

# Proposed Construction of 20 New Dams Threatens Newly Discovered Biodiversity in Northern Peru's Marañón River

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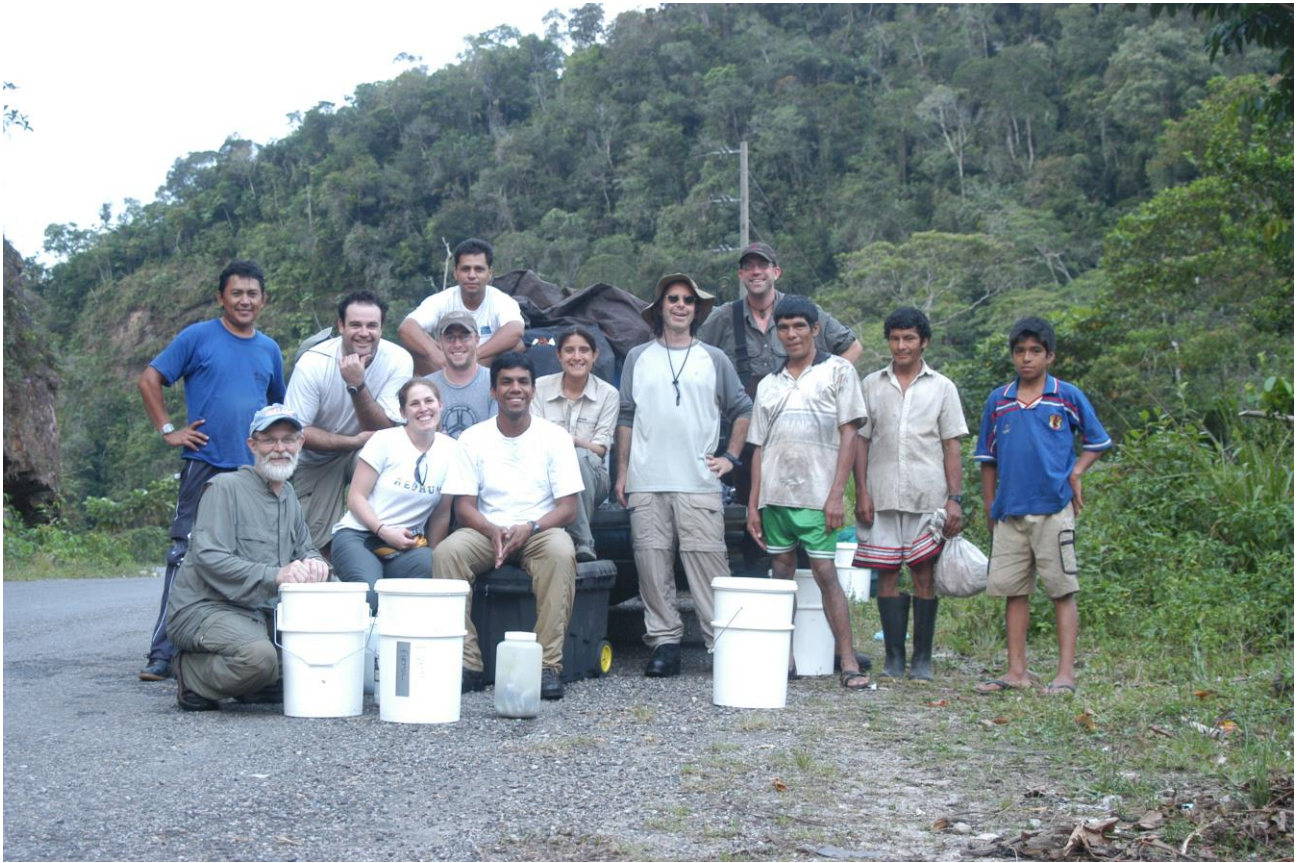
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When I first visited the Marañón River as leader of a mostly North American scientific team in August 2006, I approached the river and its reputedly fierce indigenous inhabitants – the Aguaruna – with trepidation. The last North American ichthyologist who studied the Marañón – Don Stewart, now faculty at SUNY Syracuse – was forcibly evicted from his camp on the Santiago River (a Marañón tributary), causing him to abandon his specimens and seek assistance at a nearby military base. Around the same time, the German filmmaker Werner Herzog was forced to abandon his Santiago River set for the movie *Fitzcarraldo*, with much of his equipment being either burned or thrown in the river. More recently, a pair of American college students had been attacked while rafting the Marañón, with one of them killed and the other shot, an event that received a poignant retelling in *Outside Magazine*. My nerves were not settled when, upon searching Google for 'Aguaruna' images, the only photos returned were of shrunken heads ('tsantsa'), for which the Aguaruna had once been a world-famous source.

