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Possible causes related to historical stock depletion of the totoaba, *Totoaba macdonaldi* (Perciformes: Sciaenidae), endemic to the Gulf of California

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Totoaba macdonaldi is the largest sciaenid fish. It is endemic to the Gulf of California within a protected area and listed as threatened by the IUCN red list. The history of the totoaba fishery begun around 1920 and formally finished in 1975, when an official ban was established as a result of the collapse of the fishery. Several previous studies had mentioned the decrease in Colorado River flow and overfishing as possible reasons of the catch and stock reduction. This paper extends the exploration of the causes of the collapse analyzing the co-variation of the trends in catch, biomass, abundance, and fishing mortality with the Colorado River flow, diverse climatic indexes as well as the reconstructed fishing effort. Our results confirm the important role of the Colorado River flow cessation on the decrement of the catch, and the simultaneous increase of the fishing effort during 1940-1954. A new and stronger correlation was unveiled between catch, abundance and stock biomass with the Pacific Decadal Oscillation Index (PDOI). This fact points out the influence of large temporal and spatial scale processes and stresses the importance of the interaction of anthropogenic and natural factors when exploring the historical causes of a population decline and in planning stock recovery actions. The relative role of each of the factors analyzed as well as the possible mechanisms involved is briefly discussed.

Palabras clave: Specialist, PDOI, *Totoaba macdonaldi*, Colorado River

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