

Continental-Scale Ecological Restoration: The North American Model of Wildlife Conservation



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The North American Model underpins one of the world's most significant and powerful conservation success stories. It is a unique wildlife management approach with no clear analog globally..." —Cooney (2019:153)

Abstract

Ecological restoration is considered by many to be a relatively new subdiscipline in ecology. However, in the United States and Canada, large-scale efforts to restore populations of numerous species of wild vertebrates have been ongoing since the early 20th century. These wildlife restoration efforts have become collectively known as the North American Model of Wildlife Conservation, a term coined by Valerius Geist in 1995, hereafter called the Model. The roots of the Model first developed from early efforts by people such as Theodore Roosevelt as a conservation doctrine in a political response to the public outcry against the overharvest and waste of large mammals, waterfowl and wading birds that brought many species to the brink of extinction. There are seven principles on which the Model is based:

1. Wildlife resources are in public trust
2. Markets for game have been eliminated
3. Allocation of wildlife is regulated by law
4. Wildlife can only be killed for legitimate purposes
5. Wildlife is an international resource
6. Science is the proper tool on which to base wildlife policy
7. Hunting is a democratic standard that is available to virtually anyone who demonstrates they are qualified to hunt safely.

Federal laws such as the Migratory Bird Treaty Act (1918), and the Pittman-Robertson Act (1937); also known as the Federal Aid in Wildlife Restoration Act) provided regulatory law, and a mechanism for funding wildlife restoration projects from a federal excise tax on guns and ammunition. Funds from these purchases are redistributed to state wildlife agencies based on purchases of hunting licenses and in the case of the Dingell-Johnson Act, freshwater fishes caught by anglers.

Introduction

During the past century, the North American Model of Wildlife Conservation has resulted in massively successful population restorations of ungulates, large carnivores, waterfowl, furbearers, wild turkeys, and many species of freshwater fishes, as well as the habitats needed to support them [1]. Hunting (and freshwater angling in fisheries conservation and management) license sales, along with state and federal agency harvest records over multiple decades have provided a de facto monitoring system that has generated the metrics to document this success. Admittedly, the focus of the Model on game species was both a strength as well as a potential shortcoming that has been overcome, at least partially, by additional federal regulations such as the Marine Mammal Protection Act and the Endangered Species Act that includes numerous species threatened by potential extinction. The Model has been central to more than

a century of wildlife restoration success in North America, and the maturation of wildlife science as applied ecology. Despite the success of the Model, numerous challenges such as widespread decline of grassland birds and other wildlife species that require early successional habitats in North America remain as urgent conservation priorities, if not actual crises. Contemporary factors such as climate change, ever-increasing human resource demands, animal rights and welfare activists, along with commercialization of wildlife, present challenges to the Model that must be overcome if it is to remain successful for another century of continued restoration and ultimately, sustainability of wild vertebrates on the North American continent. Wildlife resources as a public trust

Arguably, one of the most remarkable and successful efforts at ecological restoration is hiding in plain sight today throughout

most of the continental United States and Canada. The fact that wildlife resources are held in public trust is a policy that has been central to the recovery and restoration of many species of game animals in North America. In Europe, game animals were considered property of the Crown, and thus were inaccessible to commoners. When Europeans settled North America, they found an abundance of game animals and fishes and virtually unlimited access to these resources. Thus, access to abundant populations of game species was virtually unlimited to anyone almost anywhere as the colonies and provinces were settled [1,2]. The downside of this situation was that people took this unlimited access to game animals for granted. Over time, the overexploitation of game animals resulted in a classic example of a tragedy of the commons [3]. However, the implementation of laws, acts and policies, as well as cultural awareness and appreciation of wildlife, has resulted in enormously successful wildlife population restoration projects.

Markets for game have been eliminated

The unregulated killing of game animals for sale to markets and restaurants was a huge policy challenge that had to be solved in order for conservation and hence restoration these resources to occur. In the late 19th and early 20th centuries, people such as Theodore Roosevelt and George Bird Grinnell formed the Boone and Crockett Club to promote their philosophy of fair-chase hunting, as opposed to the widespread killing of game for sale to markets [4].

Allocation of wildlife is regulated by law

The legal framework of international treaties, federal laws and state regulations that form the basis of the Model have worked to promote the restoration of game populations because they have been largely impervious to political changes and challenges [5] over more than a century. Beginning with the U.S. Constitution and the Second Amendment in the Bill of Rights (to own firearms), the influence of English Game Law was overthrown as the U.S. became an independent country. The concept of wildlife in particular and nature in general as common property that cannot be privately owned has roots in ancient Roman law. In 1842, the U.S. Supreme Court formally recognized states as public trustees of wildlife, and in 1896, further designated that wildlife was legally held in public trust, rather than private ownership. The Lacey Act of 1900 protects both plants and animals by prohibiting trade in these resources. "It is one of the most significant pieces of legislation to curtail the unlawful taking of wildlife in the United States..." Cummins (2019:60)

Wildlife can only be killed for legitimate purposes

Definitions of what are legitimate versus illegitimate reasons for killing wildlife has changed to some extent over past decades. Shifting the take of game species from market hunting economics to a philosophy of fair chase hunting clearly drew a line between illegitimate and legitimate purposes. Killing wild

birds for plumage to decorate women's hats quickly went from being legitimate to illegitimate in the early 20th century as the public became appalled at such a practice.

While killing game species for their meat to nourish humans is obviously a legitimate pursuit, this history of how predators have been treated becomes much more complicated. When most of North America was wilderness, potentially dangerous animals such as bears, wolves and mountain lions were obviously seen as threats to human life as well as competition for meat from game species. As time marched forward however, people were nearly successful at eradicating these large carnivores, even to the point of making populations of several of these species endangered. Today, protection under the Endangered Species Act makes the killing of large predators illegal in most cases, other than in cases of repeated livestock depredation or human safety.

Wildlife is an international resource

The 1918 Migratory Bird Treaty between the United States and Canada clearly established an international basis for wildlife conservation and restoration in North America. Unlike people, animals pay no attention to political boundaries, and as such, the agreement between the U.S. and Canada has been a cornerstone of the Model [6].

Science is the proper tool on which to base wildlife policy

Basing wildlife policy on science should be straight-forward and based on common sense. In his book *Game Management* [7] basing management actions on scientific finding was a cross-cutting theme. In a classic case history of basing wildlife-habitat management actions on science, Herbert Stoddard demonstrated the important role of prescribed fire for maintaining northern bobwhite habitat [8] despite spirited opposition from federal agencies [9].

Far too often, however, there is a disconnect between science and policies linked to management [10]. In wildlife science, examples of such disconnects cut across taxa, (Brennan 2012, Herman 2012) [11] as well as regions (Bowers et al. 2012) and agencies block et al.2012) [12].

Hunting is a Democratic Standard

In England, the monarchy not only owned game species and wildlife according to divine right, they also controlled access to firearms, hunting dogs, and other paraphernalia used for hunting. Clearly, this draconian policy served to keep commoners in their place, and keep them from posing threats to the monarchy, vis-à-vis by prohibiting ownership to firearms.

Contrast with Australia

Given the dominance of English settlement in North America and Australia, it is reasonable to ask why the Model took root in North America but not in a comparable manner in Australia. A potential theory to explain this difference may be that Australia

was settled as a penal colony, whereas most of the original colonies and provinces in the U.S. and Canada were settled by people with free will. Burgin [13] considered these settlement differences but looked beyond them by noting that Australian colonists found wildlife on that continent to be relatively scarce and highly unfamiliar compared to the abundant and economic value of game species. In North America, a social-utilitarian approach to wildlife conservation emerged, with recreational hunting as a cornerstone whereas in Australia, a holistic approach to conservation of biodiversity emerged, with far less recreational hunting in their culture than in North America.

Why has the Model worked to restore wildlife populations in North America?

Several components of the Model have worked together in concert to restore wildlife in North America. First, cession of over-exploitation of animals from market hunting was a critical step in this regard, along with adoption of a fair-chase hunting philosophy. Second, a hard-wired federal funding mechanism from excise taxes on sporting arms, ammunition, and angling supplies and gear has resulted in billions of dollars for state agencies to purchase land for state hunting areas, as well as support agency programs and personnel. The excise taxes are collected a point of sale, and deposited in Washington D.C. These funds (Pittman-Robertson in the case of hunting, Dingell-Johnson in the case of angling, are then redistributed to states based on sales of hunting and fishing licenses and land area. Thus, federal funds to aid wildlife and fisheries restoration are proportionally distributed to states based on license sales; more license sales in a state means more federal aid for restoration, and vice versa.

Third, state wildlife agencies, over the years, have created de facto monitoring programs that have documented, and continues to document, population trajectories of harvested species. Hunter check stations, surveys, license sales, and myriad population counting techniques have documented the recovery of deer, furbearers, waterfowl, web less migratory game birds and other resident game birds.

