



INTRODUCED SPECIES

First record of an American Bullfrog (*Lithobates catesbeianus*) Population in Loja, Ecuador

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The introduction of alien species is implicated in many declines, extirpations, and extinctions of amphibians (Collins and Storfer 2003). American Bullfrogs (*Lithobates catesbeianus*), native to eastern and central North America,

have been introduced in many countries for food. Lowe et al. (2004) listed the American Bullfrog as one of the world's worst invasives. In addition to predation and competition, this species also serves as a vector for chytridiomycosis.

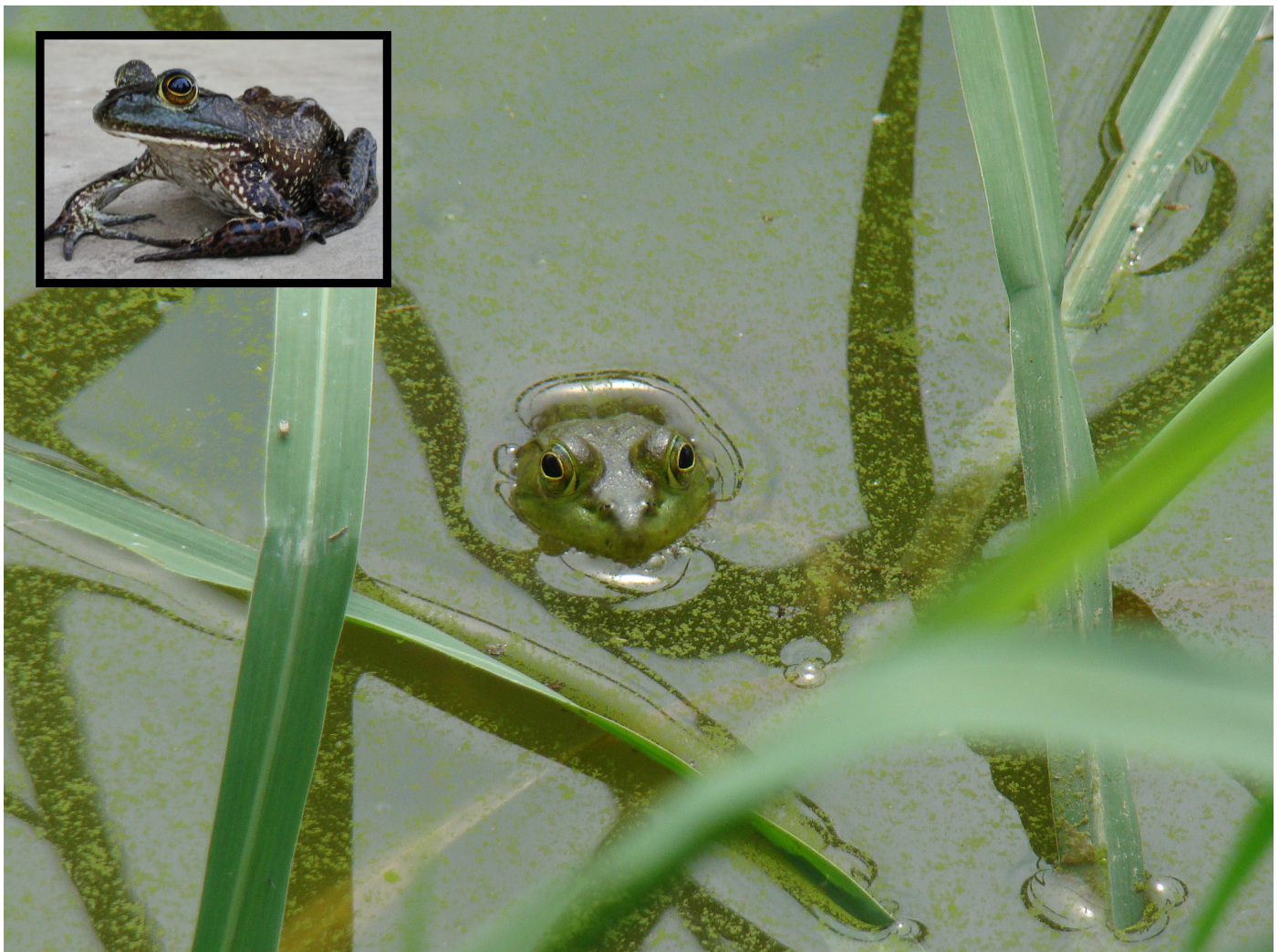


Fig. 1. Adult American Bullfrog (*Lithobates catesbeianus*) from the lagoon in Pucará Park in Loja, Loja Province, Ecuador. Insert: Adult male American Bullfrog from the same locality. Photographs by Katusca Valarezo-Aguilar.

sis (Longcore et al. 1999; Ron and Merino 2000; Daszak et al. 2003; Ruiz and Rueda-Almonacid 2008; Bai et al. 2010) and ranaviruses (Schloegel et al. 2009; Une et al. 2009), both implicated in global amphibian mortalities. Kraus (2009 and references therein) documented established populations in Argentina, Belgium, Brazil, Canada, Chile, China, Colombia, Cuba, Dominican Republic, Ecuador, France, Germany, Greece (Crete), Guyana, Haiti, Indonesia, Israel, Italy, Jamaica, Japan, Mexico, Namibia, Peru, Puerto Rico, Russia, South Korea, Sri Lanka, Tadjikstan, Taiwan, western United States (including Hawaii), and Venezuela. Mazzoni et al. (2004) noted the importation of Bullfrogs into Uruguay, and Laufer et al. (2008) described feral populations.

