CONSERVATION RESEARCH REPORTS

Conserving Mexican Amphibians

Traditionally, biodiversity conservation gap analyses have been focused on governmental protected areas (PAs). However, an increasing number of social initiatives in conservation (SICs) are promoting a new perspective for analysis. SICs include all of the efforts that society implements to conserve biodiversity, such as land protection, from private reserves to community zoning plans, some of which have generated community-protected areas. This is the first attempt to analyze the status of conservation in Latin America in which some of these social initiatives are included. The analyses were focused on amphibians because they are one of the most threatened groups worldwide. **OCHOA-OCHOA ET AL.** (2009. *PLoS ONE* 4:1–9) used a niche model approach to map the potential and real geographical distribution (extracting the transformed areas) of endemic Mexican amphibians. All species have suffered some degree of loss, but 36 species have lost more than 50% of their potential distribution. For 50 micro-endemic species, the authors could not model their potential distribution range due to the small number of records per species; therefore, the analyses were performed using these records directly. The authors then evaluated the efficiency of the existing set of governmental PAs and established the contribution of SICs (private and community) for land protection for amphibian conservation. They found that most of the species have some portion of their potential ecological niche distribution protected, but 20% are not protected at all within governmental PAs. 73% of endemic and 26% of micro-endemic amphibians are represented within SICs. However, 30 micro-endemic species are not represented in either governmental PAs or SICs. This study shows how the role of land conservation through SICs is becoming an increasingly crucial element for an important number of species not protected by governmental PAs.

Artificial Refuges Facilitate Reptilian Recovery

Ecosystem restoration requires that habitat requirements of all species be considered. In 1998, a massive quantity of tailings broke out of the holding pond of the Aznalcollar Mine in southwestern Spain and polluted the Guadiamar River valley. After the accident, a soil and vegetation restoration program began, and the Guadiamar Green Corridor was created to connect two large natural areas, a national park and the Sierra Morena. The mine-tailing spill polluted a large area, giving rise to an interesting case study involving soil and vegetation restoration and recovery of the terrestrial reptilian community in the contaminated area. The 5-year study by **MARQUEZ-FERRANDO ET AL.** (*Restoration Ecology* 17:660–667) evaluated whether the reptilian community in the polluted area remained dramatically impoverished because of the elimination of all natural refuges. The area managed with artificial refuges exhibited a better and faster recovery of the reptilian community than the control area with no refuges.

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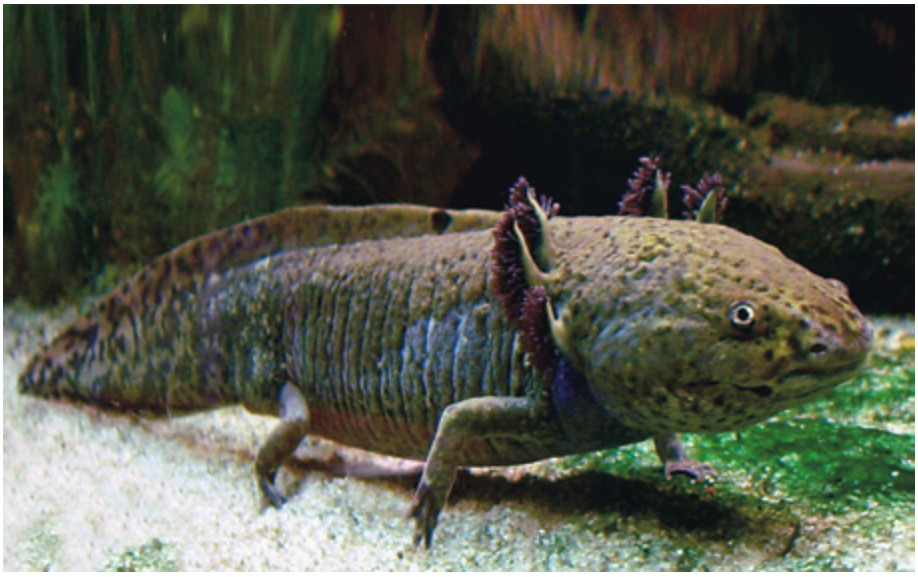
Horseshoe Whip Snakes (*Hemorrhois hippocrepis*) were found significantly more frequently in plots with artificial refuges than in control plots without refuges.

