Known only from Lake Sibaya, north-eastern Zululand.

Habitat: Benthic, inhabiting sandy substrate from shallows to about 20 metres, also macrophyte beds up to 9 metres.

Breeding rate in wild: Unknown.

Conservation measures taken: Fishing in Lake Sibaya by permit only.

Conservation measures proposed: Inclusion of Lake Sibaya in proposed Tongaland coastal park and marine reserve. Further place total ban on collecting in Lake Sibaya by aquarists.

Numbers in captivity: None as far as is known.

Breeding potential in captivity: Unknown, probably poor.

Remarks: This species could easily fall prey to any exotic predators which may be introduced into Lake Sibaya. Likewise pollution of Lake Sibaya could exterminate the species. Sheet prepared by M N Bruton.

References: Allanson *et al* (1974), Bolt *et al* (1969), Farquharson (1970).

BROADHEAD SLEEPER

Eleotris melanosoma Bleeker, 1852

Order PERCIFORMES

Family ELEOTRIDAE

Status: Rare in South Africa.

Distinguishing characteristics: Moderately large eleotrid up to 200 mm total length; live colour slaty black with yellow border to dorsal fin; robust body with small scales; head depressed.

Distribution: Known from estuary, mangrove and reed swamps at Sodwana, as well as Mgobezeleni and Shazibe lakes. Extralimitally recorded from Ibo and Delagoa bay in Mozambique; India and central tropical Pacific.

Habitat: Deep placid pools among reeds on muddy substrate. Also found under rocks in a fast flowing part of Sodwana estuary but these specimens had probably been misplaced from normal habitat.

Breeding rate in wild: Unknown.

Conservation measures taken: Mgobezeleni Lake system is adjacent to the Sodwana Bay National Park, a recreational area, but receives some protection.

Conservation measures proposed: Inclusion of the Mgobezeleni Lake system in an expanded Sodwana Bay National Park. Complete protection of Lake Shazibe as a wilderness area.

Numbers in captivity: As far as is known, none.

Breeding potential in captivity: Unknown.

Remarks: Severe disruption of the hydrology in the Sodwana mangrove swamp during the period 1972-1976 caused a deterioration of the environment in that area but recent reconstruction may result in the habitat returning to normal. Sheet prepared by M N Bruton.

References: Bruton (1975), Bruton and Appleton (1975), Smith (1958).

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