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Conservation Status of the Endangered Ocelot in the United States - A 35-Year Perspective

About Dr. Michael Tewes

Michael Tewes grew up in nearby Odem - a small town 35 miles north of Kingsville. He received a B.S. (1979) and M.S. (1982) in Wildlife Science from Texas A&M University in College Station, and a Ph.D. (1986) in Wildlife Resources from the University of Idaho. Michael began working on ocelots during the first year of the Caesar Kleberg Wildlife Research Institute in 1981. Honors include the Regents Professor, the highest honor for a professor in the Texas A&M University System in 2007, and the first holder of the Frank D. Yturria Endowed Chair in Wild Cat Studies in 2008. His research has included 12 different wild cats around the world.

Executive Summary

The ocelot is at a high risk of extinction within the United States. Fewer than 80 individuals are believed to occur in two small groups embedded in different environments. The smaller "Refuge Ocelot Population," which typically ranges from about 7 to 14 verified individuals, is ecologically encapsulated by a hostile landscape of open terrain (agriculture, coastal prairies), a dense and deadly road network, and a rapidly increasing human population with expanding urban areas. The larger "Ranch Ocelot Population," which has more than 80% of the U.S. population, is not afflicted by many of the same problems. These "ranch ocelots" occupy extensive habitat tracts surrounded by more sympathetic rangelands containing prey and cover. In addition, the extensive ranchlands will prevent the expansion of roads, local human population, and urban areas for many decades into the future.

Unfortunately, public attention and agency efforts over the decades have focused on the few ill-fated "refuge ocelots." In contrast, less recovery effort has been spent on the ranch ocelots which represent a much greater recovery opportunity.

I reviewed the effectiveness of four broad areas of ocelot conservation from 1991-2016. These programs included (1) landscape corridors and related land purchases, (2) habitat restoration, (3) ocelot road crossing structures, and (4) translocation. In essence, I concluded these four conservation programs have failed to provide "A Meaningful Benefit" for ocelot conservation over the past quarter century.

Proclamations of false ocelot benefits from these four conservation areas have three consequences: (1) they do not help ocelot recovery, (2) they promote "The Illusion of Achievement" giving the public a false sense that ocelot conservation is advancing (when it is not), and (3) large sums of taxpayer dollars are spent. More than $20 million have been spent (not including land purchases) and I believe we have less habitat and fewer ocelots than when I began 35 years ago. We need a new paradigm for ocelot conservation.

To effectuate change, I urge the adoption of programs, policies, and actions that will "Make a Difference" for ocelot recovery. These new actions should target the resident female ocelots, particularly within the Ranch Population. A few key landowners have most of the ocelot population in the United States. If their concerns over endangered species regulation and federal overreach can be accommodated, then significant ocelot recovery can be achieved in a short period of time.

However, time is extremely limited for ocelot survival in the United States. Empowering private landowners to enact a management plan for the resident ocelot population, one that is tailored for ranchers, is the essence of the new paradigm for ocelot recovery.

Introduction

The exquisite ocelot *(Leopardus pardalis)* is a beautifully spotted endangered cat that weighs about 20 pounds. Although its range includes parts of Mexico, Central and South America, I believe fewer than 80 ocelots remain in the United States.

I began the initial search for the ocelot in October 1981 during the inaugural year of the Caesar Kleberg Wildlife Research Institute. Focusing on this feline over 35 years has given me a singular ecological and conservation perspective that I will share tonight. This perspective has been tempered by many successes and a few failures, but most importantly it yields a realistic understanding of the conservation status, and a clear and rational vision of the constraints and opportunities for future ocelot recovery.

Many of my comments will be controversial. These statements will instigate concern because they vary from long accepted beliefs and unchallenged practices over the past quarter century. I am also confident that in five years my assertions will be retrospectively found accurate.

Two Goals

There are two goals for this lecture. One is to describe the current conservation status of the ocelot in the United States. Many programs, policies, and actions have occurred in the name of ocelot conservation. However, I posit that few of these efforts have provided "A Meaningful Benefit" for ocelot conservation or "Made a Significant Difference" in ocelot recovery.

The second goal is to effectuate change. I will outline a new path forward that we urgently need to adopt for ocelot recovery - a path that is strategic, rational, and defines the actions we should be implementing.

Early Days

When I began this research as a graduate student in 1981, many veteran biologists and professors whom I greatly respected admonished that ocelots were rare and elusive, and several "gray-hairs" believed this feline no longer occurred in Texas. Collectively, they prophesied failure for the ocelot project.

Consequently, the ocelot I trapped on March 2, 1982, within the Guadalupe Ranch of Willacy County, represented the most important day in my professional life. This event marked the beginning of my career, working with a great research team, studying 12 different kinds of wild cats around the world, including clouded leopard, golden cat, leopard cat, and marbled cat in Thailand, lion and leopard in Tanzania, jaguarundi, margay, and jaguar in Mexico, and mountain lion, bobcat, and ocelot in Texas.

Research on ocelots has, by far, received the greatest focus. Beginning September 1982, I captured 10 ocelots on the Laguna Atascosa National Wildlife Refuge (NWR). When I began, the refuge staff was uncertain ocelots still existed on the reserve. It had been managed as a waterfowl refuge since establishment in the 1940s.

Perhaps the most consequential achievement I may have produced for ocelot conservation followed my initial visit with Mr. Frank Yturria when we toured his San Francisco Ranch in 1983. I had already examined aerial photographs and identified two key tracts of dense thornshrub suspecting they may harbor ocelots. I was excited when we drove to the spot I sought, and he mentioned watching ocelots cross the road at that location. I could also see the bulldozer clearing the last two remaining brush fragments covering about 500 acres of the historically recognized "El Jardin."

When I described the importance of these relict patches of thornshrub for ocelot conservation, Mr. Yturria responded, as quoted in his biography (Yturria 2018, pg. 474), "So I said, 'Well, then, I'll stop clearing brush.'" This moment in 1983 also began an incredibly successful story of the achievements possible by a single landowner committed to ocelot conservation. He dedicated over 10,000 acres of his ranch into conservation easements in the heart of the Ranch Ocelot Population. This protection included key expansions of the conservation easements by the Nature Conservancy in 2007 for 698 acres and 2009 for 1,300 acres - tracts that had been previously cleared by the aforementioned bulldozer in the early 1980s. We are all fortunate that the Yturria Family continues this important legacy for ocelot conservation.

Our early cat research team which included Linda Laack, Daniel Navarro, and Arturo Caso collected much basic ecological information during the first 10 years of our research from 1982–1991 (Tewes 1986, Tewes and Everitt 1986, Tewes and Miller 1987, Tewes and Schmidly 1987, Laack 1991). An early important discovery was that ocelots are habitat specialists which prefer extremely dense thornshrub communities (Tewes 1986, Shindle and Tewes 1998, Horne and Tewes 2009). We also found that this cover type is rare and covers less than 1% of southern Texas, thus a fundamental reason ocelots are rare in the United States (Tewes and Everitt 1986, Tewes 2017).

Current Populations

Our research also defined two small relict ocelot populations (Fig. 1). The smallest group which typically ranges 7 to 14 ocelots, is termed the "Refuge Ocelot Population." It occurs in a few tiny isolated habitat tracts primarily on and around the northern, or original, portion of the Laguna Atascosa NWR. This Refuge Ocelot Population is confined to the extreme eastern portion of Cameron County, the southernmost county in Texas.

The origin of the lower number (7) emerged from our trapping and telemetry research from 1982-1999. We found the highest number of ocelots verified in each calendar year (Jan 1-Dec 31), then averaged the top three years. Thus, the most number of confirmed ocelots in a year on Laguna Atascosa NWR during the initial 17 years of study were seven.

Recently 14 ocelots were identified in 2015 using a more comprehensive approach of trapping, telemetry, and camera surveys (U.S. Fish and Wildlife Service 2016, pg. 10). This range of 7 to 14 ocelots is alarming since the population could disappear in almost any year following a few years of unfavorable conditions (e.g., severe droughts), the increasing expansion of nearby mortality agents (e.g., roads, urban areas), and random processes (e.g., genetic and demographic stochasticity).

The second larger population is the "Ranch Ocelot Population" located primarily in and around northeastern Willacy County. Our monitoring program spanning decades on Yturria's San Francisco Ranch, and more recently the East Foundation's El Sauz Ranch has shown at least 35 verified ocelots using these two ranches. This number was also derived from averaging the three highest years on both ranches. I have documented additional ocelots on other ranches that wish to remain confidential.

