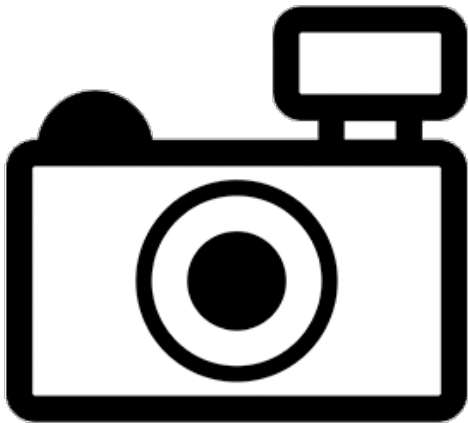


# Berg-Breede River Whitefish (*Cheilobarbus capensis*) Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, January 2022  
Revised, April 2022  
Web Version, 4/14/2023

Organism Type: Fish  
Overall Risk Assessment Category: Uncertain



No Photo Available

## 1 Native Range and Status in the United States

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### Native Range

From Skelton et al. (2018):

“*Cheilobarbus capensis* Smith, 1841 (Fig. 10B [in source material]), known as the witvis or Berg-Breede River whitefish, from the Berg (Atlantic drainage) and Breede Rivers (Indian Ocean drainage) [South Africa]; [...]”

From Impson et al. (2017):

“The Berg-Breede River Whitefish is endemic to the Berg and Breede River Systems of the Western Cape Province, South Africa (Skelton 2001). Originally widespread in both systems (Harrison 1952), it is now common only in two large impoundments (Brandvlei Dam near the town of Worcester and Sanddrif Dam near the town of De Doorns). It is believed to have gone extinct in the Berg River (Impson 2003). Recent surveys indicated that there is a viable

subpopulation in the middle Breede River near the Brandvlei Dam, it also occurs in a small section of the Hex River and the Koekedoe River.”

## Status in the United States

No records of *Cheilobarbus capensis* in trade or in the wild in the United States were found.

## Means of Introductions in the United States

No records of *Cheilobarbus capensis* in the wild in the United States were found.

## Remarks

The historic taxonomic treatment of *Cheilobarbus capensis* (Smith 1841) has been complicated (Skelton et al. 2018; see excerpts below). It has been moved between genera and at times incorrectly synonymized with other valid species (Skelton et al. 2018; Fricke et al. 2022). Skelton et al. (2018) describes this history and disentangles the identity of the species. The U.S. Fish and Wildlife Service risk screening protocol (USFWS 2020; <https://fws.gov/node/415801>) follows the taxonomic treatment of Catalog of Fishes (Fricke et al. 2022) for fish species, which in this case agrees with the assessment in Skelton et al. (2018), in considering the valid name of this species as *Cheilobarbus capensis*. Because the original description of the species, as well as historical taxonomic revisions, confuse multiple currently valid species names and ranges (Skelton et al. 2018 and references therein), this screening follows the description of the native range of *C. capensis* as given in Skelton et al. (2018).

From Skelton et al. (2018):

“Upon re-examination of the type specimen, Vreven *et al.* (2016) reversed this action by concluding that the correct identity of the species [now known as *Cheilobarbus capensis*] is the witvis of the Berg and Breede rivers, and not the Clanwilliam yellowfish. Accordingly, they restored the name of the witvis to *Barbus capensis* (Smith, 1841) and that of the Clanwilliam yellowfish to *Labeobarbus seeberi* (Gilchrist & Thompson, 1913). As both the witvis and the Clanwilliam yellowfish are large and well-known species, these scientific name changes are undoubtedly disruptive to the community and need a clear explanation (Skelton 2016).”

“The total evidence indicates unequivocally that the holotype of *B. andrewi* (NHMUK 1901.2.11.9), taken from the Berg River and illustrated by Boulenger (1911: 123, fig.100) (Fig. 3A), was correctly identified by Boulenger (1911) as a specimen of *B. capensis* (sensu Smith 1841). The evidence similarly indicates that *B. capensis* Smith, 1841 and *B. seeberi* Gilchrist & Thomson, 1913 are not conspecific as concluded by Barnard (1937).”

