Diverting the Colorado River leads to a dramatic life history shift in an endangered marine fish

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Abstract:

Diversion of river water has diminished freshwater flow into many estuaries worldwide, yet the effects of these diversions on marine fisheries, many of which depend on estuaries, are largely unexplored. We document the impact of diverting Colorado River flow from the Gulf of California on the life history of a now-endangered marine fish (Totoaba macdonaldi, Sciaenidae). Growth increments in prehistoric (1000–5000 ybp) otoliths document that predam juveniles grew twice as fast and matured 1–5 years earlier than post-dam fish. Oxygen isotopes link these changes to elimination of estuarine habitat. This study provides evidence that river diversion can have a dramatic effect on life history of marine fishes by slowing growth during the juvenile stage, thus delaying maturation. These findings also provide valuable insight into the relative influence of habitat alteration versus fishing pressure on marine fishes.

Keywords: Oxygen isotopes, Otoliths, Freshwater inflow, Marine fisheries, Estuary, Totoaba