



To fence or not to fence

Articles, editorials, and letters to the Editor on illegal immigration across the US–Mexico border – its causes, impacts, and potential remedies or control – are prevalent in newspapers here in the Southwest and across the country. While many commentators have focused on the social and economic questions surrounding immigration and its control, questions about associated impacts on the environment and biodiversity are increasingly being raised as well. The impacts of illegal immigration and its consequences on biodiversity are highly complex, and efforts to control it, such as the Southwest border fence currently under construction, have both direct and indirect impacts on biodiversity.

Changes to border enforcement at traditional crossing points near urban areas in the mid-1990s subsequently drove crossings into remote areas of the Sonoran and Chihuahuan deserts, often through public lands. As immigrants (and drug smugglers) cross these fragile ecosystems, they leave behind millions of pounds of trash, abandoned and burned vehicles, exotic weeds, illegal roads and trails, and human waste (BLM 2006a, b; Segee and Neely 2006). Fences intended to protect wildlife and plants are ripped down, riparian areas are negatively impacted, supplemental water tanks meant for wildlife are contaminated or destroyed, and fires set for cooking or rescue signals escape into an ecosystem not adapted to frequent fires (BLM 2006a, b; Segee and Neely 2006).

In response to increased crossings, the Department of Homeland Security, the Border Patrol, and the federal agencies responsible for managing the affected public lands have taken measures to dissuade or control illegal immigration, with agencies like the National Park Service and the US Fish and Wildlife Service reallocating resources toward enforcement rather than biodiversity protection (Ruse 2006; Segee and Neely 2006). Responses have included construction

of roads and barriers, including double and triple walls; increased use of all-terrain vehicles to patrol roadless areas; flooding areas with stadium lighting; and conducting low-altitude fly-bys.

These initiatives also impact biodiversity along the borderlands. In Arizona, the Border Patrol estimates that its operations impact 39 protected or proposed species, including the jaguar, bighorn sheep, Sonoran pronghorn, and various migrating birds (Defenders of Wildlife 2007). Double and triple walls lined by roads will sever the connections between the Sky Islands in Arizona and the Sierra Madre in Mexico, disrupting the ability of regional species like the jaguar, black bear, ocelot, Mexican gray wolf, cougar, pronghorn, and others to migrate through their traditional ranges (Vacariu 2007).

Some impacts of immigration are less direct. Immigration to the US (both legal and illegal) is the most notable driver of American population growth, as fertility rates hover consistently around replacement (Meyerson 2004). The US population is projected to increase by nearly 49% by 2050, with much of that increase coming from immigration (US Census 2004). Because the US has higher per capita levels of consumption and pollution, a larger US population will have more environmental impacts and will increase the demands that the country puts on natural resources, both domestically and internationally (Meyerson 2004; Pimentel and Pimentel 2005).

Regionally, increasing populations in the desert Southwest have strained limited water resources, which has downstream impacts on Mexican biodiversity as water is removed from the Colorado River before it reaches the border. Cities in the desert Southwest are dependent on, and encourage growth of, their urban areas, mostly due to immigration from other areas of the US, rather than from across the border.

Ecology can help distinguish impacts of immigration on biodiversity, but it cannot provide the answers regarding what to do. The solutions lie

in the social and political arenas, as we as a society and a nation decide how to trade off between different sets of values. Environmental lawyer (and blogger) Stephen Holzer captures the tension around this issue: "...illegal immigration degrades the environment; enforcing the border against illegal immigration degrades the environment. Glad that's clear" (Holzer 2006). As ecologists and conservation biologists, we can contribute our scientific knowledge to the discussion. As citizens, we can participate in the political and social processes that will lead us toward a solution for this complex issue.

