Conservation of Charismatic Megafauna through Economic Incentives: How the American Alligator May Provide a Blueprint for Future Delisting Programs

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We are part of a culture that loves large animals. They're just more appealing whether it's the stunning beauty of a Bengal tiger slinking through the jungle, the behemoth size of an African elephant trudging through the open plains, or the haunting silhouette of a saltwater crocodile lurking just off the water's edge. We as humans seem to gravitate to these magnificent creatures and their evolutionary achievements.

Sadly, these lovable large animals, or "charismatic megafauna," continue to face uphill battles in terms of survival.[1] Whether by overhunting or habitat infringement we seem to continuously bring these animals to the brink of extinction.[2] Fortunately, there have been laws enacted to ensure their survival. The Endangered Species Act has worked to save numerous megafauna species in the United States by recognizing these species as threatened or endangered, and offering them federal protection from poaching and human infringement.[3] This listing has success over the years in terms of protecting these lovable beasts,[4] but what happens after they are deemed recovered and lose their protected status?

Proper delisting programs are necessary to ensure long-term success of these species as well as their ecosystems as a whole.[5] Megafauna have widespread impacts on a plethora of smaller plant and animal species as well as humans through economic, environmental, and societal values.[6] When examining these species and their impacts, it is important to separate their biocentric values from their anthropogenic values. Biocentrism is based upon the view that all life has an inherent value, which promotes biodiversity and animal rights; whereas anthropocentrism is based upon the view that life is centered upon its value to humans, which pushes utilitarianism and ecosystem services.[7] While these ideologies appear to frustrate one another, they are capable of promoting the same goals for alternate reasons. This paper takes an anthropogenic approach to the species delisting programs by proposing pecuniary incentive-based programs,

which promote the economic values of animals and furthers the efforts towards their conservation and proliferation, which in turn will accomplish biocentric goals.

Three important factors must be considered when establishing a new delisting program. First, the program must examine all the future impacts that it might have on the species. Second, it must take into account the intrinsic values offered by the species and the associated costs of both its endangerment as well as its overpopulation. Third, it must apply real-world, practical scenarios to the model and attempt to rectify any potential shortcomings. By examining a successful delisting program, this paper will look at what made that program so effective, where it could be improved, and how it may serve as a blueprint for present and future delisting programs. Specifically, this paper will examine the history of the American alligator, a once endangered species that is now thriving under an excellent management program.

History of the American Alligator

American alligators were being harvested as early as the 1800s for their skins to make leather goods, such as boots and saddles, and for their oil to grease steam engines and cotton mills.[8] Demands decreased when consumers began to realize that the skins were not very durable.[9] Around the turn of the 1900s, however, commercial tanning processes began popping up in places such as New York, New Jersey, and all over Europe.[10] Due to new techniques used in the tanning process that made the hides durable, softer, and more pliable, the demand for alligator leather increased dramatically.[11] Due to increased demands for the skins, alligator populations were subjected to significant reductions by the mid-1900s from overhunting and infringement of humans into critical habitat.[12] By 1962, alligator hunting was prohibited across the state due to such low populations.[13] Due to poor enforcement and a lack of regulations, illegal hunting continued to persist throughout Louisiana.[14]

The Endangered Species Preservation Act (ESPA) was passed by Congress in 1966 and provided a means for listing native animal species as endangered and giving them limited protection.[15] The first list was issued in 1967 and included the American alligator, making it one of only six reptiles on the inaugural list.[16] In

1973, the Endangered Species Act (ESA) was enacted and incorporated all species from the inaugural list, including the alligator.[17] The alligator remained on the ESA's protected list as a threatened or endangered species for twenty years until it was removed and pronounced fully recovered in 1987.[18] However, it still remains under regulation of the U.S. Fish and Wildlife Service (FWS) through the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) due to its similarity in appearance to other threatened or endangered species of crocodilians.[19]

Following the alligator's full recovery a highly regulated harvesting industry was created and procedures were implemented whereby populations could be monitored through FWS agents.[20] Alligator populations had skyrocketed between 1962 and 1972 while hunting was completely banned statewide, and the need for regulated control measures became apparent.[21] In 1972 the first regulated wild alligator harvest was implemented in Cameron Parish.[22] Over the next nine years subsequent parishes were included in the harvesting program as populations continued to grow.[23] The wild American alligator harvesting season was finally opened statewide in 1981.[24]

A major reason for ensuring long-term conservation of the alligator is due to its function as a keystone species, meaning that it plays a critical role in the structure of its ecological community. The alligator's role as an ecosystem regulator cannot be over emphasized, however, it is critical to not just examine the balance of an ecosystem in terms of apex species abundance. In order to properly monitor and restore ecosystems to the point they were prior to human infringement, wildlife agents must find creative ways of keeping species levels, especially predators, at carrying capacity for the habitat.[25]

Harvesting Program Overview

Over the forty-three years of its existence the alligator harvesting program has remained much the same with the exception of a few minor alterations.[26] A major foundation of the program is the use of non-transferable CITES tags that the Louisiana Department of Wildlife and Fisheries (LDWF) only issues to licensed alligator hunters.[27] These tags greatly reduce the susceptibility of the harvesting program to become a fleet race, one in which hunters are attempting to

capture as many alligators as allotted for that area as quickly as possible. Also, the non-transferability of the tags creates greater accountability for those conducting the harvest.

CITES is an agreement between 175 countries to adhere to guidelines concerning international trade of certain wild animals and plants so as to not threaten their survival.[28] A requirement of CITES is that the LDWF demonstrate annually that the harvest of alligators has no detriment to Louisiana's American alligator population.[29] Aerial nest surveys and harvest statistics are instruments used by LDWF to illustrate that the harvest has no detriment to the wild population. Agents will in turn use this data to set the alligator harvest and alligator egg collection quotas statewide.[30] Another requirement derived from CITES is the tagging of all alligators harvested. Barcodes were added to Louisiana's alligator tags in 2008 to assist in inventorying and tracking alligator hides.[31] The LDWF tracks each alligator tag from hunter issuance to shipment out of Louisiana or finishing in Louisiana.[32] This tracking system also provides other important information such as harvest areas, alligator size parameters, and the number of alligators taken.[33]

Tags are granted based on the aerial nest surveys of 50 different management units across the state, which are classified by habitat types (such as fresh, intermediate, and brackish water marshes, swamps, and lakes) for each parish or sub-parish.[34] The tags are issued by LDWF based on population estimates for a given tract of land. Both state-owned and privately-owned lands are assessed. For privately-owned land, the landowner is given the allotment of tags and allowed to divvy them up among registered alligator hunters. Once the tags are assigned to a particular hunter they become non-transferable. These tags are usually subject to a commission fee paid back to the landowner, typically around 30% of the value of the harvested animal. The state-owned lands are also assigned tags, however, these are subject to an auction-style bidding war between hunters. Purchased tags carry an average life-span of five years, meaning that once those tags are successfully won at auction, the winning hunter is guaranteed access to those same tags for the next five hunting seasons. The establishment of this tag issuance system plays a vital role in ensuring the sustainability and efficacy of the wild alligator harvesting program by helping agents hold hunters accountable,

assisting in accurate population estimates, and ensuring greater safety and protection for those involved in the harvesting process.

Current Status and Future of the Program

Over the past decade the wild alligator industry has averaged an annual harvest of roughly 32,000 wild alligators.[35] These alligators averaged seven feet in length and accumulated an estimated value of over $100 million.[36] Over the entirety of the harvesting program, wild alligators are estimated to have produced almost $300 million.[37] Beyond the success of preserving the species and preventing overhunting, the alligator harvesting program has established many other benefits to the state of Louisiana. The alligator industry, which includes egg collection and farm raised alligator processing in addition to the wild harvesting program, has generated almost one billion dollars in economic benefit to Louisiana.[38]

Egg collection and alligator farming have further assisted in the preservation of populations by requiring a percentage of those alligators raised in captivity be returned to the wild. They have also benefited the processors and given a large boost to the economic value of skins by providing nearly flawless hides due to the controlled environments in which the animals are raised. The wild harvest program also prevents overpopulation of the species. Alligators are an apex species, and therefore do not face predation in the wild other than cannibalism. By regulating the number of wild alligators harvested each year, agencies can prevent excessive predation of other species, thus ensuring a healthier and more balanced ecosystem.

Yet the alligator harvesting program is not without its shortcomings. One problem that commonly occurs is the tendency for harvesters to outsmart the system in attempts to maximize their economic gains. For instance, in addition to the quality of the alligator's hide, which is graded based on its lack of scars, cuts, and other aesthetic damage, hunters are paid on a per foot basis. This creates motivation for hunters to bring in the largest animals. However, the methods employed in the majority of hunting techniques do not allow for selective harvesting. Standard alligator traps are set by tying one end of high-strength nylon rope to the trunk of a tree, or other stationary object, and attaching a large

metal hook baited with chicken meat to the other end hung roughly two feet off of the surface of the water. When the alligator takes the bait, it will typically swallow the hook as well. Therefore, when hunters release smaller alligators in order to reserve their tags for larger animals they must cut the line, leaving the indigestible hook inside the alligator's stomach. These smaller animals will almost certainly die shortly thereafter, and the end result is both wasted resources and skewed population estimates.

Furthermore, the promotion of harvesting larger animals reduces the number of apex predators in the wild. Research has shown that the diets of alligators evolve as the animals increase in size.[39] The diet of those alligators measuring under five feet in length is typically comprised of fish and crustaceans.[40] As alligators grow beyond five feet in length their diet alters to consist of larger mammals such as muskrat and nutria.[41] Nutria have proven to be a major nuisance due to their overwhelming effects on the reduction of plant biomass in these wetlands and estuaries.[42] The massive reduction in biomass from nutria is extremely problematic for the state when evaluating inland protection from hurricanes and storm surge.[43] By preserving and promoting the existence of larger alligator species in the wild, Louisiana could harness the free ecological service of biocontrol for nutria. Further research would be required to quantify the number of large alligators required to reduce nutria populations significantly, but it undoubtedly offers a unique solution to an ongoing and detrimental problem.

Another issue that consistently comes up is the infringement upon nesting habitats and subsequent reduction of female populations. By commencement of the harvesting season in September, less than one month following the hatching of juvenile alligators, female alligators are famished from building the nest, laying the eggs, and guarding it during the harsh summer months. When alligator lines are set near nesting areas, females make for an easy target due to their exhausted conditions. When too many females are captured by the harvesting program, wild numbers experience a decline. Additionally, the farming industry takes a direct impact in the following seasons by having those potential eggs taken out of production. Therefore, both ecological and economic impacts are felt as a result of these captures.

These are a few examples of where the alligator harvesting program can be improved. Although the alligator program is not without its shortcomings, it nonetheless continues to represent a shining example of how successful an economic incentive-based delisting program can be with regard to species protection and conservation.

A large part of the success behind this program, aside from the conservation of the species and the influx of commercial profit into the state economy, is the effect this program has induced upon habitat preservation. One of the largest impacts on apex species is habitat fragmentation and destruction. The pecuniary incentives to preserve these habitats has simultaneously acted as a deterrent to any other form of land development through commercial activities. A concept of landscape scale conservation utilizes similar tools in terms of natural resource management. This form of conservation considers not just biodiversity, but takes into account issues with local economies, agriculture, ecotourism, geodiversity, and health and social benefits to the environment.[44] This sort of holistic approach integrates many of the factors, known as the five P's, of natural resource management; those factors being property rights, prescriptive regulation, financial penalties, financial payments, and public disclosure and persuasion.[45]

When considering the efficacy of the wild alligator harvesting program, it is clear that the success of the program is due to implementation of several of these management factors. The combination of financial payments with property rights is the most obvious application of these tools through the commissions paid back to the private landowner, which rewards land management that centers on natural resource conservation. However, the program has also implemented the use of prescriptive regulations by limiting the number of animals harvested, the qualifications and accountability of the hunters selected to harvest, and the limited life-span of public tags awarded by the state. It also implements financial penalties for those that hunt outside of their assigned territory, take animals without a valid license, or fail to tag any animals that are harvested. Penalties are also assigned in the rare instance that a hunter is caught selectively harvesting any animals by cutting their lines. Finally, the LDWF does an outstanding job of committing public disclosure and communicating all new regulations that come out each year. This also shows that agents are constantly staying vigilant to adapt

the program wherever necessary to ensure both economic gains and species conservation.

Conclusion

The story of the American alligator harvesting program in south Louisiana is certainly a tale of success in terms of species conservation, habitat protection, landowner and environmentalist satisfaction, and economic generation. The accomplishments of this program should be used as a blueprint for wildlife agents to protect other endangered habitats and preserve other threatened species, not only in Louisiana but across the globe. Creation of landscape scale conservation efforts may be necessary, and further research to understand the impacts of population control certainly are required to ensure long-term sustainability of these newly implemented programs. Through proper application of the natural resource management factors, however, landowners and environmentalists can come together for establishment of valuable programs like the alligator industry, both now and in the future, to ensure protection of these valuable ecosystems and the charismatic megafauna that inhabit them.

These megafauna play gigantic roles in their respective ecosystems, and as such they are generally accurate representations of the well-being of those fauna and flora existing around them. Not only that, but they play very important roles in our lives as well. Beyond what they represent as charismatic icons of nature, these animals present unique anthropogenic opportunities in the way of economic productivity. Their economic value as a renewable natural resource in the form of pelts and hides, their recreational value as an ecotourism attraction, and their utilitarian value as a regulator of other nuisance animals make these species *worth* protecting.