Power Boating and Northern Map Turtles

Recreational power boating is growing in popularity in North America. This activity is known to have lethal and sub-lethal effects on aquatic wildlife, and freshwater turtles may be particularly sensitive to this activity. **BULTÉ ET AL.** (2009. *Aquatic Conservation: Marine and Freshwater Ecosystems*, early view published online 26 October 2009) reported on patterns of traumatic injuries inflicted by powerboat propellers to Common Map Turtles (*Graptemys geographica*) from two sites differing in boat traffic intensity in Ontario, Canada. The relative vulnerability of turtles was assessed in light of seasonal patterns in boat traffic, as a function of sex- and age-specific movement patterns, habitat use, and basking behavior obtained by radio-telemetry. The authors conducted population viability analyses (PVA) to evaluate the potential demographic consequences of mortality induced by powerboats. The prevalence of propeller injuries was two to nine times higher in adult females than in adult males and juvenile females. Patterns of movement, habitat use, and aquatic basking indicated that adult females are more exposed to collisions with boats. PVA showed that boat-induced mortality in adult females could lead to rapid population extinction if the risk of mortality when hit by a boat is greater than 10%. The results of this study showed that recreational power boating is a serious threat to Northern Map Turtles, even under



The critically endangered Axolotl (*Ambystoma mexicanum*) is one of many Mexican amphibians with declining distributions.

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Adult female Common Map Turtles (*Graptemys geographica*) are more vulnerable to collisions with boats than are adult males and juveniles (illustrated).

moderate boat traffic, which speaks to the need to adopt measures restricting boat traffic in areas important to turtles.

The Trade in Vertebrates Promotes Extinctions and Introductions

The process of taxonomic homogenization occurs through two mechanisms, extinctions and introductions, and leads to a reduction of global biodiversity. **Romagosa et al.** (2009. *Conservation Biology* 23:1001–1007) used available U.S. trade data as a proxy for global trade in live vertebrates to assess the contribution of trade to the process of taxonomic homogenization. Data included all available U.S. importation and exportation records, estimation of extinction risk, and reports of establishment outside the native range for species within six vertebrate groups. Based on Monte Carlo sampling (a class of computational algorithms that rely on repeated random sampling to compute their results), the number of species traded, established outside of the native range, and threatened with extinction was not randomly distributed among vertebrate families. Twenty-eight percent of vertebrate families that were traded preferentially were also established or threatened with extinction, an unusually high percentage compared with the 7% of families that were not traded preferentially but that became established or threatened with extinction. The importance of trade in homogenization of vertebrates suggests that additional efforts should be made to prevent introductions and extinctions through this medium.

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Species in the family Iguanidae were traded significantly more than expected based on randomization procedures — despite the fact that some species, such as this San Esteban Island Chuckwalla (*Sauromalus varius*), rarely appear in the trade for pets, skins, or meat.

Road-kill Hotspots

Roads with wetlands on both sides are considered hotspots because of the high mortality rates of amphibians and reptiles that live near the roads. **Langen et al.** (2009. *Journal of Wildlife Management* 73:104–114) studied a 219-mile highway network in New York, where they discovered both amphibian and reptilian road mortality to be spatially clustered, and causeways were more likely to have road-kills than points with one adjacent wetland or with no wetland present. Road crossing occurs when the animals migrate during seasonal migrations to and from hibernation or breeding sites. The authors stated that planners could identify valid predictors of hotspots when designing or restoring roads to avoid as much harm as possible to amphibian and reptilian populations.

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Northern Leopard Frogs (*Lithobates pipiens*) were among nine species of anuran roadkills found more frequently on causeways than on roads with one adjacent wetland or no wetland.

Australian Snakes Vulnerable to Climate Change

The Broad-headed Snake (*Hoplocephalus bungaroides*), Australia's most endangered snake, will find areas of higher elevation most suitable for surviving climate change. **Penman et al.** (*Diversity and Distributions* 2010:109–118) analyzed the Sydney Basin Bioregion and predicted the distribution of this species under low and high climate change scenarios for 2030 and 2070. Populations will be lost under both climate-warming scenarios. The species has highly specialized habitat requirements and exhibits delayed maturation and a low reproductive rate. These factors reduce the species' ability to recover from population reductions. Populations have declined dramatically throughout the range in the 200 years since European settlement because of anthropogenic reasons, particularly urbanization. The authors concluded that many areas that are currently occupied will become too hot and dry for this species, and only cooler areas at higher elevations will remain suitable.

If the Broad-headed Snake (*Hoplocephalus bungaroides*), Australia's most endangered snake, will survive climate change, it will most likely be restricted to cooler areas at higher elevations.