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Risk assessment of gilded catfish (*Brachyplatystoma rousseauxii* Castelnau, 1855) in Bolivia

Report summary

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Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Actinopterygii	Siluriformes	Pimelodidae

Taxon Name

Brachyplatystoma rousseauxii (Castelnau, 1855)

Common name(s)

English: Gilded catfish

Spanish: Dorado, plateado

Portuguese: Dourada

Assessment information

Red List Category proposed: Critically Endangered

Criteria: A2b

Year of Assessment: 2019

Date Assessed: February 1, 2019

Justification

In 2009, the goliath catfish *Brachyplatystoma rousseauxii* was listed globally as Least Concern (LC), based on an evaluation done in 2007 and published by Reis & Lima (2009). This categorization was justified by its large distribution and absence of major threats. Though the species was intensively exploited, there was no evidence that human pressure represented a significant threat for the species. Nevertheless, these authors recommended monitoring of the species considering new threats, particularly the planned dams on the Madera river which would disrupt their migratory routes at Teotonio waterfalls.

The construction of Jirau and San Antônio dams on the Madeira River started in 2008 and was terminated in 2015. It is believed that the closure of the San Antônio reservoir in september 2011 was a first decisive moment in disrupting the migration route of *B. rousseauxii*. The completion of the second dam, Jirau, in 2012, further reduced the possibility for the fish to accomplish their former migrations. Both dams are now equipped with fishways but their inefficiency for fish passage was demonstrated by several recent studies (Celia-Ribeiro *et al.* 2017; Hahn *et al.*, 2017; Hauser 2018). San Antônio dam possesses a channel replicating original river morphology, whereas the Jirau dam possesses an elevator with manual selection of fish. Successful dorado passing is highly improbable due to the fact that dams were constructed in cascade.

Using otolith microchemistry, Hauser (2018) presented evidence that a small porcentaje of hatched larvae floating downstream may pass and survive the dams but that upstream recruitment of pre-adults is reduced to zero. The fact that adults now fail to arrive at their spawning sites situated in Amazon headwaters in Bolivia (and in a small part of southern Peru), makes future local extinction of this species probable. Because the species reaches a maximum age of 17 years (Hauser *et al.* 2018), the migrating subpopulation may become extinct in 2026 approximately. Hauser (2018) demonstrated that all dorado sampled in Bolivia that had hatched after the dams were forced residents or local residents possibly being able to complete their life cycle in the Bolivian Amazon, but showed that these fish have a slower growth and, consequently, a lower fecundity.

Van Damme *et al.* (submitted), using capture and CPUE (Captura per Unit Effort) data collected by fishers in the Ichilo river, which is an Amazon headwater where spawning is believed to occur (Van Damme *et al.* 2011), approximately 1500 km above the Jirau dam, showed that between an ten year sampling period before dam construction (1998-2007) and a 3 year sampling period after dam construction (2015-2017) the contribution of dorado to total catch fell from 3.4% to 0.3% and CPUE was reduced from 7.8 to 0.2 kg/fisher/day. There was no significant change in individual weight of the individuals captured. These results suggest that the forced-residents observed in the upper Madeira after the dams closure (Hauser 2018) represent only the few fish that survive into the upper Madeira, which likely is only a small fraction of the former population, when pre-adults could return from the nursery areas in the lower Amazon. The data of Van Damme *et al.* (2019) and Van Damme *et al.* (submitted) are further corroborated by Santos *et al.* (2018), who showed that total fish catch after dam closure decreased significantly below Santo Antônio dam.

Based on the above, it is concluded that *Brachyplatystoma rousseauxii* is now a critically endangered species in Bolivia, due to an observed reduction of 80% or more in total population size over a period of 5 generations (15 years) including the past and the future (from 2009, when San Antônio dam was closed, to 2016), applying criterion A2b. There is evidence of (i) a decline in abundance, using an indirect abundance indicator which is "Capture per Unit Effort (CPUE)" by comercial fishers; (ii) population fragmentation and the deterioration of hábitat quality as a result of dam construction; (c) Fisheries exploitation can result in further decline of already impoverished populations. The causes of the reduction are not reversible due to the low probability of proper functioning of Santo Antônio's fishway system in the near future and considering the fact that Jirau would need to build one in the first place.

Acknowledgements

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