

Ecological impacts of wildlife conservation units policy in Mexico

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The value of biodiversity is often expressed in an abstract manner, while land-use decisions are typically made at the local level, on an economic basis, to meet the immediate needs of local communities. In Mexico, recent legislation has created new economic incentives for biodiversity conservation by allowing landowners and managers to benefit directly from the exploitation of wildlife. This bold move toward market-based approaches has proven popular, but implementation is hindered by a lack of scientific rigor in planning and monitoring requirements that, in some cases, has led to unintended and undesirable consequences. Because the program is expanding rapidly across Mexico and may serve as a model for similar efforts in other countries, the goal of the workshop described here was to review the policy and its on-the-ground effects, and to offer an initial set of recommendations for improving implementation and enhancing conservation outcomes.

El valor de la biodiversidad es frecuentemente expresado de una manera abstracta, mientras que las decisiones de uso del suelo son típicamente hechas a escala local, sobre una base económica, a menudo considerando las necesidades inmediatas de las comunidades locales. Legislación reciente en México ha creado nuevos incentivos económicos para la conservación de la biodiversidad permitiendo a los propietarios de la tierra y a los encargados beneficiarse directamente de la explotación de la vida silvestre. Este audaz movimiento hacia las estrategias basadas en el mercado han resultado populares, pero la implementación se ha entorpecido por la falta de rigor científico en los requerimientos de planeación y monitoreo que, en algunos casos, ha conducido a consecuencias involuntarias e indeseables. Debido a que el programa se está ampliando rápidamente a través de México, y que puede servir como modelo para los esfuerzos similares en otros países, el objetivo del taller reportado aquí fue revisar las políticas y sus efectos sobre el terreno, y ofrecer un conjunto inicial de recomendaciones para reforzar la implementación y aumentar los resultados para la conservación.

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The value of biodiversity is widely recognized, yet efforts to express this value are few, and they remain largely untested. Passage of the 1996 General Law on Ecological Equilibrium and the 2000 General Law on Wildlife (H Congreso de la Unión 1996, 2000) made Mexico a global leader in attempts to recognize the value of biological diversity and share it with its citizenry. Related federal legislation conveyed new rights to landowners, allowing them to benefit directly from the use and exploitation of biodiversity, if scientifically sound and federally approved monitoring and management

plans were implemented. This national initiative created a system of designated lands, called Wildlife Conservation Units, widely known by their Spanish acronym, “UMA”, and managed, in part, for biodiversity conservation. While the nature and objectives of UMAs vary widely, they share the principal aim of conservation through active management and sustainable exploitation of wildlife for economic gain. As such, UMAs represent an entirely new conservation paradigm that holds potential for increasing the direct benefits that biodiversity provides to people and thereby creating new incentives for conservation efforts.

While the innovative conceptual framework of the UMA policy provides a new paradigm for valuing biodiversity and encouraging local- and landscape-level conservation, implementation of the new policy has been difficult in practice. It has also sparked concerns about some unintended consequences of UMA designations and the difficulty of designing, implementing, and monitoring management activities that in fact assure sustainable use of native wildlife species and their habitats. Currently, there is no effective means of assessing and ensuring the

Workshop: Ecological impacts of the wildlife conservation units (UMAs) policy

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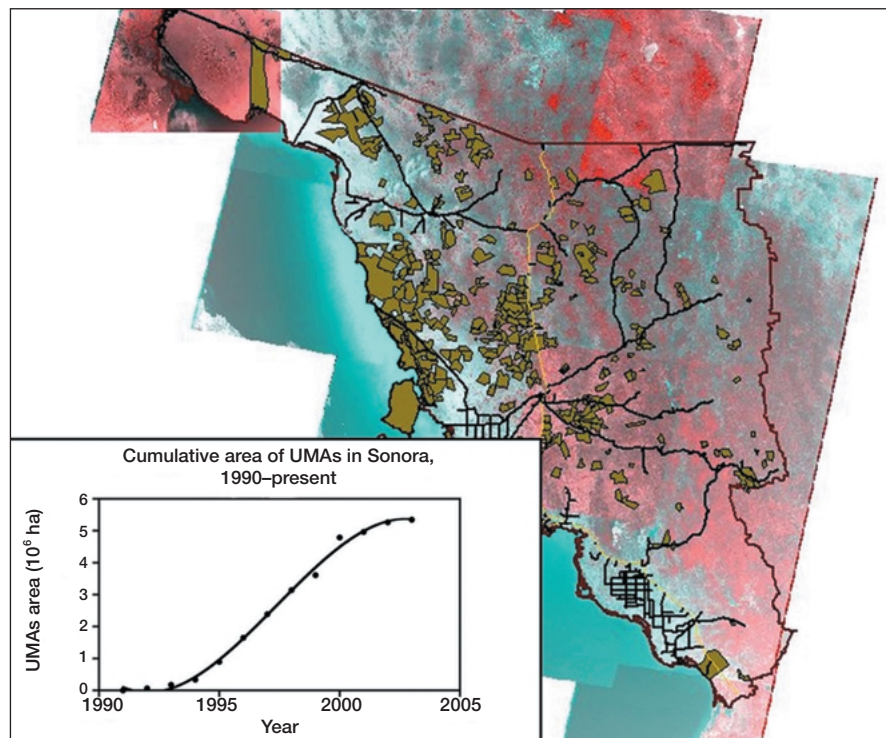