From Froese and Pauly (2022):

“Endangered (EN) [...]”

From Impson et al. (2017):

“Berg-Breede River Whitefish is listed as endangered under Schedule 1 of the Provincial Nature Conservation Ordinance for the Western Cape, thereby preventing the collection and trade of the species without a permit. It is also listed nationally as a Threatened or Protected Species under South Africa’s National Environmental Management: Biodiversity Act of 2004.”

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2022), *Cheilobarbus capensis* (Smith 1841) is the current valid name for this species. It was originally described as *Barbus capensis* Smith 1841. *Barbus andrewi* (Barnard 1937) is listed as a valid synonym for this species. Other scientific names applied to this species have included *Labeobarbus capensis* and *Pseudobarbus capensis* (Fricke et al. 2022).

From Bailly (2022):

“Animalia (Kingdom) > Chordata (Phylum) > Vertebrata (Subphylum) > Gnathostomata (Infraphylum) > Osteichthyes (Parvphylum) > Actinopterygii (Gigaclass) > Actinopteri (Class) > Teleostei (Subclass) > Cypriniformes (Order) > Cyprinidae (Family) > *Cheilobarbus* (Genus) > *Cheilobarbus capensis* (Species)”

### Size, Weight, and Age Range

From Froese and Pauly (2022):

“Max length : 60.0 cm SL [standard length] male/unsexed; [Skelton 1993]; max. published weight: 3.4 kg [Skelton 1993]”

### Environment

From Froese and Pauly (2022):

“Freshwater; benthopelagic. [...]”

From Impson et al. (2017):

“What is known is that it prefers larger rivers and does well in impoundments (Impson 2001). Adults prefer deep pools of larger rivers, where rock or overhanging vegetation cover is present, whereas juveniles are common in riffles (Impson 2007).”

### Climate

From Froese and Pauly (2022):

“Subtropical; 31°S - 34°S”

## Distribution Outside the United States

### Native

From Skelton et al. (2018):

“*Cheilobarbus capensis* Smith, 1841 (Fig. 10B [in source material]), known as the witvis or Berg-Breede River whitefish, from the Berg (Atlantic drainage) and Breede Rivers (Indian Ocean drainage) [South Africa]; [...]”

From Impson et al. (2017):

“The Berg-Breede River Whitefish is endemic to the Berg and Breede River Systems of the Western Cape Province, South Africa (Skelton 2001). Originally widespread in both systems (Harrison 1952), it is now common only in two large impoundments (Brandvlei Dam near the town of Worcester and Sanddrif Dam near the town of De Doorns). It is believed to have gone extinct in the Berg River (Impson 2003). Recent surveys indicated that there is a viable subpopulation in the middle Breede River near the Brandvlei Dam, it also occurs in a small section of the Hex River and the Koekedoe River.”

### Introduced

No records of introductions were found for *Cheilobarbus capensis*.

## Means of Introduction Outside the United States

No records of introductions were found for *Cheilobarbus capensis*.

## Short Description

From Skelton et al. (2018):

“*Cheilobarbus* is a genus of tetraploid cyprinine fishes with moderately sized, radiately striated scales; an elongated snout with elongated lacrymals, mouth subterminal with firm, well-developed lips, two pairs of simple oral barbels, pharyngeal bones with three rows of hooked pharyngeal teeth, tooth formula 5,3,2-2,3,5; intestine involuted and longer than the SL; dorsal fin positioned over or slightly behind the origin of the pelvic fins, the last simple ray bony weakly or strongly serrated, and eight branched rays; anal fin with three simple rays and five or six branched rays; mature breeding adults of both sexes develop small erupted nuptial tubercles densely scattered over head dorsum and in single rows over the pectoral fin rays; both species breed in male dominated nuptial shoals over gravel and cobbles.”

