

Appendix 6.7: Feeding behavior of the fish species occurring in the Klip River System.

Scientific name	Common name	Feeding behaviour
<i>Labeobarbus aeneus</i>	Smallmouth yellowfish	Larvae (4-6 days) eat microscopic organisms. Adults are omnivorous with a diet including benthic invertebrates, plants, algae & organic deposits.
<i>Barbus anoplus</i>	Chubbyhead barb	Omnivorous (insects, zooplankton, seeds, green algae & diatoms)
<i>Labeobarbus kimberleyensis</i>	Largemouth yellowfish	Predator (piscivorous from 300mm TL). Juveniles eat insects & small crustaceans.
<i>Barbus pallidus</i>	Goldie barb	?
<i>Barbus paludinosus</i>	Straightfin barb	Diet include wide variety of small organisms (insects, small snails, crustaceans, algae, diatoms & detritus).
<i>Labeo capensis</i>	Orange River mudfish	Grazes from firm surface of rocks & plants (specialized feeder on algae, aufwuchs & detritus)
<i>Labeo umbratus</i>	Moggel	Feeds on soft sediment & detritus.
<i>Clarias gariepinus</i>	Sharptooth catfish	Omnivorous, including any organic food source such as fish, birds, frogs, small mammals, reptiles, snails, crabs, shrimps, insects, other invertebrates & plant material (seeds, fruit). Can even strain fine plankton.
<i>Austroglanis sclateri</i>	Rock catfish	Invertebrates, esp. insects, taken from rock surfaces. (Larger specimens take small fish)
<i>Tilapia sparrmanii</i>	Banded tilapia	Omnivorous (algae, soft plants, small invertebrates such as insects & even small fish)
<i>Pseudocrenilabrus philander</i>	Southern mouthbrooder	Prays on insects, shrimps & even small fish.
<i>Cyprinus carpio</i> *	Common carp	Omnivorous, including wide range of plant & animal matter, mainly grubbing in sediments.
<i>Micropterus salmoides</i> *	Largemouth bass	Primarily piscivorous, will take any animal foods from frogs to small mammals. Juveniles feed on insects.
<i>Gambusia affinis</i> *	Mosquitofish	Diet include small live organisms, including mosquito larvae & fish larvae.
<i>Carrassius auratus</i> *	Goldfish	Omnivorous, feeding primarily on organic sediments, detritus & invertebrates.
<i>Onchorhynchus mykiss</i> *	Rainbow trout	Wide range of animal foods from small invertebrates (aquatic insects) to crabs, frogs & fish.

TL = Total Length.

* Exotic species

Appendix 6.8: Breeding behavior of the fish species occurring in the Klip River System.

Scientific name	Common name	Breeding Behaviour
<i>Labeobarbus aeneus</i>	Smallmouth yellowfish	Breed from spring to mid summer (after first heavy rains of season). Migrate up in river to spawn on gravel beds. Eggs hatch after 3-8 days, larvae start to feed on microscopic organisms after 4 to 6 days.
<i>Barbus anoplus</i>	Chubbyhead barb	Breed during summer when rivers are swollen after rains. Adhesive eggs attach to vegetation. Larvae hatch within 3 days. Swim & feed after 6/7 days.
<i>Labeobarbus kimberleyensis</i>	Largemouth yellowfish	Breed from mid- to late summer over gravel beds in running water. Eggs hatch after 2-3 days, larvae start to feed 3-4 days later.
<i>Barbus pallidus</i>	Goldie barb	Breed during summer. Lay eggs in vegetation.
<i>Barbus paludinosus</i>	Straightfin barb	Spawn amongst vegetation during summer.
<i>Labeo capensis</i>	Orange River mudfish	Breed during summer. Gather in large numbers in shallow rocky rapids where eggs are laid. Larvae hatch after 3-4 days. Growth fairly rapid in young fish.
<i>Labeo umbratus</i>	Moggel	Breeds after first rains in summer. Migrate to suitable spawning sites over flooded grassy banks of rivers or within shallow rocky stretches. Sticky eggs attach to grass or rocks, hatching after 40 hours. Growth is rapid. Larvae swim to surface and are washed out to deeper water.
<i>Clarias gariepinus</i>	Sharptooth catfish	Breeds during summer after rains. Large numbers of mature fish migrate to flooded shallow grassy verges of rivers & lakes. Eggs are laid on vegetation and hatch within 25-40 hours. Larvae are free-swimming & start feeding within 2/3 days, staying within vegetation.
<i>Austroglanis sclateri</i>	Rock catfish	?
<i>Tilapia sparrmanii</i>	Banded tilapia	Male construct a simple saucer-shaped nest in which eggs are guarded & tended by both parents. Newly hatched larvae attach to substrate by head glands but wriggles constantly for aeration. Free-swimming after 7-8 days.
<i>Pseudocrenilabrus philander</i>	Southern mouthbrooder	Breeds from early spring to late summer. Male establish & defend territory & construct simple cleared nest. Eggs are laid in the nest, fertilized & collected by female where after she withdraws to a quiet nursery area. She broods the eggs, larvae & juveniles until able to fend for themselves. Several broods in one season.
<i>Cyprinus carpio</i> *	Common carp	Breeds during spring & summer. Laying sticky eggs in shallow vegetation. Larvae hatch after 4-8 days & growth is rapid.
<i>Micropterus salmoides</i> *	Largemouth bass	Breeds during spring once water temperature reaches 18 C. Male construct nest.
<i>Gambusia affinis</i> *	Mosquitofish	Eggs are fertilized internally & fully developed young fish are born.
<i>Carrassius auratus</i> *	Goldfish	Eggs are laid in submerged vegetation.
<i>Onchorhynchus mykiss</i> *	Rainbow trout	Cold (<15 C) flowing waters essential for breeding from June – August. Migrate to lay eggs on grave beds. Eggs hatch after 4-7 weeks.