Figure 1. Proliferation of wildlife management units (yellow areas) in the Mexican state of Sonora has been rapid since the late 1990s, with over 30% of the land area under UMAs management by 2003 (inset). On-the-ground effects of the new policy are highly variable and poorly understood.

success of the UMA policy in Mexico and, to our knowledge, there have been no in-depth, quantitative studies of the ecological or socioeconomic impacts of the system. Nevertheless, the policy is viewed favorably by many Mexican leaders, and it is seen as an innovative model for biodiversity conservation in other countries.

Due to the innovative nature of the UMA policy, its rapid adoption throughout Mexico, and a troubling lack of coherence in the intent and oversight of the program, ecologists from Mexico and other countries joined forces at the Merida meeting to examine current trends in the implementation of the UMA policy and to discuss its initial effects “on the ground”. What is needed to increase the probability that this innovative policy will achieve its conservation objectives was also addressed.

Participants focused on UMA case studies from Sonora, in Mexico’s arid north, and in the tropical state of Yucatan, thus providing a broad national and biogeographic perspective. In Sonora, implementation of the UMA policy centers on the economic value derived from trophy hunting, primarily by urban Mexicans and foreign visitors. Once a scientifically sound management plan is approved and an ongoing monitoring plan is implemented, ranch owners can provide hunting opportunities on a commercial basis, deriving direct economic benefits from local wildlife populations. For many landowners, this income, derived principally from hunting deer, bighorn sheep, and small game, dwarfs income from traditional cattle operations (Guajardo-Quiroga and

Martínez-Muñoz 2004). In the past decade alone, the state of Sonora has registered over 30% of its territory (approximately 900 ranches; Figure 1) as UMAs. This shift in land use and wildlife management represents a rapid realignment of conservation strategy. While UMAs provide Sonora with a potentially powerful and far-reaching conservation tool (Burstein *et al.* 2002), these rapid changes in land use could lead to complex and unpredicted environmental and ecological changes.

Enhanced income from hunting encourages management for healthy populations of target species, but in some cases, the new policy has also led ranch owners to invest in intensive management approaches, such as fencing previously open rangelands, cultivating exotic range grasses, initiating ad hoc captive propagation efforts, and moving game animals among properties to enhance hunting success. These approaches can enhance commercial hunting operations (and therefore

income), but they may have detrimental long-term effects on animal movements and migration, with attendant and unknown influences on the population genetics of formerly free-ranging species. Similarly, clearing of native vegetation and intentional introduction of non-native grasses such as buffel grass (*Pennisetum ciliare*; Figure 2) can increase forage for some grazing game animals, while reducing native biodiversity (Saucedo-Monarque *et al.* 1997) and increasing fire frequency, with largely unknown consequences for soil fertility over the long term (Castellanos *et al.* 2002).

Workshop participants acknowledged that these aspects of UMA management represent unintended consequences of the new policy. Vague language and the lack of clear regulatory guidance have resulted in a liberal interpretation of the legislation, leading to a host of different, often conflicting approaches to implementation.

In Yucatan, the economic benefits of sport hunting are a lesser, but still important driver of the proliferation of UMAs. Different socioeconomic considerations complicate their creation on *ejidos* (agricultural lands distributed to communities). Wildlife management on *ejido* lands requires a different cultural approach, since traditional uses and local food consumption often take precedence over sport hunting and other income-generating uses. In such cases, wildlife management decisions are often driven by local needs, rather than entrepreneurial opportunities. There is concern among some wildlife managers that the economic benefits of UMAs could be captured

by knowledgeable business interests and that, as a result, *ejido* communities would lose access to an important food source. Advising *ejidos* and other rural communities about the opportunities presented by UMAs may be critical in circumstances where wildlife use is devoted mostly to family and local consumption, but economic incentives favor commercial exploitation. Where these forms of exploitation overlap, even well-intentioned management plans may not ensure sustainable use.

Currently, the UMA policy presents an opportunity for the modernization of wildlife laws in Mexico and the creation of new and more broadly recognized incentives for conservation. However, it is clear that neither the country nor the international conservation community are well prepared to guide or assist in the implementation of this well-intentioned but vague policy. Ecologists from Mexico and other parts of the Americas came together to

identify areas in need of clarification and/or allocation of additional resources, and to make recommendations on how the scientific community might work with the Mexican Government to ensure that the intent of the laws and policies are met. Participants identified the following needs for successful implementation of the UMAs policy:

- (1) Narrow the definition of UMAs, so that it pertains only to free-ranging populations of native species. Currently, the UMAs designation may pertain to endeavors as distinct as wildlife conservation areas, plant nurseries, ecotourism businesses, and botanical gardens. In an effort to be inclusive, the policy has created confusion regarding the purpose of the new conservation units.
- (2) Increase capacity for training technicians capable of designing innovative, science-based wildlife conservation plans that focus on both population dynamics and habitat conservation. Current practices are often insufficiently detailed and, according to Mexican ecologists, few are based on current scientific understanding. Existing training programs range from 1-day workshops to 2-year technical programs, with all graduates receiving certification as “wildlife managers”. More formal and uniform training objectives, as well as increased accountability, are essential.
- (3) Improve the application and approval process by requiring greater specificity in UMA management and monitoring plans. Workshop participants described private-lands conservation programs in several other countries, under which the preparation of management plans required field inventories and detailed planning to ensure high scientific standards, as well as congruity with other planning schemes already in place.
- (4) Create incentives or provide resources for landscape-level planning. Currently, each UMA, no matter its area, is treated as an independent unit. Because many focal species are wide ranging, and because habitat restoration and conservation efforts benefit from economies of scale, gains in biodiversity conservation will be enhanced by efforts to manage UMAs as a network of conservation areas. Until there is a capacity to assess management plans in light of neighboring land uses and conservation, the opportunities presented by the UMA policy are likely to be underutilized.
- (5) Monitoring efforts should be standardized, so that results can be compared and aggregated at landscape and regional scales. Each UMA is required to develop a monitoring plan before its application is approved. Currently, monitoring efforts are highly variable, focusing on population dynamics of focal species, habitat quality, and/or other variables. Some standardization of effort will allow managers and officials to examine trends in common response variables over appropriate spatial and temporal scales. Monitoring standards will necessarily vary among bioregions and could be standardized at the state level.
- (6) Ecologists familiar with the UMA policy, and similar policies being considered in other countries, identified a general need for a more specific regulatory framework to guide implementation on the ground. This task might be undertaken by panels of scientists



Figure 2. Designation of a wildlife management unit provides incentives for conserving populations of focal species, but it does not necessarily convey protection to other native organisms and ecosystems. Here, the authors study a field of buffel grass (*Pennisetum ciliare*), an invasive exotic grass introduced to enhance forage production, on a UMA in central Sonora.

and technical experts, who could draft region- or state-specific regulations to be implemented by UMA consultants and landowners.

While Mexico's UMA policy provides exciting new opportunities for the conservation of biodiversity, the clear consensus of the workshop participants was that considerable refinement of intent and increased guidance and oversight of implementation is required. For example, without appropriate regulation, the increased value of wildlife may encourage landowners to artificially augment wild populations and confine animals, leading to changes in gene flow and fragmentation of habitats. Conversely, with proper planning and guidance, UMAs may provide an entirely new and highly effective model for biodiversity conservation, one that relies less on setting aside land and top-down regulation, and more on the initiatives of many thousands of citizens who benefit directly from biodiversity and enhanced environmental quality. In combination with more traditional parks and nature reserves across the country, UMAs can provide the additional area and enhanced habitat connectivity to safeguard wildlife in Mexico, one of the most biologically diverse nations in the world (Meyers et al. 2000).

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