## Biology

From Froese and Pauly (2022):

“Prefers deep, rocky pools of larger tributaries and mainstreams and does well in dams such as Voëlvlei and Brandvlei. Feeds on bottom-dwelling invertebrates and algae. Breeds in summer, congregating at the head of large, stony pools or at the base of rapids. Eggs are laid in gravel in

flowing water and hatch after about 5 days. Has been artificially bred and restocked by conservation authorities [Skelton 1993].”

From Impson et al. (2017):

“Juveniles feed on zooplankton and small aquatic invertebrates (Skelton 2001). Berg-Breede River Whitefish breed in late spring, when water temperatures exceed 20 °C and schools of adults migrate to deep (1 to 1.5 m) riffles and spawn (Impson 2007). Fecundity is high with a 2.5 kg captive female yielding about 100,000 eggs (Smith 1987). The species spawns successfully in impoundments, with spawning occurring over gravel and rocky beds in shallow water (Impson 2001).”

## Human Uses

From Froese and Pauly (2022):

“Fisheries: ; [sic] aquaculture: experimental; gamefish: yes”

From Impson et al. (2017):

“Berg-Breede River Whitefish [...] is an angling target in Brandvlei Dam where fish are common and appreciated by anglers. Translocations of this species are controlled by CapeNature’s Indigenous Fish Utilisation Policy (Jordaan et al. 2016). It is sometimes kept in public aquaria for awareness and education purposes.”

## Diseases

**No records of OIE-reportable diseases (OIE 2022) were found for *Cheilobarbus capensis*.**  
No information on diseases was found.

## Threat to Humans

From Froese and Pauly (2022):

“Harmless”

## 3 Impacts of Introductions

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No records of introductions were found for *Cheilobarbus capensis*; therefore, there is no information on impacts of introduction.

## 4 History of Invasiveness

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The history of invasiveness is classified as No Known Nonnative Population. *Cheilobarbus capensis* has not been reported as introduced in the wild outside of its native range. No impacts of introduction are available.

## 5 Global Distribution

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**Figure 1.** Global distribution of *Cheilobarbus capensis* as reported under the name *Cheilobarbus capensis* in GBIF (GBIF Secretariat 2023a). Observations are reported from South Africa.



**Figure 2.** Global distribution of *Cheilobarbus capensis* as listed under the synonym *Pseudobarbus capensis* in GBIF (GBIF Secretariat 2023b). Observations are reported from South Africa.

The northernmost observation and the two single observations along the southern coast (figure 2) were not used to select source points for the climate match as they are outside the described range of the species and no information in the records support the existence of an established population at that location (GBIF Secretariat 2023b).



**Figure 3.** Global distribution of *Cheilobarbus capensis* as listed under the synonym *Labeobarbus capensis* in GBIF (GBIF Secretariat 2023c). Observations are in Namibia and South Africa.

The observation in Namibia and northeastern South Africa (figure 3) were not used to select source points for the climate match as they may represent observations of the related species *Labeobarbus seeberi* (GBIF Secretariat 2023c).

Observations within the Clanwilliam-Olifants river system (figures 1, 2, 3) in southwestern South Africa were not used to select source points for the climate match as they most likely are observations of the related *Labeobarbus seeberi* (Skelton et al. 2018). The observations within the Berg River system were also not used to select source points for the climate match as it is considered extinct within that system (Impson et al. 2017 and references therein).

## 6 Distribution Within the United States

No records of *Cheilobarbus capensis* in the wild in the United States were found.