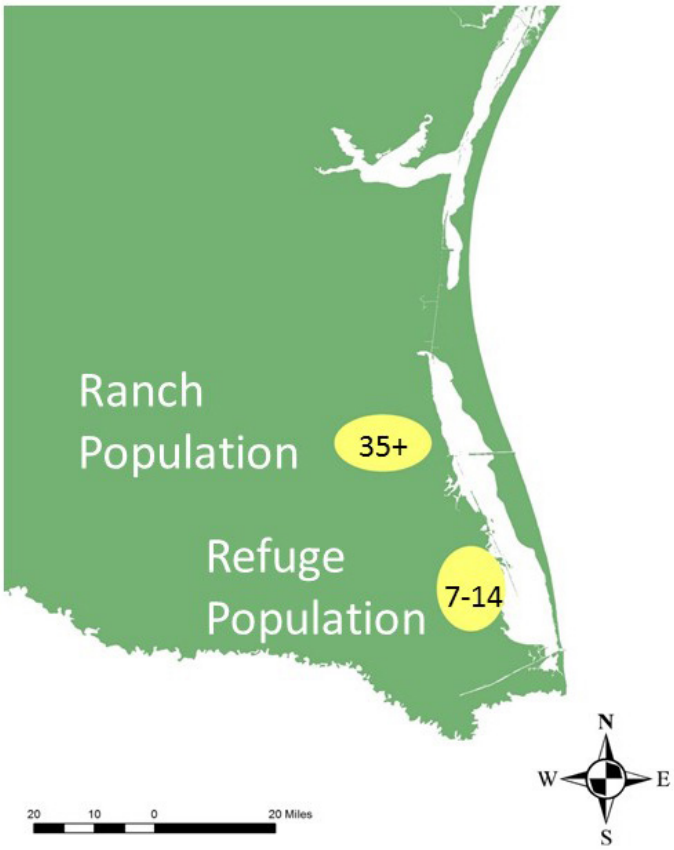

Figure 1. Location of the two ocelot populations in South Texas.

Population size varies each year because of many factors including drought and wet periods, variations in prey abundance, and many other factors (Pence et al. 1995, Haines et al. 2005, Tewes and Hornocker 2008). However, based on my accumulated information and experiences, I am convinced the Ranch Ocelot Population represents at least 80% of the resident ocelot population in the United States (Tewes 2017, Tewes personal observation).

The General Problem

With a few exceptions, most of the conservation attention over the past quarter century has focused around the 7 to 14 ocelots on Laguna Atascosa NWR. Even within the refuge, prime habitat patches are small and fragmented with few connections beyond the refuge boundaries. As male ocelots are forced out by other dominant males, they attempt to travel through the high-risk landscape. Many dispersing males have been found road-killed within 10 miles of the Laguna Atascosa NWR (Fig. 1).

One factor producing conservation inefficiencies is excessive focus on trying to accommodate dispersing male ocelots, which behave almost as butterflies floating randomly over the landscape, and not enough attention (e.g., habitat restoration) is spent on resident female ocelot populations which are more predictable in space and time.

The Refuge Ocelot Population has been surrounded by an inhospitable sea of open natural land (prairies, wetlands, mud flats) for many decades which is dangerous for transient ocelots which require escape cover during risky dispersal journeys. The lethality of these open areas is increasing significantly with a sharply growing anthropogenic landscape of roads and urban areas overlaid on the original dangerous natural landscape. The Refuge Ocelot Population is isolated, and this insularization will only grow worse by 2050 according to Environmental Protection Agency (EPA) models (Jason Lombardi personal communication). That reality cannot be changed. And essentially, there are no simple rational solutions that can restore landscape connectivity to amend this problem of isolation.

Finally, the limited prime habitat available to the Refuge Ocelot Population will continue to constrain population size at its current low levels. We have documented multiple cases of inbreeding and matings among relatives. Loss of genetic diversity is a major threat to population persistence - the gene pool of the refuge ocelots has turned into a gene puddle (Janecka et al. 2008, 2011, 2014, 2016).

Urgent extensive habitat restoration within the resident female population should be paramount. If the carrying capacity can be expanded over the next 20 or 30 years, then a few translocated ocelots will diversify the gene pool. Increasing the chance to sustain population persistence through a future catastrophe such as a multi-year severe drought, major wildfire, or epidemic should be a goal vigorously pursued by increasing carrying capacity through habitat restoration on Laguna Atascosa NWR.

Time is Limited

Beside all the natural and anthropogenic afflictions threatening the small Refuge Ocelot Population, "time" is not a friend either. There are two separate, yet compelling, reasons that available time for population rescue is limited. First, the cat research team has conducted two Population Viability Analyses (Haines et al. 2005, Stasey 2012). Results clearly show that the small sizes of both ocelot populations are destined for imminent extinction in the near future unless major interventions are deployed for these felines. This conclusion reflects basic teachings in "Conservation Biology," a graduate course I have taught for the past 25 years, that a very small population in a fixed habitat area with limited carrying capacity is doomed.

The interplay of four interacting variables - environmental variation, demographic variation, genetic loss, and catastrophic events - and their synergistic or "vortex effects" can lead to rapid local extinction of small populations unless demographic and genetic rescue occurs. The small Refuge Ocelot Population is particularly vulnerable to the "vortex effect" and should be considered as a highly "conservation-reliant species" (Scott et al. 2010).

A second reason that "time" is limited was recently re-emphasized by my doctoral student, Jason Lombardi. Jason applied EPA models of future scenarios that show the forthcoming rapid increases in the human population and related urban areas destined in Cameron County. Models show alarming increases in both categories that will have chilling consequences for survival of the Refuge Ocelot Population.

The human population in the Lower Rio Grande Valley increased from 400,000 in the 1960s to 1,317,156 in 2013, and may reach 3 million by 2050 (Leslie 2016). Increases in population and urban coverage will further reduce landscape permeability of the already confined Refuge Ocelot Population. I term this "The Process of the 4Es" or "Ecological Encapsulation and Eminent Extinction." This crushing ecological process has already been operating over the past 25 years, and appears to be accelerating. Sand is rapidly draining from the hour glass.

Ocelot - A Flagship Species

About 1991, the emergence of the Wildlife-Agriculture Coexistence Group occurred under the effective leadership of the late Steve Thompson, an earlier manager of the Laguna Atascosa NWR from 1988-1995. He began an era of conservation actions in which the U.S. Fish and Wildlife Service (USFWS) frequently began meetings and presentations as identifying itself as the 'Lead Agency' responsible for ocelot conservation. Consequently, this evaluation focuses on the 25-year period from 1991-2016 when the USFWS asserted responsibility for ocelot recovery. It should also be noted that Steve Thompson and the first ocelot biologist for USFWS, Linda Laack, played critical roles in studying the ocelot and expanding the mission of the Laguna Atascosa NWR beyond a waterfowl refuge to a reserve that also emphasized endangered ocelots.

In the early 1990s, ocelots became the raison d'etre to support various conservation efforts in the Lower Rio Grande Valley. The ocelot is a high-profile, charismatic carnivore often used as a "flagship species" by agency biologists and environmentalists to galvanize public support for various conservation actions. (Historically, a naval armada was led by the "flagship" carrying the banner representing the fleet or country. The flagship was important for "rallying the troops" and "leading the fight.")

Four Areas of Conservation Failure

The Ocelot Flagship has frequently been invoked over the past 25 years as an important reason to support four conservation programs: (1) landscape corridors, (2) habitat restoration, (3) ocelot road crossing structures, and (4) translocation. It is necessary to examine the relationship of these four broad areas of conservation as they were linked particularly to the recovery of the small Refuge Ocelot Population. Much supporting information in the following discussion was borrowed from Leslie (2016). Leslie (2016) is an excellent compendium of the current natural and anthropogenic milieu of the Lower Rio Grande Valley funded by and prepared in cooperation with the USFWS.

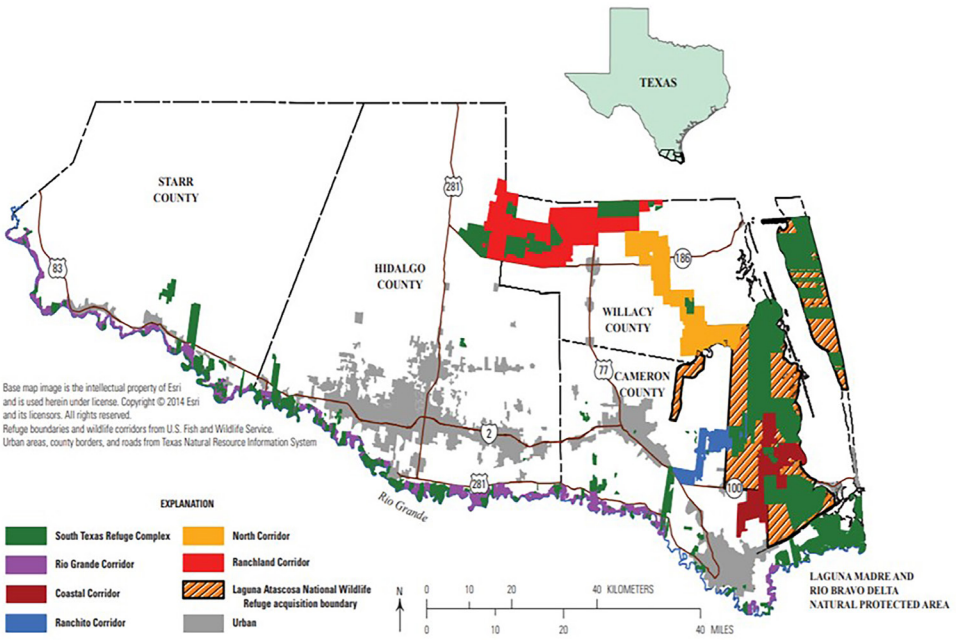

Figure 2. Five landscape corridors and federal refuges in the Lower Rio Grande Valley.