Appendix 6.9: Habitat requirements of fish species occurring in the Klip River System.

Scientific name	Common name	Habitat requirements
<i>Labeobarbus aeneus</i>	Smallmouth yellowfish	Clear flowing water with sand or rocky substrates. Also in large dams. Spawn over gravel beds.
<i>Barbus anoplus</i>	Chubbyhead barb	Cooler waters, variety of habitats from small streams to large rivers/lakes. Associated with cover/shelter, eg. fallen logs, brushwood & marginal vegetation.
<i>Labeobarbus kimberleyensis</i>	Largemouth yellowfish	Flowing waters in deep channels or below rapids (also in dams).
<i>Barbus pallidus</i>	Goldie barb	Clear, rocky streams with emergent marginal vegetation.
<i>Barbus paludinosus</i>	Straightfin barb	Hardy, preferring quiet, well vegetated waters in lakes, swamps & marshes or vegetated areas of large rivers & slow flowing streams.
<i>Labeo capensis</i>	Orange River mudfish	Preferring running waters of large rivers or large impoundments.
<i>Labeo umbratus</i>	Moggel	Prefer standing or gently flowing waters. Thrives in shallow impoundments & farm dams.
<i>Clarias gariepinus</i>	Sharptooth catfish	Almost any habitat, favours floodplains, large sluggish rivers, lakes & dams.
<i>Austroglanis sclateri</i>	Rock catfish	Prefer rocky habitats in flowing waters. Favour rapids.
<i>Tilapia sparrmanii</i>	Banded tilapia	Tolerant of a wide variety of habitats. Prefer quiet or standing waters with submergent/emergent vegetation.
<i>Pseudocrenilabrus philander</i>	Southern mouthbrooder	Large variety of habitats. Favours vegetated areas.
<i>Cyprinus carpio</i> *	Common carp	Generally favours large water bodies with slow flowing/standing waters & soft bottom sediments. Thrives in farm dams & large turbid rivers.
<i>Micropterus salmoides</i> *	Largemouth bass	Favour clear, standing/slow flowing waters with submerged & floating vegetation. (does well in farm dams).
<i>Gambusia affinis</i> *	Mosquitofish	Prefer standing water with plant cover.
<i>Carrassius auratus</i> *	Goldfish	Favour quiet, weedy habitats.
<i>Onchorhynchus mykiss</i> *	Rainbow trout	Cool (<21 C) , clear, well-aerated waters.

* Exotic species

Appendix 6.10: General characteristics of fish species occurring in the Klip River System.

Scientific name	Common name	General characteristics
<i>Labeobarbus aeneus</i>	Smallmouth yellowfish	Angling species, present at higher altitudes & smaller tributaries than <i>B. kimberleyensis</i> . Males mature at 200mm SL, & females at 240mm SL.
<i>Barbus anoplus</i>	Chubbyhead barb	Serve as pray for larger fish & birds. Used for forage fish, coolwater aquariums & garden ponds. Conservation status is widespread & common. Mature after 1 year. Male live 2 years & females 2/3 years.
<i>Labeobarbus kimberleyensis</i>	Largemouth yellowfish	Angling species. Artificially cultured & restocked. Conservation status- endemic to Orange-Vaal System and is becoming scarce. Males mature after 6 years & females after 8 years. Reach ages of up to 12 years.
<i>Barbus pallidus</i>	Goldie barb	Attractive aquarium species. Conservation status- divided distribution.
<i>Barbus paludinosus</i>	Straightfin barb	Hardy, eaten by predatory fish & birds. Caught & dried as food source in some lakes.
<i>Labeo capensis</i>	Orange River mudfish	Angling species. Male mature at 220mm SL & female at 240mm SL. Reach ages of 8/9 years.
<i>Labeo umbratus</i>	Moggel	Commercial & subsistence fisheries (esp. in dams). Occasional angling species. Used in aquaculture & physiological research. Male mature after 2-3 years (150mm SL) and female at 250mm SL. Reach ages of 5-6 years.
<i>Clarias gariepinus</i>	Sharptooth catfish	Can endure harsh conditions such as high turbidity or desiccation. Prayed on by birds, crocodiles etc. Important angling & food species. Mature after 1 to 2 years. Lives up to 8 years.
<i>Austroglanis sclateri</i>	Rock catfish	Rare, indeterminate and uncommon species. Threatened by gross habitat change caused by construction of weirs/dams, extraction of water, pollution, alluvial mining operations & sedimentation from soil erosion.
<i>Tilapia sparrmanii</i>	Banded tilapia	Forage fish for bass. Common component of subsistence fisheries. Occasional angling target.
<i>Pseudocrenilabrus philander</i>	Southern mouthbrooder	Aquarium species, used for behavioral & evolutionary research. Live 4 to 5 years.
<i>Cyprinus carpio</i> *	Common carp	Hardy & tolerant of wide variety of conditions. Aquaculture & angling species. Considered a pest by conservation authorities because of destructive feeding habits.
<i>Micropterus salmoides</i> *	Largemouth bass	Fairly tolerant of temperatures from below 10 C to 32 C. Game fish species. Mature after 1 year. 100 – 200mm SL
<i>Gambusia affinis</i> *	Mosquitofish	Tolerant of temperatures of 4-38 C and freshwater to salinities higher than seawater. Known to nip fish fins.
<i>Carrassius auratus</i> *	Goldfish	Aquarium species.
<i>Onchorhynchus mykiss</i> *	Rainbow trout	Important aquaculture species & top rated angling species. Male mature after 1 year & female after 2 years. Lifespan of 3 – 4 years.

SL= Standard Length

* Exotic species