

REPORT

Potential Conflict Between Fishermen and Giant Otter (*Pteronura brasiliensis*) Populations by Fishermen in Response to Declining Stocks of Arowana Fish (*Osteoglossum bicirrhosum*) in Northeastern Peru

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Abstract: Giant otter (*Pteronura brasiliensis*) populations are increasing in many parts of the Peruvian Amazon, and are coming into contact with people more regularly. Giant otters are piscivores and fishermen often see them as potential competitors for fish stocks. We report on giant otter - fisherman conflict on the River Yanayacu. During informal discussions, we found that fishermen considered the giant otter a competitor for fish, and one of their main concerns was for the fisheries of arowana (*Osteoglossum bicirrhosum*). This fishery, for young arowanas for sale to the ornamental fish trade, is very important for the communities in the Pacaya-Samiria National Reserve, and fishermen believe that stocks of this species are declining. Although arowana can be preyed upon by giant otter, smaller fish are preferred and there is no evidence for giant otters impacting on populations of this species. We identify a need for more research into giant otter populations, arowana populations, the exploitation of arowana, and the diet of giant otters in northeastern Peru, to support conservation initiatives aimed at changing the perception of giant otters as competitors for fish.

KEYWORDS: fishing, trade, conflict, arowana, conservation

Giant otters (*Pteronura brasiliensis*) are increasing in number in many parts of their range and are returning to many areas where they have not been seen for many years (Recharte, 2007; Van Dame et al., 2001; Hajek and Groenendijk, 2006). This is bringing the giant otter into contact with people. While otters are not generally hunted (Recharte, 2007), their predominantly piscivore diet (Duplaix, 1980; Laidler 1984; Carter and Rosas, 1997; Gonzáles, 1997; Carrasquilla, 2002; Velasco, 2004; Staib, 2005) may bring them into conflict with fishermen. Fishing is an important

subsistence and commercial activity in most parts of the giant otters range, and giant otter-fisherman conflict has been considered in Colombia by Gómez and Jorgenson (1999) and Velasco (2004), and in Brazil by Calvimontes and Marmontel (2006) and Zucco and Tomas (2004). Gómez and Jorgenson (1999) concluded that although there is overlap in the diet of giant otters and the fish taken by fishermen, giant otters have little effect on fisheries in Colombia. Giant otter-fisherman conflict has not yet been evaluated in northeastern Peru, where extremely low populations of giant otter have meant that the issue has not been important. As giant otter populations increase and repopulate rivers near human habitation, conflict may be inevitable. This paper describes a possible conflict between fishermen harvesting ornamental arowana fish (*Osteoglossum bicirrhosum*) and giant otters observed on the Yanayacu River in the Pacaya-Samiria National Reserve (PSNR), where giant otter populations have increased between censuses by Schenck et al. (1996) and Isola (2000).

The Yanayacu River is 158km long and 40m wide, and joins the Marañon River about 30km upstream from the city of Nauta. The area is composed of white-water várzea forests that flood between November and May each year, leaving only high areas of ground exposed. We visited two communities on the Yanayacu. The Community of Arequipa near the mouth had 57 inhabitants in 15 families, and the community of Yarina on the middle section of the river had 118 inhabitants in 25 families. Fishing for subsistence and sale in markets, including fishing for various species of ornamental fish, is overseen by a management group; '*Organización Social de Pescadores y Pescadores Artesanales*' (OSPPA UPC Yarina). This management group is assisted by biologists from 'Pro Naturaleza', a Peruvian NGO. Some low-level tourism is also conducted in the area.

Fishermen on the Yanayacu have noted the expansion of the ranges of giant otters and are concerned about increasing competition with otters for fish. During separate informal discussions, seven fishermen expressed concern that the giant otters were competing with them for fish, and thought that the otters were reducing fish populations. Five fishermen said they believed that giant otters preyed on arowana fish, and were impacting on numbers of these fish. Community members said that the collection of arowana fry for sale to the ornamental fish trade was very important for them economically, and was one of the main sources of income for many families. The harvest of the young of this fish is managed by community groups in the area. However, one community member claimed that the harvest of this species had fallen from around 15,000 fry to 2,000 in recent years and thought that the increase in numbers of giant otters was one of the main factors in the reduction in size of recent harvests of arowana fry. One interviewee requested verification that the giant otters were indeed feeding on arowana from biologists, and said that a solution is necessary because the arowana fishery is of such economic importance to the communities.

Arowana are large fish growing up to 1m in length (Goulding, 1980). The male arowana broods 180-210 eggs in its mouth after spawning, and keeps the young in its mouth for several weeks after hatching (Goulding, 1980). Fishermen catch the male fish at this stage and remove the young for sale (Moreau and Coomes, 2006; Figure 1). Harvesting practices vary in different fishing grounds. In many areas the parent fish is killed in the process of harvesting the young, while on some rivers, especially within the Pacaya-Samiria National Reserve, brooding adults are released alive after the young are collected (Figure 2). This is a result of participation by local communities in projects that aim to sustainably harvest the fish (Moreau and Coomes, 2006; Durand and McCaffrey, 1999). Moreau and Coomes (2006) highlighted the importance of the trade in Arowana to the economy of Iquitos in northeastern Peru.

Just over one million juvenile arowanas were legally exported in 2001 for a value of 559,615 USD. The species was the most commercially important to the Peruvian Amazon aquarium trade, representing 42% of the total export value (Moreau and Coomes, 2006). At a community level, Moreau and Coomes (2006) and Kvist et al., (2001) demonstrated that the arowana fishery was of considerable importance to local people, with earnings from arowana making up 20.7% of the mean household income in some communities.