Conservation Failure I. Landscape Corridors

Landscape corridors have been championed over four decades as the remedy for the isolation of the tiny ocelot population on Laguna Atascosa NWR (Fig. 2). I utterly disagree with this premise, and there is no empirical evidence to support the hypothesis that ocelots are using landscape corridors for movements between populations. However, I have marshalled extensive data to show they lack utility for ocelots. Consequently, I label these Landscape Corridors, widely supported by the public, NGOs, and natural resource agencies, as "Ecological Fairy Tales" and "Conservation Charades" relative to ocelot conservation (Appendix 1).

Rio Grande Corridor. The Rio Grande Corridor was the first Ecological Fairy Tale that I recognized in 1983. The USFWS worked with various partners to pursue a corridor along the Rio Grande that would link the small but disconnected vestiges of the diverse flora and avifauna of the delta floodplain. Attached to this effort was the narrative that this corridor will connect ocelots to Mexico and maintain east-west movements along the Rio Grande (Leslie 2016). This corridor never approached completion with the vegetation fragments still highly disconnected and isolated.

For 35 years, I kept copies of the brochure that I am handing out to the audience. This publication, with an ocelot photograph on the front, was published in the early 1980s to introduce the Rio Grande Corridor to the public. The cover image of this cat is highly suggestive that ocelots would be an ecological beneficiary of such a corridor. Interestingly, I found a copy of this brochure still available to the public last month while attending the Ocelot Festival at the Brownsville Zoo. The same false narrative continues 35 years later.

This brochure also represented one of the first examples of using the ocelot as a "flagship species" to galvanize support for buying land to create a landscape corridor. I remember during the 1980s when Congressional authorizations for land purchases along the Rio Grande Corridor often ranked in the top 10 nationally. Broad support was expressed for this corridor by several federal and state agencies, and NGOs. However, an expensive study is not required to conclude that the Rio Grande Corridor does not operate for ocelot exchange between populations.

In January 1983, I gave a scientific presentation titled "Landscape Ecology of the Ocelot" at the Texas Chapter of the Wildlife Society Conference in Austin. I captured the first ocelot for research only 10 months earlier, so our ecological discovery was in its infancy. Yet I remember expressing that an ocelot would have an extremely difficult journey to find the small refuge tracts, many lacking ocelot habitat, scattered in the agricultural fields on the north side of the Rio Grande.

A major segment in the middle of the corridor that lies between Brownsville and Hidalgo, Texas, is still highly disconnected. Further, it lies within a dominant agriculture landscape bounded by a major urbanized corridor along Highway 2 located north of and parallel to the Rio Grande. An ocelot, unaware of refuge boundaries drawn on maps, would have to make numerous travel decisions with options to move essentially anywhere in a 360 degree direction. The opportunity to select a route or destination with lethal consequences was high. Chance ocelot encounters with humans, homes, and roads would occur, and related exposures to antagonistic dogs and disease-carrying feral cats would be another threat.

We radio tracked a single female ocelot on Santa Ana NWR in 1995. Its home range encompassed essentially the entire refuge which yielded one of many moments of clarity I have experienced over the years. If the largest tract on the Rio Grande Corridor, with arguably the best and most extensive ocelot habitat, can support only one territorial female ocelot, then the carrying capacity and transfer capability of the remaining corridor is virtually nonexistent.

This singular instance of an ocelot occupying one tract on the Rio Grande Corridor over 35 years, a felid that was never documented actually traveling along the corridor, has been used as a flagship to justify the value of the Rio Grande Corridor for ocelots (Leslie 2016). Unfortunately, new international bridges and associated secondary developments have since been constructed following commencement of the North American Free Trade Agreement in 1994 functioning as additional barriers. Consequently, the isolated woody tracts along the Rio Grande Corridor are not connected; the intermittent woody corridor is essentially a scattering of small tracts becoming increasingly encapsulated by an "ecologically lethal" environment of open space (e.g., agriculture), expanding urban areas, and border wall.

Leslie (2016, pg. 72) further states "...previous efforts to establish a wildlife corridor along the lower Rio Grande have been thwarted." Leslie (2016, pg. 73) states "...the Lower Rio Grande NWR...remains, in general, a series of small and often isolated tracts with limited connectivity, which leaves some tracts vulnerable to local extirpations and ecosystem degradation."

A few tracts, including the Santa Ana NWR and the Bentsen-Rio Grande State Park which attract many bird watchers and nature enthusiasts, are often highlighted as a success story for the Rio Grande Corridor. However, these units were created before the formal establishment of the Rio Grande Corridor, and would have existed regardless of that effort. Incidentally, most of the numerous small tracts in the Rio Grande Corridor are not open to ecotourists on a daily basis.

I predict that major segments of the Rio Grande Corridor, currently being further isolated and encapsulated by urban areas, will retrospectively be condemned as a major ecological boondoggle for terrestrial (non-flying) wildlife, particularly ocelots.

Coastal Corridor. During my presentation in January 1983, I also introduced the idea of a broad landscape swath of natural coastal prairies and wetlands with a scattering of thornshrub patches that spanned north-south around the far eastern portion of the delta into Mexico. For the following 35 years, I used the same satellite image to illustrate this coastal corridor idea during the numerous ocelot presentations that I gave, and questioned its potential value for ocelots. I also believe my repeated description of a potential coastal corridor of natural communities was the genesis for the concept of a Coastal Corridor, which today has produced a fine collection of protected coastal prairies and wetlands extremely valuable for waterfowl and migratory birds under federal protection.

Unfortunately, I have also concluded for many years that the Coastal Corridor has no value in linking ocelot populations between Mexico and the United States, and has extremely limited, to no value in linking the two populations in Texas. The thornshrub patches are too small, too isolated, and the intervening landscape consists of extensive open terrain greatly opposing successful ocelot movements. Further, much of this hypothetical corridor is dominated by coastal prairies with soils too saline to support successful restoration of the thornshrub density needed for prime ocelot habitat.

Landscape Sinks. Potentially more distressing is whether the landscape corridors are damaging to ocelot survival by encouraging an emigrating ocelot to travel into a high-risk environment. I believe certain landscape corridors may actually be injurious to the ocelot population in the United States.

I have labeled the highly-developed interior of the Rio Grande Delta as a "Killing Box" for ocelots (Fig. 3). This lethal zone basically occurs south of FM 186 in Willacy County, bounded by Highway 281 on the west and FM 1847 on the east, and the Rio Grande on the south. A mirror polygon of at least the same or greater size, and lethality, could be delineated on the Mexican side of the border.

If a dispersing ocelot enters this "Killing Box," then the extensive coverage of agriculture, roads, and urban areas will likely shorten its longevity significantly. In addition, sufficient prime habitat is lacking in the Killing Box to sustain even a small group of ocelots.

I believe habitat patches which are distributed in the Rio Grande Corridor and the Coastal Corridor contain tracts that could be hab-

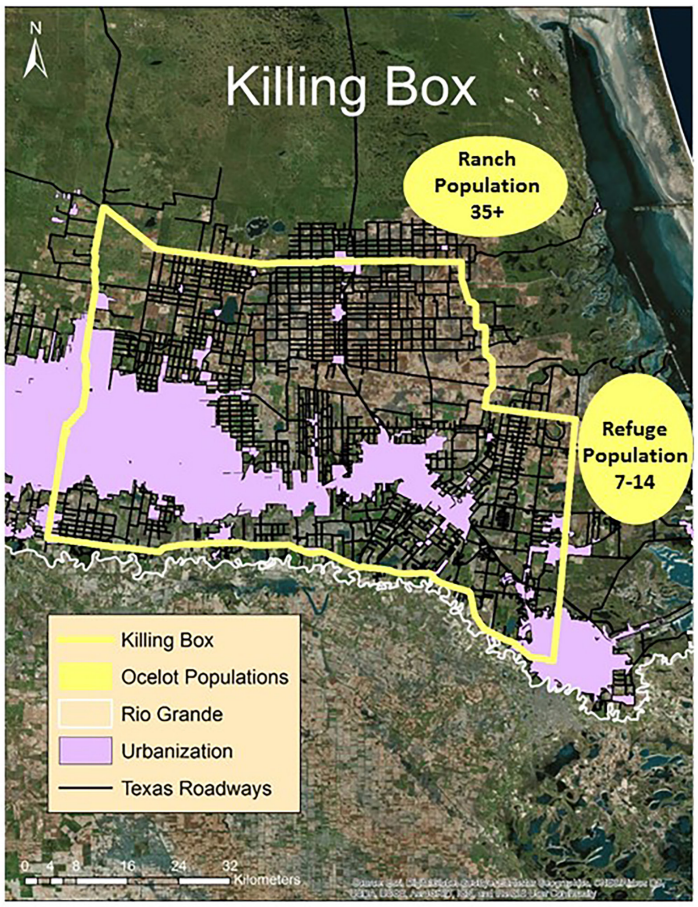

Figure 3. The Killing Box – A hypothesized high-risk landscape for ocelots with a dense road network, urban areas, and open agricultural fields.

itat sinks or ecological traps. An ecological trap may be a tract of otherwise prime habitat that attracts wildlife, but it is located adjacent to a high mortality agent (e.g., roads). A habitat sink is defined as an area where ocelot mortality is greater than ocelot reproduction. If an objective analysis was conducted, I believe many areas within the Rio Grande Corridor and Coastal Corridor would likely qualify as a habitat sink or high-risk landscape for ocelots.

Consistent with a landscape sink would be the numerous road moralities we have found over the decades occurring in the Coastal Corridor. Many refuge ocelots moved south from the original Laguna Atascosa NWR into an exposed or open landscape consisting of extensive coastal prairies, wetlands, and mud flats. As a result, several ocelots have been killed on FM 106, Highway 510, and Highway 100, which are three east-west roads connecting tourists to the popular destination of South Padre Island.

Of additional concern is the proposed new causeway to South Padre Island that would enter the mainland immediately south of the core refuge ocelot population on the Laguna Atascosa NWR (Leslie 2016, Tewes 2017). Should this causeway be constructed, then the high-traffic volume and secondary commercial and residential development would further jeopardize any hypothetical movement of ocelots into the southern segment of the hypothetical Coastal Corridor. The lethality of this existing "ecological killing-zone" would be further elevated. Additional mortalities are likely occurring in this Coastal Corridor, although they are not as easily discovered as a roadkill.

Agency officials and biologists have promoted for many years a long international Coastal Corridor into Mexico with the stated purpose of connecting the U.S.-Mexico ocelot populations. Ocelots are not known for successful long dispersal movements in this highly-developed Rio Grande Delta. Such a perilous journey into Mexico would require an even longer movement through open landscapes with little escape cover along the way.

Contrary to various media and biologists who 'hope' the Coastal Corridor will link the distant ocelot populations in Mexico with the Refuge Ocelot Population, I believe this region represents an extensive landscape sink for the few remaining refuge ocelots.

Finally, it should be mentioned that there are no known resident ocelot populations in Mexico close to the international border. The closest verified population occurs at least 100 miles from the U.S.-Mexican border. The Mexican side of the delta has an even greater void of thornshrub cover than the U.S. side. This fact provides an additional reason why hypothetical ocelot movement between populations in Mexico and the United States is even more incredulous.

I believe an important metric of landscape corridor success for a dispersing ocelot should be whether a viable "destination population" or "destination habitat" occurs along that corridor. (I am defining "destination habitat" as a dense thornshrub tract at the end of a corridor movement that provides sufficient habitat quality and area suitable for the establishment of at least four or five resident female ocelots.) I am concerned that dispersing ocelots are likely using landscape corridors to enter an "ecological black hole" destined for oblivion.

As previously mentioned, a high-risk landscape also occurs along much of the Rio Grande Corridor. Fortunately, no resident ocelot population occurs near the Rio Grande Corridor capable of using it on a consistent basis, thereby avoiding this increased mortality.

Other Proposed Corridors. In recent years, three additional landscape corridors have been proposed in the Lower Rio Grande Valley: the Ranchito Corridor, the North Corridor, and the Ranchland Corridor (Fig. 2, Leslie 2016, pg. 74)). Each of these corridors share many challenges as well as additional problems that must be overcome in order to benefit ocelots - challenges which I believe are insurmountable.

If the Ranchito Corridor were successful in transferring ocelots, then it would serve as a direct conduit for the few remaining refuge ocelots into the Killing Box. Similarly, the North Corridor contains little thornshrub and it is not close to being a continuous corridor of ocelot habitat. It would require large expenditures for extensive land acquisition, including removal of much prime farmland from production. The many problems causing failures in ocelot habitat restoration must be overcome to even give this North Corridor a chance at assisting ocelots.

Another concern is this North Corridor will likely exist as small isolated patches of low quality ocelot habitat for decades into the future, a similar fate currently shared with the Rio Grande Corridor and the Coastal Corridor. If ocelots disperse north draining the fragile Refuge Ocelot Population, or south from the Ranch Ocelot Population, into the isolated patches of low quality tracts, then the existence of ecological traps or habitat sinks could threaten survival.

Programs for land acquisition in the Lower Rio Grande Valley "...have been constrained by multiple factors (e.g., increasing land prices, limited funding, and border fence issues) in their...abilities to acquire properties in the LRGV" (Leslie 2016, pg. 73). Land speculation and values in the Lower Rio Grande Valley are among the highest in Texas. Farm and ranch land may sell for $2,900 per acre compared to $1,196 per acre in Texas in 2007 (Leslie 2016). This cost factor is just one of many other challenges affecting the creation of successful landscape corridors.

The following is a quote from an introductory ecology textbook (Smith and Smith 2001, pg. 456) widely used in classrooms about 18 years ago: "The effectiveness of biological corridors as a means of stimulating the immigration between habitat patches has never been explicitly demonstrated. Beyond general observation of corridor use, there is little experimental evidence of the role of corridors in species dispersal."

This quote echos true related to my experience with ocelots, and their failure to successfully use landscape corridors to move between populations in South Texas. The massive Rio Grande Corridor and Coastal Corridor programs were supposed to help the 7 to 14 isolated ocelots connect to other ocelot populations in the Rio Grande Valley and with Mexico - but it never happened.

I believe the proposed landscape corridors are simply ecological hypotheses based on weak foundational science and little empirical information. Relative to ocelots, they represent large expenditures trying to fix something that cannot be fixed - successful ocelot movements over a vast hostile landscape.

I have found little, if any, empirical support that an ocelot population in Texas has benefitted from the Rio Grande Corridor or the Coastal Corridor. Considering the limited funds available for land acquisition, the limited time available for ocelot recovery, and the failure of habitat restoration as explained later, it is hard to accept that the other three hypothetical corridors will produce a better outcome for ocelot recovery. However, I do recognize that professed attempts at corridor creation, in part aided by the Ocelot Flagship, is an effective mechanism to justify land acquisition programs that have greatly expanded federal refuges in the Lower Rio Grande Valley from 1979 to the present (Fig.4).

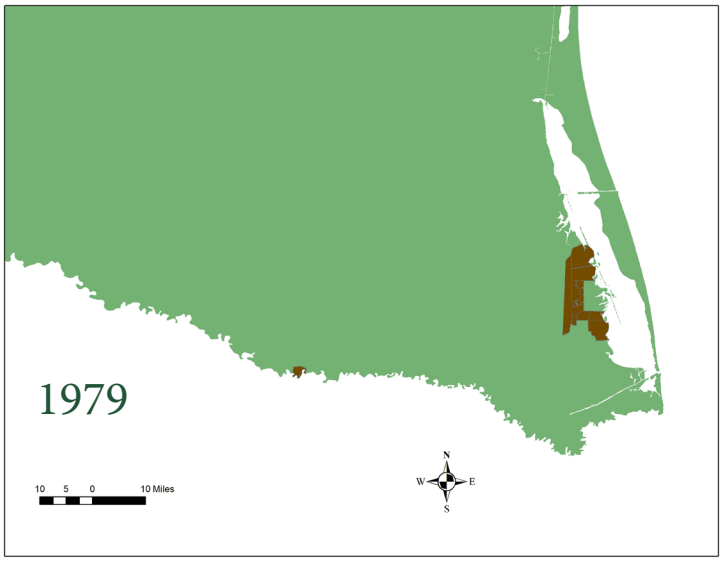

Fig. 4a. National Wildlife Refuges - 1979.

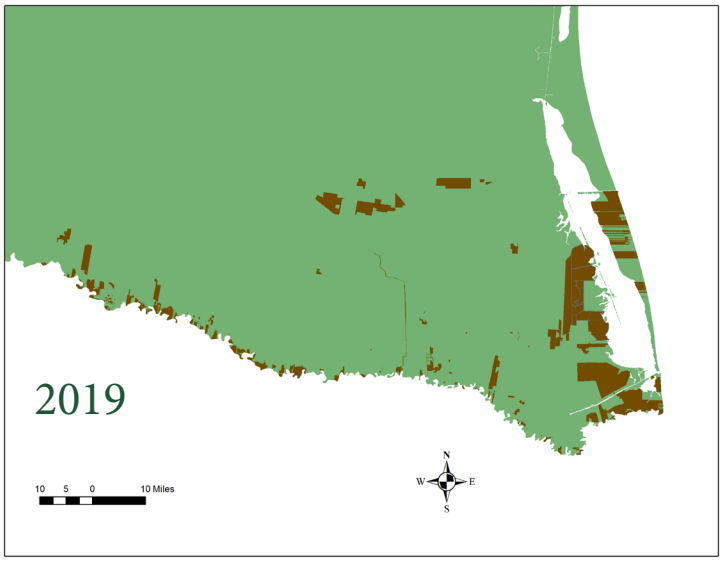

Fig. 4b. National Wildlife Refuges - 2019.

Corridorphilia. Finally, a rhetorical question: Does the widespread love for corridors represent a concept worthy of a new word; "Corridorphilia?" The public, NGOs, and biologists seem obsessed in clinging to the idea that corridors represent the solution to many problems associated with population fragmentation. They frequently express support for corridors in diverse situations, and for a wide diversity of organisms, sometimes even when it is not rational. Ocelots are not exempt from this phenomenon. However, I will save this concept for another time.

In summary, the Ocelot Flagship has been used to justify creating five corridors (Leslie 2016, pg. 78-79), unfortunately, they have not helped ocelot recovery. For example, the Rio Grande Corridor is part of the Lower Rio Grande Valley NWR. This refuge did not exist before 1979. Between 1988-2015, it expanded from 50 tracts of about 27,300 acres to 147 tracts of 96,458 acres - a 344% increase (Leslie 2016). Yet ocelots are effectively absent from the Rio Grande Corridor.

Similar major expansions of the Laguna Atascosa NWR have been justified to help create the Coastal Corridor. Some of these expansions are extremely valuable for wildlife and environmental conservation. Unfortunately, I have concluded that use of an Ocelot Flagship to justify acquisition of land for landscape corridors represents a "Conservation Charade" (Appendix 1).

A real ocelot corridor would be a continuous pathway of dense thornshrub that has a woody canopy of >85% horizontal cover (Horne and Tewes 2009). Further, if such a corridor is to be useful for ocelots, then it should be located within or adjacent to one of the two resident ocelot populations. I suspect the hypothetical southern Coastal Corridor between Laguna Atascosa NWR and Mexico has less than 5% thornshrub continuity, and many of these isolated tracts represent poor quality habitat. Thornshrub continuity in the Rio Grande Corridor is likely not much better than 5%. Purported ocelot corridors lacking continuity of dense thornshrub represent another Conservation Charade.

The assumed presence of ocelots successfully using the Coastal Corridor and Rio Grande Corridor has been used by environmental advocates to attempt to stop or alter a variety of projects over the past 25 years. Similar contemporary efforts are focused on the border wall, liquid natural gas facilities, wind turbines, Space X launch site, and various transportation projects. I believe most, if not all, of these projects will be constructed. I also predict that these projects will eventually be blamed retrospectively for terminating the nonexistent ocelot connection between the Refuge Ocelot Population and its distant counterpart in Mexico. But our past research on ocelot genetics found that the population disconnection occurred several decades ago following massive clearing of the Rio Grande Delta for agriculture (Janecka et al. 2008, 2011, 2014, 2016, Janecka personal communication).

The certitude of the premise that ocelots benefit from landscape corridors expressed by numerous popular articles, the public, and natural resource agencies is amazing (Leslie 2016). Equally amazing is the lack of empirical evidence to support this premise.

In recapitulation for emphasis, there is an absence of data, information, and facts that these hypothetical landscape corridors promote exchange between ocelot populations. Agency biologists are effective at drawing lines on maps identifying corridors and refuge boundaries, however it is interesting how little ocelots seem to care about these lines.

Conservation Failure II. Habitat Restoration

My early graduate student, John Young, and I initiated the first thornshrub restoration study to benefit ocelots on Laguna Atascosa Refuge in March 1991 (Young and Tewes 1994). A salient take-home message, at least for me, was successful restoration of ocelot habitat with a quantity and quality that would provide "A Meaningful Difference" in ocelot recovery would be extremely challenging and very expensive. Several restoration failures over the past quarter century by two agencies and at least four NGOs have confirmed this early diagnosis.

Often a premature announcement that "ocelot habitat" has been restored merely following the event of planting thornshrub seedlings has frequently occurred. Unfortunately, these projects have failed to develop into prime ocelot habitat extensive enough to add one new female ocelot to the population. Agencies continue to advocate this conservation strategy as effective for ocelot conservation despite repeated failures.

Tewes (2017) identified several causative agents responsible for the failure of thornshrub restoration for ocelots. Factors included planting at insufficient seedling density, competition from invasive grasses (e.g., guineagrass, buffelgrass), planting in unfavorable soils, and seedling damage from herbivores including grasshoppers, rodents, and deer.

Frequent droughts and failure to sustain follow-up care and monitoring are also major contributors to restoration failure. Even if these disparate challenges could be overcome, the insufficient nursery infrastructure and production capability constrains the ability to restore enough acreage that could "Make a Meaningful Difference." Finally, restoration experts predict it will take 20 to 30 years to create

ocelot habitat - remember the hour glass is rapidly draining.

A false use of the Ocelot Flagship has often occurred in popular articles messaging the public that a particular restoration event will benefit ocelot conservation, when in reality, a resident ocelot population was too remote to visit the site should that restoration succeed (i.e., Conservation Charade). Future habitat restoration should be strategic by focusing intense efforts in a few locations within existing resident ocelot populations. A primary target for restoration that will bring major benefits for ocelot recovery would be establishment of dense thornshrub communities over both easements acquired by the Nature Conservancy on Yturria's San Francisco Ranch.

Conservation Failure III. Ocelot Road Crossing Structures

During the 1990s and 2000s, the Ecological Services Division of the USFWS urged three different Districts within the Texas Department of Transportation (TxDOT) to construct or modify culverts to reduce ocelot road mortality. Crossing structures in the Corpus Christi District, Laredo District, and Pharr District of South Texas, some at distances greater than 100 miles from a verified resident ocelot population, were constructed or modified for ocelot use (Fig. 5).

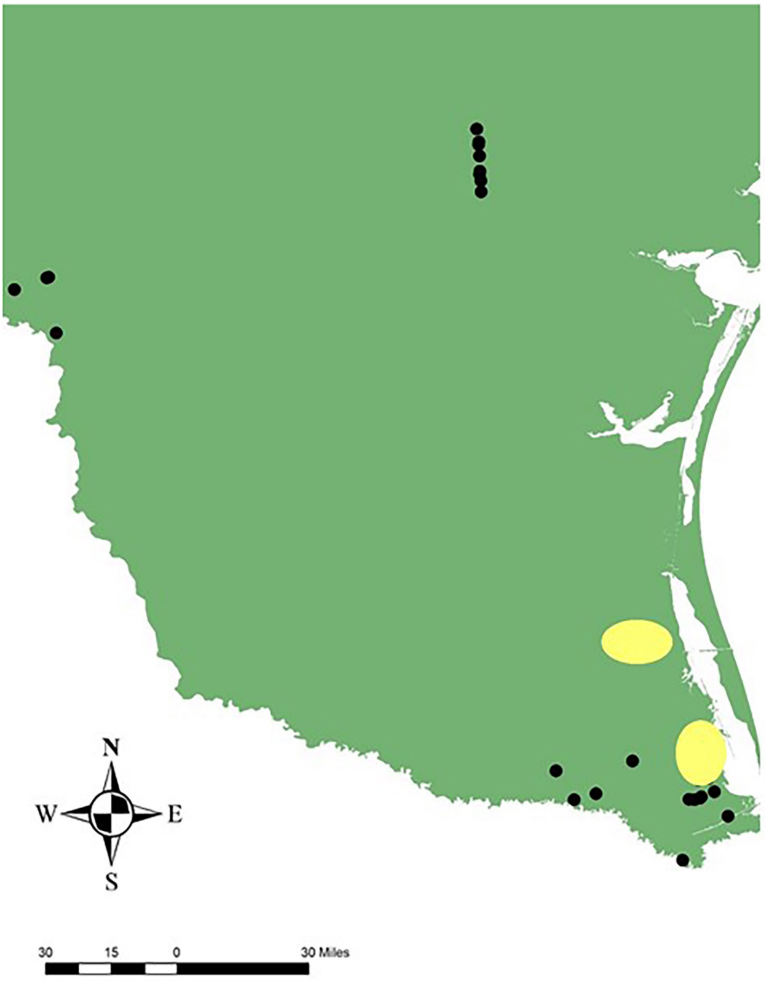

Figure 5. Existing ocelot road crossing structures (dots) relative to the location of the two ocelot populations (ovals).

Many previous discussions on ocelot crossing structures under the persuasion of Section 7 compliance have resulted in placement of crossing structures where there is no habitat, and several crossing structures have been built or modified where there is no known resident ocelot population. Justification for these ocelot crossing structures during Section 7 consultations included unverified sightings or single historical records of dispersing male ocelots followed by the statement that it was "better to err on the side of ocelot conservation." Unfortunately, the broad application of this failed process (i.e., using sightings or single records) over the past quarter century has resulted in many crossing structures that wasted millions of dollars and, thus far, providing no conservation benefit for ocelots.

In recent years, decisions to locate expensive ocelot road crossing structures are sometimes linked to ineffective landscape corridors which, in turn, yield ineffective road crossing structures. The cat research team is working on an in-depth, realistic understanding of ocelot use, or lack of use, of the Rio Grande Delta to provide TxDOT with key information to help refine placement of ocelot crossing structures, and to prevent the waste of large expenditures of taxpayer dollars.

Recently, the evolution of strategies for crossing structures to enhance ocelot conservation has progressed toward more effective recovery efforts by TxDOT. For this change, accolades should be given to Dr. John Young and the Environmental Affairs Division of TxDOT. Dr. Young has implemented an active program of gathering information about ocelot-transportation issues, thereby advancing ocelot conservation by TxDOT.

Monitoring of the current and future ocelot crossing structures is critical to gathering biological insights into improving crossing structure use by ocelots. In particular, future potential crossing structures under the eastern segment of FM 186 will have perhaps the best opportunity to benefit within-population movements, genetic exchange, and promote landscape connectivity. Ocelot movement and habitat

studies on the Ranch Ocelot Population should be done "before" crossing structures are placed so engineers and biologists can benefit from site-specific information. Such an ocelot project for FM 186 would serve as a model for effective placement of ocelot crossing structures.

Conservation Failure IV. Translocation

Nationally renown conservationist, philanthropist, and my friend, Mr. Tim Hixon, visited the Caesar Kleberg Wildlife Research Institute office in Kingsville during 2007 with a generous offer to donate $150,000 each year for five years to underpin ocelot translocation. He was also representing two other donors who would support this effort.

At that time, ocelot translocation was only briefly mentioned 17 years earlier in the original Ocelot Recovery Plan as a possible recovery tool (Harwell and Siminski 1990). Translocation was not on any agency radar or in any active discussion. When our university attempted to advance with translocation, the Lead Agency (USFWS) for ocelot conservation took control of the planning process in 2008 and created a cumbersome Ocelot Translocation Working Group. The Translocation Working Group consisted of over a dozen organizations (Leslie 2016) and about 20-25 individuals who met frequently to eventually create a draft translocation plan.

During the conclusion of the initial meeting on August 14, 2008, I distinctly remember the Endangered Species Coordinator for the Southwest Region of the USFWS asking a poignant question to the group, "Now what was the reason for forming this group and having this meeting?" Response from the Lead Ocelot Biologist of USFWS was "We were afraid some people were getting ahead of the process." This reply was related to our university efforts to advance ocelot translocation, and to honor the gift by Mr. Tim Hixon.

Subsequent discussions between the Translocation Working Group and agency officials from Mexico resulted in them understandably expressing concern about the concept of sending their ocelots into the isolated habitat fragments of the Refuge Ocelot Population. They expressed their desire not to release ocelots into the Refuge Ocelot Population until habitat area was expanded and the problem of ocelot road mortalities were resolved. Neither of these two thresholds has been achieved.

Unfortunately, the option of translocating ocelots from Mexico into the safer Ranch Ocelot Population, where the habitat and population size was significantly better, and road mortality represented a much lower risk, was not seriously advanced by the U.S. delegation. Translocation efforts essentially ended on February 21, 2015 when the Leader of the Ocelot Recovery Team and the Lead Ocelot Biologist, both employees of the USFWS, declared that an organizational procedure or technical step had not been properly followed.

This announcement effectively terminated the Translocation Working Group with no attempt by the USFWS to restart this group. The last meeting of the Translocation Working Group was incidentally held as a side meeting to the Texas Chapter of The Wildlife Society in Corpus Christi. Besides myself, four other Translocation Working Group members who were present to hear that pronouncement are in the audience - Dr. Randy DeYoung, Dr. Tyler Campbell, Dr. John Young, and Jonah Evans.

That message essentially terminated eight years of hard work on ocelot translocation - a conservation strategy desperately needed to rescue and invigorate the ocelot population in the United States. I have always believed that a more streamlined process using the 2015 members of the Translocation Working Group could still be successful.

Twelve years have passed since the Kleberg Institute was offered a significant grant by the late Tim Hixon to implement ocelot translocation, with no translocation planned for the immediate future. Agency control took over in 2008 with smothering effects. The process was made more difficult with violence in northeast Mexico and Mexican permit issues. But termination of the Translocation Working Group in February 2015 was an action with major ramifications, I believe, threatening ocelot survival in the United States because of the long delay of this much needed population rescue.

I submit that the four major conservation strategies purported to help ocelots - Landscape Corridors, Habitat Restoration, Road Crossings, and Translocation - have failed to provide "A Meaningful Benefit" for conservation of these felines in the United States.

The Illusion of Achievement

In 1992, Dr. James Teer, Director of the Welder Wildlife Foundation, a person who played an important role in my career development, brought to my attention a key piece of information. An article in the Los Angeles Times (December 21, 1992) ranked the ocelot as 8th on a list of top 10 expenditures for endangered species. It claimed that $3 million had been spent on ocelot recovery. My astonishment was obvious as I was under the impression virtually no funds had been spent on ocelots for many years. To this day, I assumed that amount was related to land purchased for the Rio Grande Corridor.

Recently, I conducted a brief search of expenditures on behalf of ocelot conservation. I found over $20 million have been spent over the

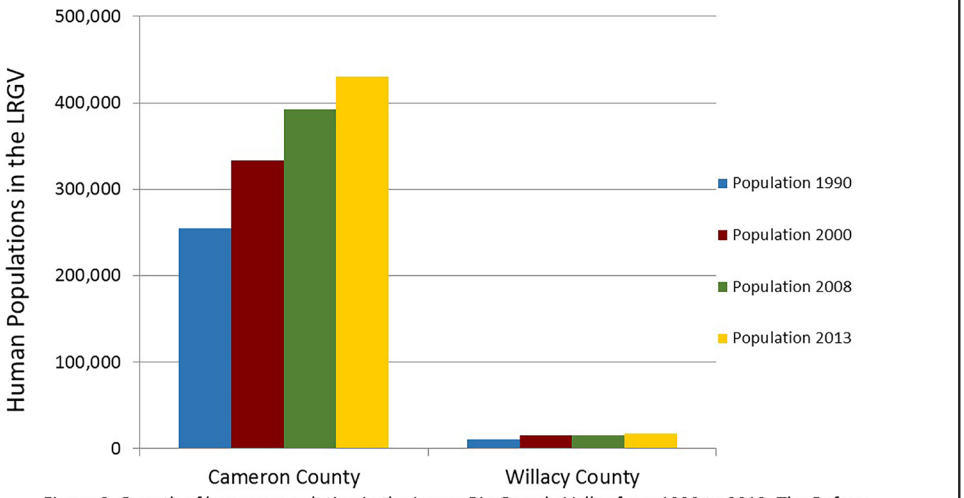

Figure 6. Growth of human population in the Lower Rio Grande Valley from 1990 to 2013. The Refuge Ocelot Population occurs in Cameron County, whereas the Ranch Ocelot Population occurs in Willacy County.

past 15 years, and that does not include expenditures for land acquisition. My fear with the newspaper article in 1992, and still today, is that the public may be under the "Illusion of Achievement," believing the numerous programs, policies, and actions announced for ocelots with expenditure of several million dollars indicate that effective recovery is ongoing at a high level. Nothing could be further from the truth.

Ecological Fairy Tales and Conservation Charades

This "Illusion of Achievement" is disturbing, at least for me, at a moment in time when we should be implementing the ecologically equivalent "Manhattan Project" for ocelot recovery. The public and agencies need to accept that past efforts have not achieved effective ocelot conservation - we must discard the Ecological Fairy Tales and Conservation Charades (Appendix I).

1. **Landscape Corridors.** Five landscape corridors with extensive purchases of over 100,000 acres of new refuge lands. Bottom line - not a single ocelot has been documented moving from one population to another using these corridors.

2. **Habitat Restoration.** Many projects have been attempted, a great workforce deployed, and significant funds expended to plant thornshrub seedlings with ocelots frequently announced as one of the beneficiaries. Bottom line - not a single acre of prime ocelot habitat or a new ocelot has been added in the United States.

3. **Road Crossing Structures.** Many road crossing structures have been constructed or modified for ocelots since the 1990s at the cost of several million taxpayer dollars. Bottom line - not a single verified ocelot has used a road crossing structure.

4. **Translocation.** Over 12 years have passed with numerous meetings, extensive planning, and considerable field work expended in Mexico preparing for urgently needed translocation of ocelots from Mexico into Texas. Bottom line - not a single ocelot has been translocated.

I believe we have less habitat and fewer ocelots than when I began working on ocelots. Perhaps even more concerning, we squandered 25 precious years in the ongoing countdown to ocelot extirpation within the United States.

Ocelot conservation has been ineffective and feckless over the past quarter century.

Time for a New Paradigm

There is good news! The future is much brighter for the Ranch Ocelot Population where 80% of the ocelots reside in the United States. This group of ocelots is not afflicted by many of the same factors threatening refuge ocelots. Habitat patches used by the ranch ocelots are embedded within more sympathetic rangelands often with abundant prey and extensive woody cover to support ocelot dispersal between groups - an important contrast with the Refuge Ocelot Population surrounded by a lethal landscape.

Private lands will also provide a more secure environment well into the future. Ranch ocelots are mainly threatened by only two primary roads, FM 186 and Highway 77, with few paved roads expected to be developed on ranchlands. The human population has changed little in Willacy County where ranch ocelots reside (Fig. 6, Leslie 2016). And the extensive ranchlands covering much of South Texas will effectively impede increases in the human population and block urban areas from developing for several decades into the future.

The Ranch Ocelot Population will respond well to many recovery efforts if they are given the chance to be implemented. Following is a short list of potential management and conservation actions that could be applied by willing landowners:

- Conduct monitoring and management programs on key ranches.
- Increase the carrying capacity by augmenting habitat quality and quantity through natural processes and accelerated restoration in strategic locations (particularly the two Yturria conservation easements).
- Economic incentives for landowners seeking more ocelots.
- Release translocated ocelots to invigorate the existing ocelot population.
- Establish a new population or a "metapopulation" with several smaller groups linked by exchanges using assisted reproduction and translocations.

Ranchers are essential for ocelot recovery and supporting their needs should be paramount. Concerns of landowners regarding federal regulations, liability, and government overreach as related to the presence of an endangered ocelot need to be alleviated with official agreements that are binding. Once a landowner is assured that their normal land uses and ranch operation will not be threatened, then voluntary ocelot management can be engaged by willing ranchers. This approach must be strategically implemented to optimize effective benefits, and not squander precious resources of time and money.

The East Foundation is keenly aware of the ingredients for a successful recipe for ocelot conservation and recovery. East Foundation operates six ranches in South Texas, one of which, the East Foundation's El Sauz Ranch supports the greatest number of ocelots known within a single property. This population occurs in the heart of the Ranch Ocelot Population.

A stroke of success would be if the East Foundation were able to lead a "Rancher Program for Ocelot Conservation." Obviously this would require some positive work with U.S. Fish and Wildlife Service to properly assure landowners that they could participate without fear of regulatory constraints or potential liability. This singular action would represent a major advance toward a new paradigm for effective ocelot recovery.

Ranchers must be a major element of the new paradigm for ocelot conservation. Ultimately, if ocelot recovery is to have any possibility of success in the United States, ranchers must be the key players to support this effort. I have been promoting this vision my entire career.

Conclusion

The conservation status of the ocelot in the United States is fragile. This status has deteriorated into significantly greater peril than when I began in 1982. Some habitat has been lost in a couple of areas, suggesting we now have fewer ocelots. And the remaining ocelots are more vulnerable with reduced genetic variation and increased isolation, and more threatened with expanding urban areas and increased traffic volume.

The next 35 years will be worse for the refuge ocelots. Little can stop the human juggernaut from further encapsulating the small Refuge Ocelot Population. These ocelots need to shelter-in-place. The best tactic would be to rapidly implement an extensive plan designed to increase quality and quantity of within-refuge ocelot habitat on the original Laguna Atascosa NWR. If successful, then hopefully enough living space can be added for a few more ocelots to buffer against extinction during the next multi-year or decades-long drought.

It has been frustrating for me to watch the past 35 years speed by with few conservation benefits for ocelots, although the Yturria Ranch and East Ranch represent two meritorious exceptions. This extended perspective has also provided clarity to recognize Ecological Fairy Tales and Conservation Charades, and to plead for a dramatic shift in how we approach ocelot recovery in the United States.

LITERATURE CITED

Horne, J.S., A.M. Haines, **M.E. Tewes**, and L.L. Laack. 2009. Habitat partitioning by sympatric ocelots and bobcats: implications for recovery of ocelots in southern Texas. The Southwestern Naturalist 54:119-126.

Janecka, J.E., **M.E. Tewes**, I.A. Davis, A.M. Haines, A. Caso, T.L. Blankenship, and R.L. Honeycutt. 2016. Genetic differences in the response to landscape fragmentation by a habitat generalist, the bobcat, and a habitat specialist, the ocelot. Conservation Genetics DOI:10.1007/s 1059 2-016–0846-1.

Janecka, J.E., **M.E. Tewes**, L.L. Laack, A. Caso, L.I. Grassman, and R.L. Honeycutt. 2014. Loss of genetic diversity among ocelots in the United States during the 20th century linked to human induced population reductions. PLOS One DOI:10.1371/journal pone 0089384.

Janecka, J.E., **M.E. Tewes,** L.L. Laack, A. Caso, L.I. Grassman, Jr., A.M. Haines, D.B. Shindle, W.J. Murphy, R.L. Honeycutt. 2011. Reduced genetic diversity and isolation of remnant ocelot populations occupying a severely fragmented landscape in southern Texas. Animal Conservation 14:608-619.

Janecka, J.E., **M.E. Tewes**, L.L. Laack, L.I. Grassman, Jr., A.M. Haines, and R.L. Honeycutt. 2008. Small effective population sizes of two remnant ocelot populations (*Leopardus pardalis albescens*) in the United States. Conservation Genetics 9:869-878.

Laack, L.L. 1991. Ecology of ocelot (*Felis pardalis*) in south Texas. Thesis, Texas A&I University, Kingsville, Texas, USA.

Leslie, D.M., Jr. 2016. An international borderland of concern: conservation of biodiversity in the Lower Rio Grande Valley. U.S. Geological Survey Scientific Investigations Report 2016-5078:i-xii, 1-120.

Haines, A.M., **M.E. Tewes**, L.L. Laack, J.S. Horne, and J.H. Young. 2006. Habitat based population viability analysis of ocelots in southern Texas. Biological Conservation 132:424-436.

Haines, A.M., **M.E. Tewes**, and L.L. Laack. 2005. Survival and sources of mortality in ocelots. Journal of Wildlife Management 69:255-263.

Haines, A.M., **M.E. Tewes**, L.L. Laack, W.E. Grant, and J.H. Young. 2005. Evaluating recovery strategies for an ocelot population in the United States. Biological Conservation 126:512-522.

Harveson, P.M., **M.E. Tewes**, G.L. Anderson, and L.L. Laack. 2004. Habitat use by ocelots in south Texas: implications for restoration. Wildlife Society Bulletin 32:948-954.

Pence, D.B., **M.E. Tewes**, D.B. Shindle, and D.M. Dunn. 1995. Notoedric mange in an ocelot (*Felis pardalis*) from southern Texas. Journal of Wildlife Diseases 31:558-561.

Scott, J.M., D.D. Goble, A.M. Haines, J.A. Wiens, M.C. Neels. 2010. Conservation-reliant species and the future of conservation. Conservation Letters 3:91-97.

Shindle, D.B., and **M.E. Tewes**. 1998. Woody species composition of habitats used by ocelots (*Leopardus pardalis*) in the Tamaulipan Biotic Province. Southwestern Naturalist 43:273-279.

Smith, R.L., and T.M. Smith. 2001. Ecology and field biology. 6th edition, Benjamin-Cummings, 771 pp.

Stasey, W.C. 2012. Evaluating translocation strategies for ocelot in the Tamaulipan Biotic Province. Dissertation, Texas A&M University-Kingsville, Kingsville, Texas, USA

Tewes, M.E. 2017. Clinging to survival in the borderlands. The Wildlife Professional 11:26-29.

Tewes, M.E., and M.G. Hornocker. 2008. Effects of drought on bobcats and ocelots. Pages 123-138 in Wildlife Science: Linking Ecological Theory to Management Applications (T. Fulbright, and D. Hewitt, eds.), CRC Press, Boca Raton, FL.

Tewes, M.E., and D.J. Schmidly. 1987. The Neotropical felids: jaguar, ocelot, margay, and jaguarundi. Pages 697-712 in Wild Furbearer Management and Conservation in North America (M. Novak, J.A. Baker, M.E. Obbard, and B. Malloch, eds.). Ministry of Natural Resources, Ontario, 1,150 pp.

Tewes, M.E., and D.D. Everett. 1986. Status and distribution of the endangered ocelot and jaguarundi in Texas.Pages 147-158 in Cats of the World: biology, conservation, and management (S.D. Miller, and D.D. Everett, eds.). National Wildlife Federation, Washington, D.C., 501 pp.

Tewes, M.E. 1986. Ecological and behavioral correlates of ocelot spatial patterns. Dissertation, University of Idaho, Moscow, Idaho, USA.

U.S. Fish and Wildlife Service. 2016. Recovery plan of the ocelot (*Leopardus pardalis*), First Revision. U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico.

Young, J.H., and **M.E. Tewes**. 1994. Evaluation of techniques for initial restoration of ocelot habitat. Proceedings Annual Conference Southeastern Association of Fish and Wildlife Agencies 31:336-342.

Yturria, F. 2018. The amazing life of a South Texas cowboy. Greenleaf Book Group, 568 pp.

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Appendix 1. Ecological Fairy Tales and Conservation Charades as related to ocelot ecology and conservation.

A. Ecological Fairy Tales

1. Ocelots are traveling on the Rio Grande Corridor.
2. The Rio Grande Corridor provides a safe conduit with continuous good habitat for ocelots.
3. Ocelots are moving between populations using the Coastal Corridor.
4. The Coastal Corridor provides a safe conduit with continuous good habitat for ocelots.
5. The international Coastal Corridor will provide a natural dispersal connection between ocelot populations in Mexico to the United States.
6. Landscape corridors do not have major areas of high-risk for ocelot mortality.
7. All corridors and all connectivity are positive for ocelot conservation.

B. Conservation Charades

1. The Rio Grande Corridor is important, now and in the future, for ocelot movements across the Lower Rio Grande Valley or into Mexico.
2. The central segment of the Rio Grande Corridor will eventually be established to a level where ocelots will use it.
3. Habitat restoration spread distantly across the Valley will benefit ocelots.
4. Landscape corridors do not need to lead to other ocelot populations or tracts of prime ocelot habitat capable of sustaining at least a few ocelots.
5. Landscape corridors are effective in supporting movement between ocelot populations.
6. Habitat restoration has increased the ocelot population over the past quarter century.
7. Habitat restoration will make a landscape corridor successful for ocelot travel to other populations.
8. Road crossing structures built for or modified for ocelots west of Corpus Christi, in the Laredo area, or within Brownsville city limits are being used by ocelots.
9. The border wall between Brownsville and Hidalgo is impacting ocelots (there are no ocelots there).
10. The border wall will end dispersal from Mexico into Texas along the Coastal Corridor.
11. Unverified "sightings" of ocelots provide reliable information on which to base conservation decisions.
12. A single ocelot occurrence can be used to make decisions or deploy actions that cost millions of taxpayer dollars.
13. Contrived and unlikely ecological scenarios involving ocelots should guide conservation decisions and Section 7 consultations.

Appendix II. The following statements are intended to improve ocelot conservation, particularly through application of rational approaches and actions.

1. Information should provide an honest and truthful expression of how ocelots use (or do not use) landscape corridors, restored thornshrub habitat, and road crossing structures. Landscape corridor benefits for ocelots are greatly exaggerated and wildly misstated. Providing false narratives is perhaps the greatest impediment to implementing honest and forthright ocelot recovery.

2. Avoid any policy, program, or action that may facilitate an ocelot entering into a hostile landscape with potential habitat sinks or ecological traps. As currently designed, many corridor segments actually increase risk to ocelot survival by encouraging individuals to enter an expansive landscape supporting tiny, disconnected, poor-quality habitat patches, which may represent a habitat sink or ecological trap.

3. Refrain from using a single ocelot occurrence, observation, or anecdote to weave Ecological Fairy Tales that support other causes (e.g., land acquisition, project termination). Such a tactic is not using "best science" and will waste expenditures on ecologically unsound hypotheses.

4. Recognize true habitat restoration for ocelots is extremely difficult and extremely expensive. Consequently, 'ocelots' should only be used,

even as partial justification, for restoration projects that occur within the boundaries of an existing resident female ocelot population, or secondarily within three miles of such a population. All other attempts have a highly likelihood of not providing "A Meaningful Benefit" for ocelot conservation.

5. Focus intensive habitat restoration within the two conservation easements managed by the Nature Conservancy on Yturria's San Francisco Ranch.

6. Significantly expand the infrastructure and operational capacity needed to grow, plant, and monitor success of thornshrub restoration. The Native Plants Program of the Caesar Kleberg Wildlife Research Institute, led by Forrest Smith, has a long established record of working with private ranchers and would be willing to restore habitat at a level that would establish "A Meaning Benefit" should the funding become available.

7. Place road crossing structures in an area where they can be used by ocelots. For best results place structures either within or adjacent to a resident female ocelot population.

8. Place road crossing structures where suitable factors will encourage ocelot use. Usually prime ocelot habitat on both sides of the crossing structures should be a minimum attribute. Otherwise, enhance the thornshrub on both sides of crossing structures until it reaches prime habitat status and becomes beneficial for ocelot use, and use fences to prevent over-road crossings at strategic locations.

9. Do not place ocelot road crossing structures surrounded by dense urban areas (i.e., skunk-opossum crossings). Avoid constructing crossing structures at locations that facilitate ocelot movement into high-risk landscapes dominated by open habitats (e.g., agriculture) or intensely impacted areas (e.g., urban).

10. Agency biologists and administrators should provide information that we request for our research program on ocelot crossing structures and ocelot-road evaluation funded by the Texas Department of Transportation so more effective recommendations may be developed and fewer taxpayer dollars are wasted.

11. Allow the private lands effort to return to their translocation initiative of 2007. Make it easier, not harder, for personnel from the Caesar Kleberg Wildlife Research Institute to work with private land partners to advance ocelot translocation and assisted reproduction on private lands.

12. Prioritize the translocation of ocelots from Mexico into the Ranch Ocelot Population before the Refuge Ocelot Population. This strategy is consistent with the expressed wishes of the federal government of Mexico during the previous discussions with the Ocelot Translocation Working Group. Their fear was that the limited habitat area and high risk of ocelot-vehicle collisions inherent with the Refuge Ocelot Population would threaten their donated ocelots. Both factors still continue as major problems.

13. Use ocelots from the larger Ranch Ocelot Population as a source to sustain and augment the Refuge Ocelot Population.

14. Ocelots dispersing south of the Refuge Ocelot Population should be captured before becoming road-killed, and released within the safer Ranch Ocelot Population.

15. Funds obtained from mitigation-like programs and other "opportunity funding" should also be shared with and spent on the Ranch Ocelot Population where it will have a much greater benefit for each dollar spent.

16. After 35 years of experience, I can confidently state that "sightings" of ocelots by the public and biologists are incorrect a vast amount of the time - likely greater than 99% of the sightings are wrong. Avoid use of "sightings" for any program, policy, or action intended to benefit ocelot conservation. Use only "documented records" from photographs or radio telemetry. (My experience has found the same fallacy with sightings of mountain lions and jaguarundis.)

17. Replace abstract ecological hypotheses (e.g., landscape corridors) with concrete recommendations using "best science" to guide ocelot conservation. Lines drawn on a map often represent landscape corridors and refuge purchases that are often ignored by a dispersing male ocelot floating almost randomly over the landscape.

18. Disentangle shared approaches used by Section 7 consultations and ocelot recovery actions. For example, Section 7 consultation was linked to the placement or modification of ocelot road crossing structures on the Highway 281 west of Corpus Christi and the crossing structures near Laredo. Neither set of crossing structures occurred near a resident ocelot population, thereby becoming an expensive failure. Also, do not place crossing structures based on ocelot sightings.

19. The jaguarundi is extirpated. Officially declare that the jaguarundi no longer occurs in Texas. Cease using this species as a regulatory tool under Section 7 to achieve other purposes (project modification or termination), similar to how ocelots are used to alter projects in many cases.

20. Once the jaguarundi has been officially listed as extinct in Texas, evaluate potential programs, policies, and actions to return the jaguarundi to Texas using individuals from northeastern Mexico. Private landowners should be the dominant group in any such reestablishment.

Acknowledgments

Initial inspiration to pursue ocelot research was given in early May 1981 by Dr. Lynn Drawe of the Rob and Bessie Welder Wildlife Foundation for whom I will forever be indebted.

Another major inspiration beginning in 1983 and lasting throughout the program was generously proffered by Frank and Mary Yturria and their family. They allowed me access to a beautiful ranch with resident ocelots during an era when few others made a similar offer. Continued support for active ocelot management and habitat restoration will expand upon the major legacy already achieved by the Yturria Family. The major endowment which established the Frank D. Yturria Endowed Chair in Wild Cat Studies was created by the teaming of two giant ranchers and nationally renown conservationists - Frank Yturria and Tio Kleberg.

Numerous financial supporters over the decades have included the Rob and Bessie Welder Wildlife Foundation, the Tim and Karen Hixon Foundation, the East Foundation, the Betty and George Coates Endowed Fellowship, The Rachel and Ben Vaughan Foundation, The James R. Dougherty Foundation, The Brown Foundation, Annova LNG, Exelon Generation, and one of the first fellowships given was by the National Wildlife Federation. Past agency support was provided by Texas Parks and Wildlife Department, Texas Department of Transportation, and U.S. Fish and Wildlife Service. We also appreciate financial support given by Travis and Bettina Mathis, Barry Putegnat, Dean Putegnat, John Richardson, Scott and Kathryn Petty, Gene and Jeanette Aycock, Maxine Maxwell, and Carolyn Jess.

I appreciate the support given by past Directors of the Kleberg Institute including Charles DeYoung, Sam Beasom, Fred Bryant, and David Hewitt. Advisory Board members of the Kleberg Institute who have provided funds to support the ocelot program include Tio Kleberg, Tim Hixon, Ben F. Vaughan III, Barry Roberts, and Karen Hunke.

Numerous graduate students of the Feline Research Program assisted various aspects over the years. Discussions with the current Cat Team - Jane Anderson, Jason Lombardi, Shelby Carter, Amanda Veals, AnnMarie Blackburn, and Maksim Sergeyev - help refine my thoughts and perspectives. Most students have benefitted from the Houston Safari Club Scholarships and the generous tuition assistance provided by the Rene Barrientos Fund.

Staff of the Kleberg Institute are the unsung heroes and deserve tremendous recognition - they have performed a critical role in supporting our research, and facilitating our efforts through the official university maze.

I greatly appreciate the ranchers who provided access to their beloved ranches in the early years, including Charles Corbett, Michael Corbett, and Frank Yturria. Although these three gentlemen are deceased, their families should be aware of their critical role in laying the groundwork for subsequent ocelot conservation.

I wanted to recognize the important role that other ocelot biologists have played in gathering ecological information that was synthesized and used in this lecture. This appreciation is extended to former graduated students of the Kleberg Institute, particularly Linda Laack, Arturo Caso, John Young, David Shindle, Aaron Haines, Lon Grassman, Jon Horne, Nathan Cook, Jody Mays, Jennifer Korn, Patricia Harveson, Joe Holbrook, John Leonard, and Jan Janecka.

Dr. John Young deserves much recognition for his vision and assistance in evolving the ocelot-transportation policy at the TxDOT which is charged with several mandates including safety, efficiency, and conservation. Robin Gelston of the Pharr District and personnel with the Environmental Affairs Division in the Austin Office of TxDOT have been very helpful. Personally, I enjoy daily use of the best transportation system of any state, and applaud TxDOT for maintaining its high standards.

The writing escapes to the Rio Frio on the Susan Lynch Ranch in the Hill Country were very productive and greatly appreciated. Much of the extensive original content and numerous ideas expressed herein were crystallized in the serenity of this Hill Country setting. