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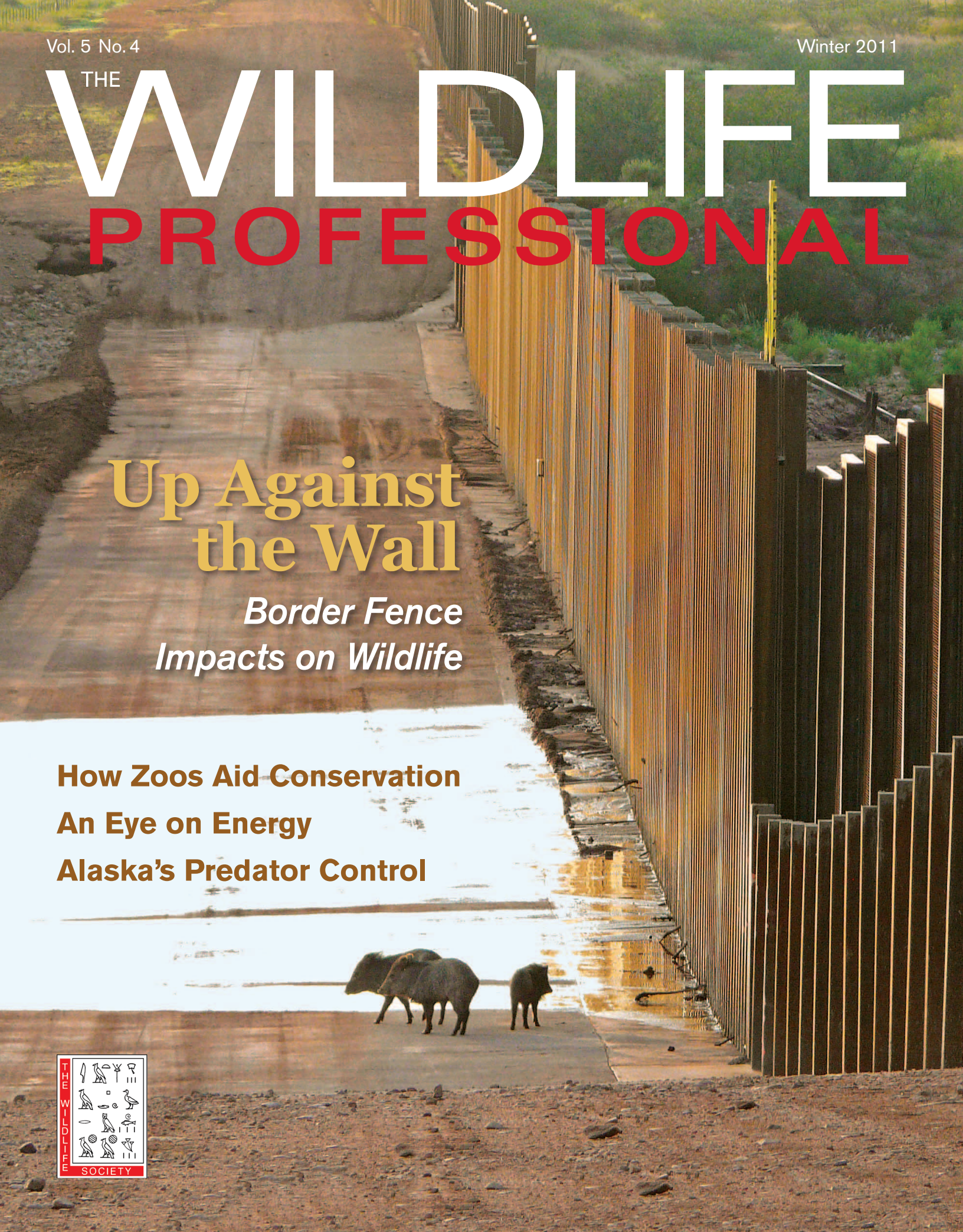

Up Against the Wall

Border Fence Impacts on Wildlife

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THE WILDLIFE SOCIETY

Life on the Line

By Aaron D. Flesch

Credit: Cathy Slatas

Aaron D. Flesch is a Senior Research Specialist at the University of Arizona's School of Natural Resources and the Environment.