Despite their history of repelling outside invaders since at least the Incans, who repeatedly and unsuccessfully tried to conquer them, the Aguaruna were beginning to confront unassailable external threats to their resource-rich territory by the time my team and I arrived. An oil pipeline had recently been laid along much of the middle Marañón, and with it had come a stream of government and business interests seeking to exploit divisions among the Aguaruna. At Aguaruna checkpoints along the road to the regional capital of Santa Maria de Nieva, we were repeatedly asked for shotgun shells, which they seemed to have grown accustomed to receiving from other visitors. Of course, we had no firearms or ammunition, so we distributed batteries instead.

Once in Santa Maria, my Peruvian colleagues and I met with the town's mayor and the head of a local Aguaruna council. We explained our mission, where we wanted to visit, and what we wanted to collect. The Aguaruna representative whom we met assured us safe passage and provided us with a captain to hire and a boat to rent. We had what appeared to be comprehensive Aguaruna authorization to sample the main channel of the Marañón and even visit some more remote Aguaruna communities on the Cenepa River. In addition to two Peruvian colleagues from Peru's San Marcos Museum of Natural History in Lima (Darwin Osorio and Blanca Rengifo), our team consisted of three (Fig. 1) ichthyologists from Auburn University (myself plus Donald Taphorn and David Werneke), two fish ecologists from Cornell University (Alex Flecker and his then PhD student Krista Capps, now faculty at U. of Georgia), and Donovan German, a fish nutritional physiologist who was then completing a PhD at the U. of Florida and is now faculty at UC Irvine. In addition to thoroughly surveying fish diversity in the area, our team was planning to study the ecology and nutritional

physiology of wood-eating catfishes, which only occur in tropical South America and exist nowhere at greater diversities and abundances than in the Marañon River.



**Figure 1. Expedition team. Photo: N. Lujan.**

With the potential to discover new species palpable, I prioritized sampling the most remote habitats I thought our team could reasonably reach: headwaters of the Cenepa River, which drain the mountainous border region between Ecuador and Peru. We set off on our day-long boat trip to the mouth of the Cenepa on the morning of July 31. On August 1, in a gravel shoal in the lower Cenepa, our team collected the first of what would become five new fish species discovered by our expedition. This first discovery was a suckermouth armored catfish (Loricariidae) with large eyes and a distinctive golden sheen when held in the sunlight. The osteology of this species was so enigmatic that my PhD advisor and I eventually described it as a new genus and species (*Etsaputu relictum*; although molecular research work would later reveal that it is actually an unusual member of the already described genus *Peckoltia*; Fig. 2). Unfortunately, our work in the Cenepa was cut short by high water and repeated, lengthy negotiations with local Aguaruna groups, including ungrantable requests for generators and essential pieces of our scientific equipment. We therefore headed back downriver to the Pongo de Manseriche where, luckily, more discoveries awaited us.



**Figure 2. *Peckoltia relictum*. Photo: N. Lujan**

In Peru, a pongo is any dangerous or turbulent stretch of river, and the Pongo de Manseriche (Fig. 3) is one of the most notorious of these stretches in all of northern Peru. It occupies a narrow gorge through which the mighty Marañón River breaks out of the Andes Mountains and into the Amazon Basin proper. It features sheer rock walls and only a few small boulder fields at its top end where it is safe to enter the river and work. On our first night sampling one of these boulder fields with a backpack electrofishing unit, we collected two specimens of the most spectacularly beautiful loricariid catfish species I had ever seen. A slight pink tinge of muscle was visible through their lateral body plates, which had the white translucence of quartz. In addition to small eyes and a distinctively gracile body, they had long caudal-fin filaments that trailed behind them like



streamers. I would eventually give this species the epithet '*pankimpuju*', meaning 'beautiful white' in the Aguaruna language, and these two type specimens remain the only two specimens of its species in natural history collections today (Fig. 4).



**Figure 3. Pongo de Manseriche. Photo: N. Lujan.**



**Figure 4.** *Peckoltia pankimpuju*. Photo: N. Lujan.

In addition to our discoveries of the species now known as *Peckoltia relictum* and *Peckoltia pankimpuju*, we collected specimens that would provide the foundation for three other new species descriptions (the loricariids *Chaetostoma trimaculineum* and *Panaque bathyphilus*, and the auchenipterid *Gelanoglanis travieso*). Ranging from beautiful to bizarre, other interesting Mara on River catfishes that we collected include the loricariid *Lasiancistrus schomburgkii* (Fig. 5), and the aspredinids *Amaralia hypsiura* (Fig. 6) and *Ernstichthys* cf. *megistus* (Fig. 7). We also made great strides in understanding the ecology and physiology of wood-eating catfishes. Donovan dissected and froze intestinal samples of several wood-eating catfish species and used these as the basis for a chapter of his PhD dissertation, and I focused a chapter of my PhD dissertation on the functional diversity of wood-eating catfish jaws. We would ultimately publish five papers on these topics and we continue to study this material until today.



*Figure 5. Lasiancistrus schomburgkii. Photo: N. Lujan.*





*Figure 6. Amaralia hypsiura. Photo: N. Lujan*



**Figure 7. *Ernstichthys cf. megistus* . Photo: N. Lujan**

Since our expedition in 2006, there have been no concerted, large-scale efforts to document the distinctive biodiversity and ecology of the Marañón River and its tributaries. Many parts of the watershed, such as the upper Cenepa River, remain totally unstudied and likely hold within them many more intriguing species that are unknown to science. Unfortunately, recent and ongoing efforts to commercially exploit the natural resources of the Marañón River have far outpaced scientists' efforts to understand this ecosystem. No less than 20 hydroelectric dams have been proposed for the Marañón River main channel upstream of the Pongo de Manseriche. If these dams are built, the still wild and poorly understood Marañón River, which has long been protected by the fierce reputation of the Aguaruna, will be tamed, and the unique habitats on which fishes that are found nowhere else in the world depend will disappear. With this rapid pace of change, opportunities to understand this river and its biodiversity in their natural state are beginning to dwindle. Fortunately, a fledgling NGO called Marañón Waterkeeper (<http://maranonwaterkeeper.org/>) has formed with the goal of working to protect the Marañón River from unsustainable development. Team members from Marañón Waterkeeper have also been involved in the production of a documentary, *Serpent of Gold*, about the river and the threats to it and the people who rely on it. The documentary follows the story of local people who are fighting to retain sovereignty over their lands, intertwined with national and international perspectives on development of large scale hydroelectric dams.

For two trailers go to:

<https://www.youtube.com/watch?v=TXcf8Ynz7iY>

<https://www.youtube.com/watch?v=uj5q4gB5HZc>



Marañon Waterkeeper needs assistance from scientists in the form of water physicochemistry and aquatic biodiversity data collection and analysis. In addition, they are compiling published information about the river, including information from the grey literature, included in local and regional reports, and they would be interested to hear from anyone who would be interested in helping with that literature review. If you would like to help, you can contact FFSG technical Officer, who can compile information and send this on to Benjamin Webb, the International Coordinator for Marañon Waterkeeper.