## 7 Climate Matching

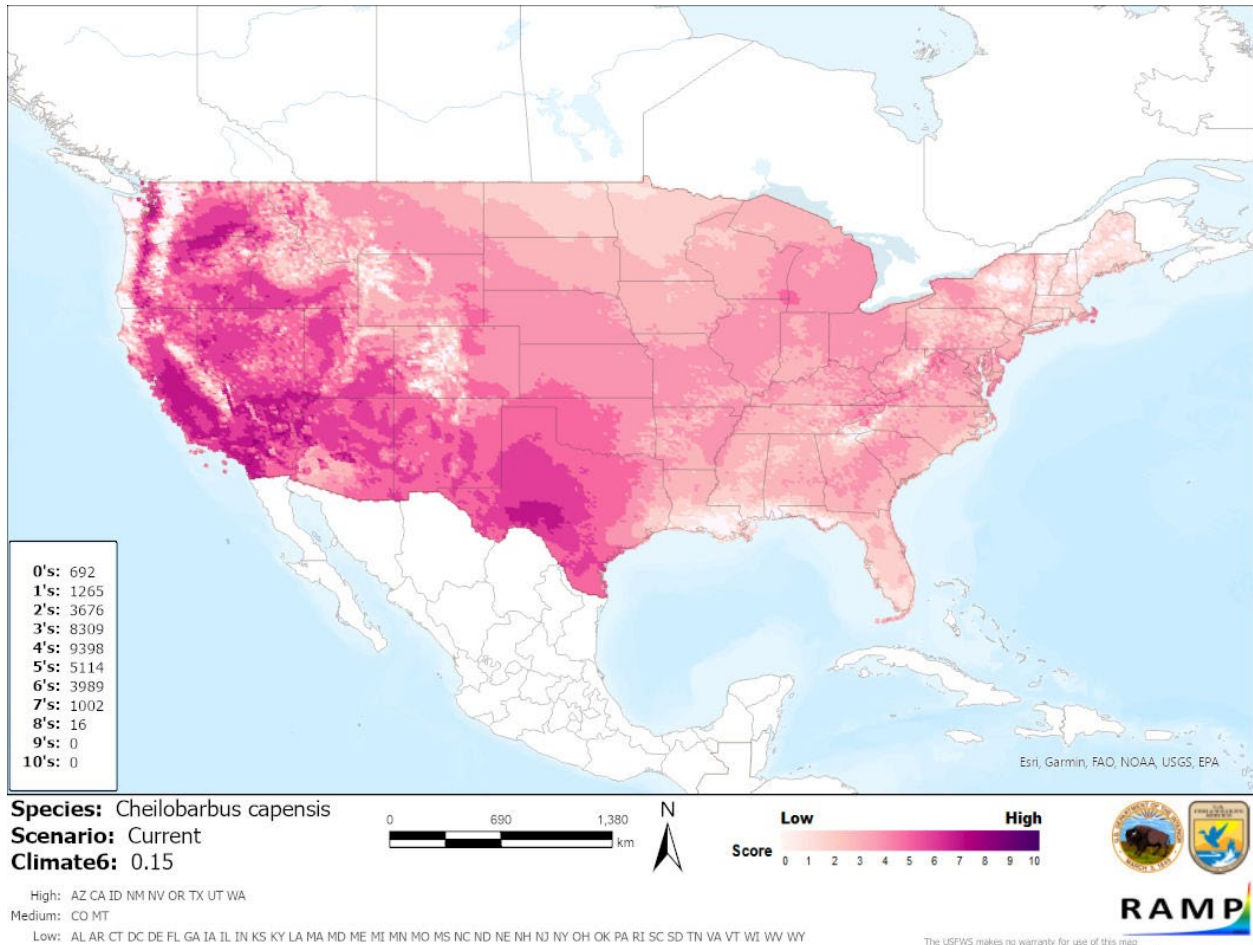
### Summary of Climate Matching Analysis

The area of highest match for *Cheilobarbus capensis* within the contiguous United States was in the west, primarily southern California and Nevada. Other patches of high match were found in western Texas, the Intermountain West, and along the western side of the Cascade Range from Washington to California. The high match along the western side of the Cascade Range was bordered by low match to the east and along the coast from Washington to northern California. There was also a strip of low match running along the California-Nevada border, stretching roughly from Lake Tahoe to Death Valley. The climate match in the eastern United States was generally low. The overall Climate 6 score (Sanders et al. 2021; 16 climate variables; Euclidean distance) for the contiguous United States was 0.150, High (scores greater than 0.103, inclusive, are classified as high). The following States had High individual Climate 6 scores: Arizona, California, Idaho, New Mexico, Nevada, Oregon, Texas, Utah, and Washington. Colorado and

Montana had Medium individual scores. The rest of the States had Low individual climate scores.