After earning my bachelor's degree in 1996, I moved south to the U.S.-Mexico borderlands to monitor birds on Arizona's Buenos Aires National Wildlife Refuge. While exploring the refuge's rolling grasslands and mesquite woodlands, I remember watching deer and coyotes cross the old barbed-wire fence that separated the refuge from Mexico. Back then, only an occasional monument from the 1850s and a fence of T-posts and wire spanned most of the border between Arizona and the state of Sonora, Mexico.

Over the years, I've witnessed dramatic changes. Today, vehicle barriers and tall pedestrian fences harden that once-permeable wire fence and nearly half of the nation's 3,000-kilometer southern border. Together with patrol roads, lighting, and efforts to intercept migrants and smugglers, vast areas of our southern border have been converted from open country to militarized zones. The impact of these changes on wildlife and ecosystems is complex. Although we know that border fortifications can limit and potentially prevent trans-boundary movements of individual animals, how these restrictions will affect entire populations is harder to determine.

The U.S.-Mexico border traverses ecologically diverse regions of North America where biogeographic provinces collide and many species reach the margins of their geographic range. The Arizona-Sonora borderlands, for example, spans over 600 kilometers from the vast lowland deserts of the Colorado River Valley to highland coniferous forests of the Madrean Sky Islands. These complex elevation and rainfall gradients produce patchy distributions of resources and fragmented populations of many species. Research shows that the ability of wildlife to move among resource patches can influence distribution, extinction and colonization dynamics, and gene flow, especially in dynamic systems. As a result, security infrastructure and human activity along the border that impedes movement of borderland species such as bighorn sheep (*Ovis canadensis*) and jaguar (*Panthera onca*) that rely on fragmented habitats, could subsequently impact populations.

Consider the ferruginous pygmy-owl (*Glaucidium brasilianum*). During natal dispersal, pygmy-owls fly near ground level and tend to change direction to avoid large vegetation openings such as agricultural fields. These observations suggest that vegetation clearing associated with tall border fences could limit trans-boundary movements of pygmy-owls that are critical for recovery efforts in Arizona where the species has declined to endangered levels (Flesch *et al.* 2010). Similarly the movement of black bears (*Ursus americanus*) from northern Coahuila into southern Texas maintains existing populations in that region (Hellgren *et al.* 2004), and bears in southeast Arizona that disperse across the border into Sky Islands in Sonora may enable smaller populations to persist there as a result (Varas 2007). If border development limits trans-boundary movement of bears, some populations will likely be lost.

Connectivity and Collaboration

In addition to connectivity, both the area and quality of habitat are fundamental drivers of distribution and persistence in patchy environments. Where connectivity is compromised by border development, mitigation efforts could involve bolstering habitat area and quality. As a result, efforts to assess and mitigate the effects of border development on wildlife should consider each of these drivers in spatially realistic contexts.

Given the ecological connections we share across the border and our joint stake in conservation, efforts to conserve wildlife in the borderlands must be bi-national. Elected officials, scientists, and stakeholders must join forces to establish an agenda for progress and facilitate the exchange of information, expertise, and wildlife. Unfortunately, the U.S. government's response to conservation issues resulting from border development has thus far been minimal at best, and policies such as the Real ID Act of 2005—which waives all environmental laws along the border—only makes mitigation efforts more difficult.

Aldo Leopold's Land Ethic offers a salient central tenet for action: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." I believe we should seek to prevent extirpations, link conservation reserves across the border, and maintain ecosystem function while ensuring national security and economic and aesthetic values. Unfortunately, how we can achieve these seemingly conflicting goals is still unclear and will continue to pose a challenge for wildlife professionals and policy makers in the borderlands. ■