Here, we report an apparently well-established population of the American Bullfrog (Fig. 1) in Pucará Park, a popular recreational area in Loja, the capital of Loja Province, Ecuador (4°0'45.10"S, 79°11'42.64"W; elev. 2,206 m) (Fig. 2A). Previous accounts of apparently established populations of *L. catesbeianus* in Ecuador include those of Baker (1995), Lever (2003), and Cisneros-Heredia (2004), who recorded the presence of a population in Napo Province in Ecuadorian

Amazonia and observations in Manabí (a coastal Ecuadorian province) (Fig. 2B). Despite these observations, very little is known about introduced populations of this species, its dispersion, and its effects on native populations and ecosystems.

Frogs were found in and around a small semi-natural lagoon of approximately 750 m² in the southeast of the city, a few meters from the La Pradera Alta neighborhood and near the Pucará-Podocarpus trail. We visited the site at 1830 h on 23 December 2014. In 30 min, we found eleven tadpoles in various stages of development, along with six juvenile and seven adult frogs, but collected no specimens. Robert Powell confirmed the identity of the species from photographs, and a photographic voucher was deposited in the Milwaukee Public Museum (MPM P772). All frogs were along the shore or on the adjacent bank. Most were quiet, probably attributable to the temperature (15 °C), but one male was calling near the lagoon.

Situated in the south Andean region of Ecuador, the climate at Pucará Park is temperate. The mean annual temperature is 16 °C with annual variations of 1.5 °C. Mean annual precipitation is 900 mm (Anonymous 2007). Rainfall is variable, but the rainiest and driest months are March and