Lori Hidingier

Consortium for Science, Policy, and Outcomes, Arizona State University, Tempe, AZ (lori.hidingier@asu.edu)

- BLM (Bureau of Land Management). 2006a. Southern Arizona project to mitigate environmental damages resulting from illegal immigration, fiscal year 2006 end-of-year report. Phoenix, AZ: Bureau of Land Management. www.blm.gov/az/st/en/info/newsroom/undocumented_alien/06_report.html. Viewed 11 Aug 2009.
- BLM (Bureau of Land Management). 2006b. Southern Arizona project to mitigate environmental damages resulting from illegal immigration, summary of 2003–2005 accomplishments. Phoenix, AZ: Bureau of Land Management. www.blm.gov/pgdata/etc/medialib/blm/az/pdfs/undoc_alien.Par.62736.File.dat/complete_summary_03-05.pdf. Viewed 11 Aug 2009.
- Defenders of Wildlife. 2007. Security without walls: the organ pipe experience. Washington, DC: Defenders of Wildlife.
- Holzer S. 2006. Environmental overtones of illegal immigration debate. <http://environmentallegal.blogs.com/sholzer/immigration/index.html>. Posted 15 Jul 2006; viewed 11 Aug 2009.
- Meyerson FAB. 2004. Policy view: immigration, population policy, and the Sierra Club. *Popul Environ* **26**: 61–69.
- Pimentel D and Pimentel M. 2005. Global environmental resources versus world population growth. *J Ecol Econ* **59**: 195–98.
- Ruse CE. 2006. Illegal immigration a drain on wilderness areas. *Scripps Howard News Service*, Sep 21.
- Segee BP and Neely JL. 2006. On the line: the impacts of immigration policy on wildlife and habitat in Arizona borderlands. Washington, DC: Defenders of Wildlife.
- US Census. 2004. Projected population

change in the United States, by race and Hispanic origin: 2000 to 2050. www.census.gov/population/www/projections/usinterimproj/idsbsummeth.html Washington, DC: US Census Bureau, Population Division. Viewed 11 Aug 2009.

Vacariu K. 2007. Conservation strategy: ecological security on the border. Portal, AZ: The Wildlands Project. www.twp.org/cms/page1130.cfm. Viewed 11 Aug 2009.

doi:10.1890/09.WB.022



Writing and citing “international” names

The names of colleagues from countries with naming traditions other than the Anglo-Saxon convention (ie the trinomial format: given name plus middle name/initial[s] plus family name, hereafter “western”) are a frequent topic of informal conversations among ecologists. Although seemingly trivial in such a context, I would argue that this issue deserves more consideration, given that the English language, western-style, peer-reviewed journal is one of the most important mechanisms for communicating science, and certainly one in which people’s names play a central role. Many journals are international fora for authors from regions with different naming styles (hereafter “international”), and these contributions are becoming more common and are rapidly gaining in importance.

When writing, scientists employ in-text callouts or tags – often composed of an author’s family name and a publication year (eg “Darwin 1859”) – to cite other works. Such tags and their corresponding references are also critical for organizing and searching for articles, published or not; without them, it is impossible to navigate vast bodies of literature. This raises an important question: if the present style for generating those tags is based on appropriately identifying the family name of an author, why aren’t we learning how to write and cite the names of our international colleagues properly?

The naming convention of most countries includes two basic ele-

ments: a given name and a family name (Table 1). The given component contains one, two, or occasionally three or more names, some commonly abbreviated (Table 1, examples 1–2). However, family names and their components are listed in different positions relative to those of given names. Some (examples 6–9) are composed of a “patronymic” and a “matronymic”. Matronymics are infrequent in North America (north of Mexico) and in many western European countries, but almost omnipresent in the Iberian Peninsula, Latin America, and the Caribbean (with some exceptions; see example 5); they are usually dropped by the third generation, as only the patronymic is inherited. Lineages interested in preserving matronymics commonly turn their family names into composite ones (example 6), sometimes – but not always – hyphenated (examples 8–9). In countries that use matronymics, it is common to use only the patronymic for the sake of brevity; thus, example 7 would be shortened to “Jorge Ruelas”, and example 9 to “Carla Pimentel” (in both, the “first” given name plus the patronymic). Typically, in Asian names (example 4), the family name is listed first, followed by the given name(s). The use of family names in some Asian countries is a relatively recent phenomenon or has been a selective practice (examples 10–11).

Why does this matter? Fitting inter-

national naming traditions to “standard” name-based literature-tagging systems and associated tools (eg style manuals, bibliography software, search engines) can be complicated or impossible if the template available is rigidly defined in the western format. To follow these conventions, many of our colleagues with international family names (and what western readers can identify as such) have had to make uncomfortable adjustments. It has forced scientists from Spanish- and Portuguese-speaking countries that use matronymics to (a) convert family names into composite last names, when in many cases they don’t truly have one (example 6), (b) have their patronymic mistakenly turned into an abbreviated “middle” (given) name, or (c) simply opt for matronymic “self-mutilation” (for an involuntary example, refer to my e-mail address). Likewise, Asian researchers often reverse the position of their names (eg to “Mari Kimura” in example 4).

Conversely, the mismatch between international naming conventions and systems based on western traditions has caused confusion and prevented or delayed the discovery of published works from international colleagues to an unknown extent, thereby limiting the effectiveness of search tools and compromising the advance of communications.

Although it is impracticable to rectify callouts and references in

Table 1. Sample names of international colleagues (written following country-specific usage in western alphabet characters) and a corresponding deconstruction

Example	Name	Country
1	Tania M ¹ Schusler ^{2a}	United States
2	C Scott ¹ Weidensaul ^{2a}	United States
3	Aurélie ¹ COULON ^{2a}	France
4	KIMURA ^{2a} Mari ¹	Japan
5	Valentina ¹ Ferretti ^{2a}	Argentina
6	César ¹ Tejeda-Cruz ^{2a,b}	Mexico
7	Jorge Ricardo ¹ Ruelas ^{2a} Inzunza ^{2b}	Mexico
8	Héctor ¹ Gómez de Silva ^{2a} Garza ^{2b}	Mexico
9	Carla Sofia ¹ Madeira ^{2b} Gomes Pimentel ^{2a}	Portugal
10	Sunarto ¹ –	Indonesia
11	Khubilai ¹ –	Mongolia

Notes: Given and family names are not equal to “first” and “last” names. Superscript notation: (1) given name; (2) family name, including patronymic (2a), and matronymic (2b). Notice the inverse placement of matronymic names in Portuguese- and Spanish-speaking countries (examples 7 and 9).

existing manuscripts, it may be relatively simple to avoid this conundrum in the future. Ideally, authors should be able to write their names on papers as they would like to, and capitalize their family name(s) to indicate the element to tag. The French standard usage wisely capitalizes family names (example 3) to distinguish between given and family elements. This solution does not seem to affect communications adversely in any way. Some journals have already taken this step; others have gone even further, adding the names of Asian authors in their original characters, as the “translation” of their names into the western alphabet is not always accurate.

A simple study of different naming conventions by indexing and software developers could help to modify the existing templates while increasing search effectiveness. This theme will be the subject of future informal and academic discussions, as the demographic makeup of developed countries changes over time and the overall contribution of international scientists gains even further relevance. Adopting such solutions would make the practice of scientific publishing in ecology (and elsewhere) a

culturally sensitive and more inclusive endeavor.

Ernesto Ruelas Inzunza
Biology Department, Dartmouth
College, Hanover, NH
(ernesto.ruelas@dartmouth.edu)

doi:10.1890/09.WB.023



Clarification regarding Panama hydroelectric project

In the June issue (*Front Ecol Environ* 2009; **7**[5]: 233), a news dispatch by A Burton – *Panama’s polemic hydroelectric project* – quoted Humberto González (Manager, AES Changuinola) as claiming that the AES Corporation has “been negotiating a relocation program that provides better housing, health services, and education for the Ngöbe people. The program was validated by The Nature Conservancy, the Panamanian National Association for the Conservation of Nature, and the Audubon Society of Panama”.

The Panama Audubon Society (PAS) wishes to make it clear that it has not validated any part of the AES hydroelectric project in Changuinola. In September 2008, AES invited PAS to visit the project site. PAS accepted this invitation, for the purpose of

becoming acquainted with the area and determining whether PAS could assist the resident Ngöbe communities to develop birding tourism as a possible source of additional income. AES representatives briefed us on the hydroelectric project and their efforts to assist the Ngöbe communities in relocation.

PAS was not asked to evaluate or endorse AES’s social and cultural programs, nor did we offer to do so. Any statement inferring that PAS validated those programs is incorrect. PAS’s general policy regarding projects of this kind is that they must be fully evaluated before execution – to ascertain potential environmental and cultural impacts – and should only be permitted to proceed if acceptable practices of sustainable development are agreed upon by all parties. The project must then be monitored at all stages for compliance with these practices. Within that context, the impact on indigenous communities is one of the essential components in the final acceptability of an environmentally sustainable project.

Rosabel Miró R
Panama Audubon Society, Panama,
Republic of Panama
(rosabelmiro@mac.com)

doi:10.1890/09.WB.024

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