Figure 1. Arowana fry being removed from an adult male, Rio Yanayacu, Pacaya Samiria National Park, Peru. Photograph: Mark Bowler



Figure 2. Adult male arowana being released after removal of fry, Rio Yanayacu, Pacaya-Samiria National Park, Peru. Photograph: Mark Bowler

There have been no extensive studies on the diet of the giant otter in northeastern Peru, but the diet of giant otters has been recorded in several other sites where arowana do not occur (e.g Schenck, 1999; Staib, 2005). Although the diet in Madre de Dios consists mainly of fish ranging from 10cm to 30cm in size, larger fish are sometimes taken (Schenck, 1999; Staib, 2005). Gómez (1999), Roopsind (2002) and Recharte (2007) recorded arowana in diet of giant otters in Colombia, Suriname and northeastern Peru respectively, but smaller fish species were generally preferred. We therefore believe that the impact of giant otters on arowana populations is likely to be negligible, and suspect that overexploitation of Arowana for the aquarium trade is more likely to be the cause if stocks of this species have declined. Arowana are large and slow to mature, and fecundity is very low (Goulding, 1980). This makes the species vulnerable to overexploitation when fishing by humans is intensive (Moreau and Coomes, 2006). The related Asian arowana (*Scleropages formosus*) was listed on Appendix I of CITES in 1975 as a result of over collection for the aquarium trade.

Our discussions on the Yanayacu suggest that otters may be blamed for falling stocks of arowana, even though there is no evidence for such a relationship. A perceived increase in giant otter populations on the Yanayacu River has coincided with a decline in the numbers of arowana harvested by some households. Considering the importance of the arowana fisheries to the people in the Pacaya-Samiria National Reserve, it is conceivable that communities may take action to protect their fisheries from the perceived threat by shooting giant otters. Better understanding of giant otter

populations, arowana populations, the exploitation of arowana, and the diet of giant otters in northeastern Peru are required. A dialog with communities and fisherman is also needed to determine how attitudes to giant otters might affect their conservation. Communities on the Yanayacu River have shown a willingness to work with biologists and may accept a scientific assessment of the giant otter's impact on the arowana fishery.

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RESUME

CONFLIT POTENTIEL ENTRE LES PÊCHEURS ET LES POPULATIONS DE LOUTRE GÉANTE (*Pteronura brasiliensis*) SUITE AU DÉCLIN DU STOCK D'AROWANA (*Osteoglossum bicirrhosum*) DANS LE NORD-EST DU PÉROU.

Les populations de loutre géante (*Pteronura brasiliensis*) sont en augmentation à plusieurs endroits de la partie péruvienne du fleuve amazonne et sont donc en contact de façon plus fréquente avec les habitants locaux. Les loutres géantes sont piscivores et sont perçues comme compétiteurs potentiels par les pêcheurs pour le stock de poissons. Nous reportons ici le cas d'un conflit dans la rivière Yayacu. Au cours de discussions informelles, les pêcheurs nous ont confié qu'ils considéraient la loutre géante comme un compétiteur pour le poisson, notamment pour la pêche d'arowana (*Osteoglossum bicirrhosum*). La pêche de jeunes arowana pour la vente sur le marché est une activité importante pour les communautés de la réserve nationale de Pacaya-Samiria et les pêcheurs pensent observer un déclin du stock de ces poissons.

Les arowana sont attaqués par la loutre géante mais les plus petits semblent être préférés : cependant, il n'y a pas d'évidence actuellement sur le réel impact des populations de loutre sur ces poissons. Nous avons donc identifié ici une demande forte d'études sur les populations de loutres géantes et leurs régimes alimentaires, sur les populations d'arowana et sur leurs exploitations. Ces données permettront de prendre des mesures pour la conservation de cette espèce de loutre et changer la perception négative des populations locales de pêcheurs.

RESUMEN

CONFLICTO ENTRE LOS PESCADORES Y LAS POBLACIONES DE LOBOS DE RIO (*Pteronura Brasiliensis*) EN RESPUESTA A LA REDUCCION DE STOCKS DE AROWANA (*Osteoglossum Bicirrhosum*) EN EL NORESTE DE PERU.

Los lobos de río (*Pteronura brasiliensis*) han aumentado en muchos lugares de la Amazonia peruana, y están entrando en contacto con la gente más frecuentemente. Esta especie es piscívora y los pescadores a menudo los ven como una competencia por los peces. En este trabajo, nosotros reportamos el conflicto de lobo de río-pescadores en el río Yanayacu. Durante entrevistas realizadas en el área de manejo, encontramos que los pescadores consideran a los lobos de río como un competidor por los peces, y principalmente arahuana (*Osteoglossum bicirrhosum*). El comercio de alevinos de arahuana como pez ornamental es muy importante para las comunidades en la Reserva Nacional Pacaya-Samiria, los pescadores dicen que la población de arahuana está disminuyendo durante los últimos años. Aunque la arahuana está incluida en la dieta de lobo de río, se observo que tiene preferencia por peces más pequeños y no hay evidencia que el lobo de río esta impactando de forma negativa en las poblaciones de esas especies. Nosotros identificamos una necesidad de información acerca de las poblaciones de lobo de río, poblaciones de arahuana, explotación de arahuana, dieta de lobo de río en el noreste de Perú y los cambios de percepción de los pescadores hacia el lobo de río como competidores por los peces para mantener las iniciativas de conservación.