**Figure 4.** RAMP (Sanders et al. 2021) source map showing weather stations in southern Africa selected as source locations (red; South Africa) and non-source locations (gray) for *Cheilobarbus capensis* climate matching. Source locations from GBIF Secretariat (2023a,b,c). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.



**Figure 5.** Map of RAMP (Sanders et al. 2021) climate matches for *Cheilobarbus capensis* in the contiguous United States based on source locations reported by GBIF Secretariat (2023a,b,c). Counts of climate match scores are tabulated on the left. 0/Light Pink = Lowest match, 10/Dark Purple = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: (Count of target points with climate scores 6-10)/ (Count of all target points)	Overall Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
$\geq 0.103$	High

## 8 Certainty of Assessment

There is limited information available about the biology and ecology of *Cheilobarbus capensis*. There is a confusing taxonomic history which makes it more difficult to determine if the information published pertains to this species or a related species. This species has never been

reported outside of its native range, so there is no information from which to assess the history of invasiveness. Certainty of this assessment is therefore Low.

## 9 Risk Assessment

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### Summary of Risk to the Contiguous United States

Berg-Breede Whitefish (*Cheilobarbus capensis*) is an endemic whitefish native to the West Cape of South Africa. *C. capensis* is used in local aquaculture and is considered a game fish; at the same time its population seems to be declining and it is listed as a threatened species in South Africa with legal protections. It is considered to be extinct in part of its historical native range. It has never been documented as introduced or established outside of its native range; therefore, its History of Invasiveness is classified as No Known Nonnative Population. *Cheilobarbus capensis* has a High Overall Climate Match with the contiguous United States; the area of highest match was in the west, especially California. Certainty of this assessment is Low due to the complicated taxonomic history and a lack of information regarding the history of invasiveness. The overall risk assessment category is Uncertain.

### Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **Overall Climate Match Category (Sec. 7): High**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks, Important additional information: No additional remarks.**
- **Overall Risk Assessment Category: Uncertain**

## 10 Literature Cited

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**Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.**

- Bailly N. 2022. *Cheilobarbus capensis* (Smith, 1841). World Register of Marine Species. Available: <https://www.marinespecies.org/aphia.php?p=taxdetails&id=1526229#sources274340> (April 2022).
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Sanders S, Castiglione C, Hoff M. 2021. Risk Assessment Mapping Program: RAMP. Version 4.0. U.S. Fish and Wildlife Service.

Skelton PH, Swartz ER, Vreven EJ. 2018. The identity of *Barbus capensis* Smith, 1841 and the generic status of southern African tetraploid cyprinids (Teleostei, Cyprinidae). *European Journal of Taxonomy* 410:1–29.

[USFWS] U.S. Fish and Wildlife Service. 2020. Standard operating procedures: how to prepare an ecological risk screening summary. Available: <https://fws.gov/media/standard-operating-procedures-how-prepare-ecological-risk-screening-summary-updated-february> (April 2022).

## 11 Literature Cited in Quoted Material

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**Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.**

Barnard KH. 1937. Note on the identity of the Cape “white-fish”, *Barbus capensis*. *Annals Magazine of Natural History Series* 110(10):304–306.

Boulenger GA. 1911. Catalogue of the fresh-water fishes of Africa in the British Museum (Natural History). Volume 2. London: Trustees of the British Museum of Natural History. DOI:10.5962/bhl.title.8869.

Harrison AC. 1952. The Cape witvis. *Piscator* 21:24–26.

Impson D. 2001. Threatened fishes of the world: *Barbus andrewi* Barnard, 1937 (Cyprinidae). *Environmental Biology of Fishes* 61:212.

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