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Comment on Rojas-Bracho and Colleagues (2019): Unsubstantiated Claims Can Lead to Tragic Conservation Outcomes

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Comment on Rojas-Bracho and Colleagues (2019): Unsubstantiated Claims Can Lead to Tragic Conservation Outcomes

The vaquita's decline is a tragic story indeed. However, the lack of action to prevent the extinction of this species is not due to unsubstantiated claims and scientific uncertainty.

The cause of the vaquita's decline was well established 20 years ago. Rojas-Bracho and Taylor (1999) and D'Agrosa and colleagues (2000) documented that the threat to the survival of the vaquita was the mortality resulting from vaquita drowning in fishers' nets.

Regulations are poorly enforced and unlicensed fishing continues, prompted by the black market for the dried swim bladders of the endangered *Totoaba macdonaldi*. Vaquita drown in the gillnets used by poachers. Support for a ban on gillnets is weak in the local communities where fishing is the principal livelihood.

Rojas-Bracho et al. refuted the claim made by Manjarrez-Bringas and colleagues (2018) that the decline in the vaquita may have resulted from the decline in the flow of the Colorado River to the Gulf of California. We agree. There is no direct evidence of a causal link between the river's decreasing flow and the vaquita's declining population.

However, we disagree with Rojas-Bracho et al.'s dismissal of the substantial body of evidence from stable isotopes, sclerochronology and analyses of the shelly faunas that the Colorado River was a significant influence on the Upper Gulf. These studies document the river's effects on salinity (Rodriguez et al. 2001a, Dettman et al. 2004, Cintra-Buenrostro et al. 2012), benthic productivity and relative abundance (Kowalewski et al. 2000, Rodriguez et al. 2001b, Dietl and Smith 2017), growth rates in mollusks (Schöne et al. 2003) and fish (Rowell et al. 2008), distribution of species (Rowell et al. 2005, Smith and Dietl 2016, Lau and Jacobs 2017) and trophic relationships (Cintra-Buenrostro et al. 2005, Smith et al. 2018).

There is no logical inconsistency in maintaining that the vaquita is suffering from bycatch and that the Upper Gulf's environment has been affected by the decline in the flow of the river.

The shifting baseline phenomenon (Pauly 1995) may have affected Rojas-Bracho and colleagues' perspective. Perceptions of what is normal and natural can change in only a few generations. Sáenz-Arroyo and colleagues (2005) and Lozano-Montes and colleagues (2008) document this syndrome among fishers in the Upper Gulf of California. In the Anthropocene, the present may not be the key to the past.

Nature does not present itself as a carefully controlled experiment. More than one variable is usually changing. The challenge for conservation biologists in the case of the vaquita was to use the best available evidence to document the harmful effects of bycatch on the population. This task was accomplished two decades ago. The effort by Rojas-Bracho and colleagues to dismiss evidence for environmental change is both inadequate and unnecessary.

Vested interests often use unsubstantiated assumptions and alleged scientific uncertainty to justify denial, delay or lack of action (Oreskes and Conway 2010). Unnecessary disputes among scientists give a false impression of uncertainty.

Restoring the flow of the Colorado to the Gulf will not save the vaquita. Enforcing a gillnet ban is necessary to save this iconic species.

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