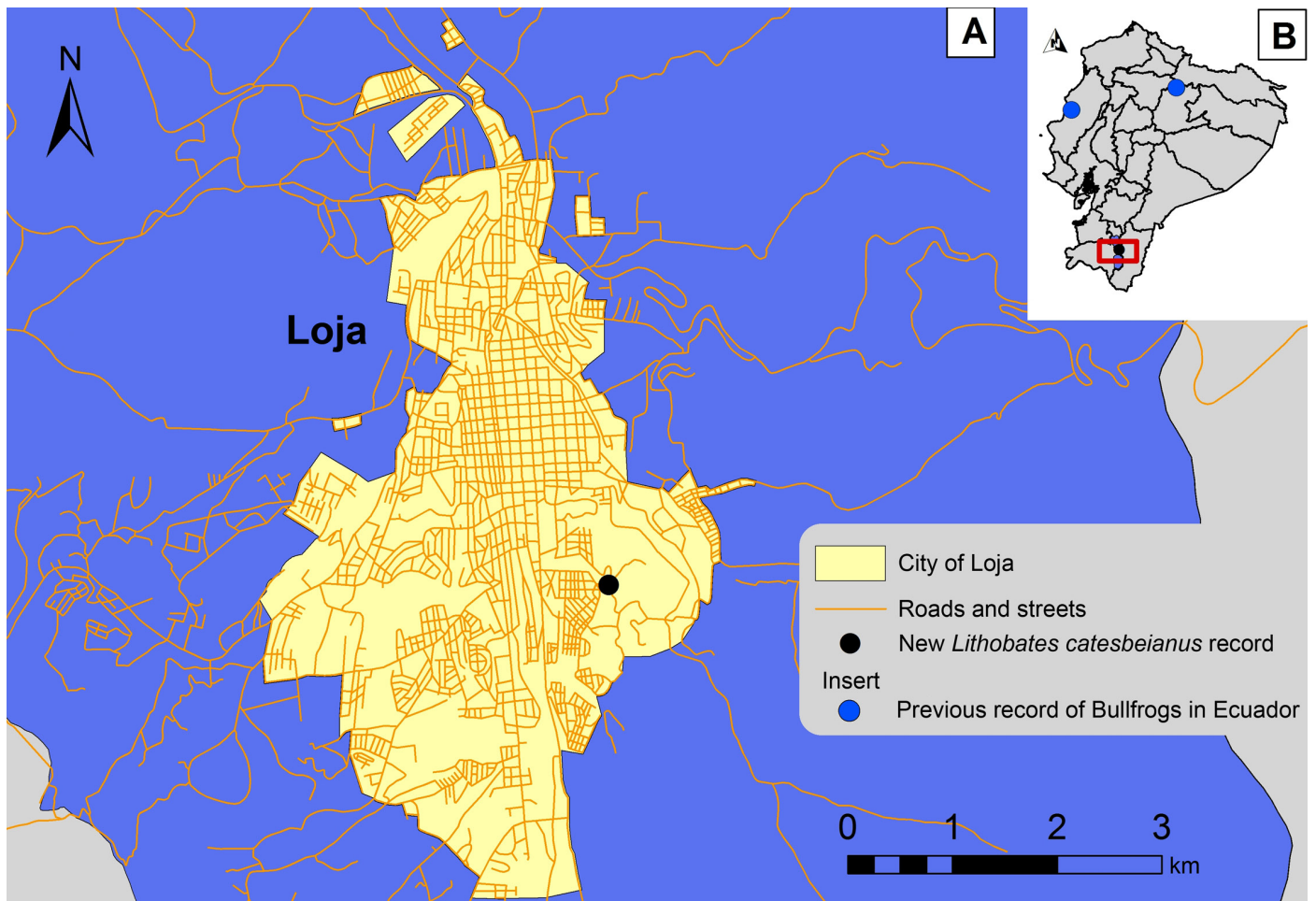


Fig. 2. (A) Loja city, location of the first record of the American Bullfrog (*Lithobates catesbeianus*) in Loja Province. (B, inset) Previous records of American Bullfrogs in Ecuador (blue dots) and location of the detailed map (red outline).

October, respectively. None of the vegetation around the lagoon is native. Trees include Mexican Weeping Pine (*Pinus patula*), Andean Alder (*Alnus acuminata*), and Pencil Willow (*Salix humboldtiana*); the most abundant shrub is Tropical Brackenfern (*Pteridium arachnoideum*) and the most abundant grass is Kikuyu Grass (*Pennisetum clandestinum*).

This is the first record of American Bullfrogs in Loja Province. The origin of this population, according to a resident of the city, was the escape of some live individuals brought from a production farm in Zamora Chinchipe (an adjacent Amazonian province in southern Ecuador). The high elevation and low temperatures in Loja are testament to the plasticity of the species. The large size, resilience, and voracity of the American Bullfrog make it a formidable competitor and potential predator of native amphibians and other small animals (Valarezo Aguilar 2012), but additional studies are necessary to document the actual ecological impact of this species in this area.

Acknowledgements

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