Fourth, the majority of wildlife population restoration recovery efforts, especially those that use a triple-t approach (trap, tag and translocate) have focused on restoring native species to their original geographic ranges. This has especially been the case with deer and wild turkeys. In some cases, non-native species have been introduced such as pheasants, chukars and Hungarian partridge.

Fifth, there is a massive cultural appreciation for wildlife in North America. The rapid demise of bison, beaver, deer, and other once common animals struck a chord with the general public, thanks to the many “early champions” who promoted wildlife conservation efforts. Hunters and anglers, through the taxes they pay for sporting arms and ammunition, angling gear, and licenses have done more than any other group to restore wildlife populations in North America. To many in the public who are

uninformed, this seems to be a contradiction in terms because they conflate harvesting game animals as a negative phenomenon rather than a sustainable pursuit, if managed correctly with bag limits and hunting seasons based on biological criteria.

Threats and Challenges to the Model

The legal and cultural constructs that form the basis for the Model, and hence one of the largest and most successful ecological restoration projects in the world have been more-or-less impervious to the winds of political change during the past century or so. Nevertheless, there are numerous emerging challenges in our society and culture that need to be addressed if the Model is to remain successful. Seven of the most significant challenges to the Model include

1. Increasing human population
2. Globalization
3. Urbanization
4. Novel Ecosystems
5. Fragmentation
6. Lack of adequate funding
7. Superabundance of both native and invasive species

These topics were addressed in detail by Brennan et al. [14] and are summarized here.

Increasing human population

The human population is on track to reach 8.5 billion people by 2030. The implications for maintaining any kind of sustainable use of renewable natural resources are enormous.

Globalization

The process of globalization moves ideas and causes organizations to operate on an international scale. What this means is that distant publics can influence local and regional policies by lobbying and generating political pressure to advance agendas that may or may not be helpful for wildlife restoration and conservation.

Urbanization

More than two-thirds (68%) of the global population is projected to live in urban areas by 2050. In North America, more than 80% of the population already lives in cities. Thus, the human-nature divide is likely on track to become wider rather than narrower.

Novel Ecosystems

Biogeographers now consider us to be in the Anthropocene era. Half to three-quarters of the globe is dominated by urban, suburban and industrialized landscapes. Putting the development of novel ecosystems in the context of climate change makes this challenge to the Model enormous.

Fragmentation

Connectivity, which is the inverse of fragmentation, is essential for maintenance of virtually all populations of wild animals, whether they are migratory or resident. Declines in huntable populations can work to potentially erode license sales and other formula-funding support for wildlife restoration.

Lack of adequate funding

As noted above, hunters and anglers have generated the lion's share of financial support for wildlife restoration during the past century. It is clear that alternative sources of funding need to be identified so that less of the burden falls on hunters and anglers to support wildlife restoration efforts. Perhaps a modest excise tax on camouflage clothing, binoculars, field guides and bird seed can provide additional support for wildlife restoration efforts, especially for species that are not hunted. The state of Missouri has a fraction of a penny tax on soft drinks that goes directly to their state conservation agency, which has worked as a supplement to funds from hunters and anglers for nearly three decades.

Superabundance of species

In certain instances, the Model has resulted in a superabundance of species such as white-tailed deer, elk, snow geese, beavers and even black bears. This, in turn, leads to human-wildlife conflict such as crop depredation, damage to buildings, and excess bird manure on golf courses and city parks. These sorts of negative interactions have the potential to erode public support for wildlife restoration and conservation.

Other Legislation that Compliments the Model

The Marine Mammal Protection Act and the Endangered Species Act are two pieces of federal legislation that have worked with the Model to restore populations of animals that were once at the brink of extinction. Elephant seals are a species that has benefitted from the Marine Mammal Act (by protecting them from exploitation), and peregrine falcon's populations have been restored to the point to where they were taken off the endangered species list. In the case of peregrine falcons, legislation banning the use of DDT and related chlorinated hydrocarbons allowed falconers to successfully restore peregrines throughout the eastern two-thirds of the United States.

Postlude

Ecological restoration is a tricky business. The concept of restoration is often deemed a warm and fuzzy effort to put things back to the way they were before humans messed things up. How we decide what to restore and what not to restore is a topic way beyond the scope of this short article. Nevertheless, in the late 19th century, people joined hands in what must have seemed like an impossible task at the time: restoring native game animals to their former levels of abundance. By and large, they got things right, and were wildly successful. However, we still have a long

way to go when it comes to restoration of populations of wild species of animals and the habitats that support them. The northern bobwhite quail, numerous species of grassland birds, as well as scores of species that remain on the endangered list all need attention from the North American Model of Wildlife Conservation as we move forward through this century, and beyond.

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