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[1] David C. Holzman, *As big animals poop out*, Science News for Students (Dec. 11, 2015), https://student.societyforscience.org/article/big-animals-poop-out [https://perma.cc/L476-LFD6].

[2] *Id.*

[3] 16 U.S.C. 1531 *et seq.* (1973) [hereinafter *Endangered Species Act*].

[4] *See* Kieran Suckling, Noah Greenwald, & Tierra Curry, *On Time, On Target: How the Endangered Species Act is Saving America's Wildlife*, Center for Biological Diversity (May 2012).

[5] Holzman, *supra* note 1.

[6] *Id.*

[7] James Rasband, James Salzman, & Mark Squillace, Natural Resources Law and Policy 12-20 (2d ed., 2009).

[8] *General Alligator Information*, La. Dep't of Wildlife & Fisheries (last visited Sept. 29, 2015), http://www.wlf.louisiana.gov/general-alligator-information.

[9] *Id.*

[10] *Id.*

[11] *Id.*

[12] *Id.*

[13] *Id.*

[14] Allan R. Woodward, *History of American Alligator Regulations in the U.S.A.*, Florida Fish and Wildlife Conservation Commission (June 12, 2007).

[15] *A History of the Endangered Species Act of 1973*, *Endangered Species*, U.S. Fish & Wildlife Service (last visited Sept. 29, 2015), *available at* http://www.fws.gov/endangered/laws-policies/esa-history.html.

[16] 32 Fed. Reg. 4001 (1967).

[17] Endangered Species Act, *supra* note 3.

[18] John Hammond, *American Alligator*, U.S. Fish & Wildlife Service (Feb. 2008).

[19] *Id.*

[20] *Alligator Hunting Regulations Overview*, La. Dep't of Wildlife & Fisheries (last visited Sept. 29, 2015), http://www.wlf.louisiana.gov/alligator-hunting-regulations-overview [https://perma.cc/4PGY-499A].

[21] *Id.*

[22] *Id.*; Although the alligator remained listed under the ESA until 1987, FWS agents allowed for regulated takings based on population estimates as determined on a parish-by-parish basis.

[23] *Id.*

[24] *Id.*; The American alligator remained under ESA protection in the state of Florida until 1987 when a full recovery was determined within all habitat ranges.

[25] As opposed to overpopulation of any one species, namely apex predators such as the American alligator.

[26] *Alligator Hunting Regulations Overview*, *supra* note 20.

[27] *Id.*

[28] *General Alligator Information*, *supra* note 8.

[29] *Id.*

[30] *Id.*

[31] *Id.*

[32] *Id.*

[33] *Id.*

[34] *Id.*

[35] *Louisiana Wild Alligator Harvests, 1979-2014,* La. Dep't of Wildlife & Fisheries (Aug. 1, 2014), *available at* http://www.wlf.louisiana.gov/sites/default/files/pdf/page/33674-historical-data/alligatorindustrygraphs.pdf; This excludes the 2009 harvest, which produced drastically lower numbers due to the worldwide economic recession, which in turn greatly reduced the demand for wild alligator skins.

[36] *Value of Wild Alligators Harvested in Louisiana, 1979-2014*, La. Dep't of Wildlife & Fisheries (Aug. 1, 2014), *available at* http://www.wlf.louisiana.gov/sites/default/files/pdf/page/33674-historical-data/alligatorindustrygraphs.pdf.

[37] *Id.*

[38] *AAC Annual Report*, Alligator Advisory Council 1 (Dec. 2014), *available at* http://www.alligatorfur.com/alligator/14alligatorannual.pdf.

[39] Paul A. Keddy, Laura Gough, J. Andy Nyman, Tiffany McFalls, Jacoby Carter, & Jack Siegrist, *Alligator Hunters, Pelt Traders, and Runaway Consumption of Gulf Coast Marshes*, *in* Human Impacts on Salt Marshes, A Global Perspective 115, 117-20 (B. R. Sillman, E. D. Grosholz, & M. D. Bertness eds., 2009).

[40] *Id.*

[41] *Id.*

[42] *Id.*

[43] *Id.*

[44] Krisztina Szalai, Richard Field, & Sarah Jewitt, *The appeal of landscape-level certification to enhance biodiversity conservation and community development*,

Biodiversity Science (Dec. 2013), *available at* http://www.biodiversityscience.com/2013/12/03/landscape-level-certification/.

[45] Rasband et al., *supra* note 7, at 69-74.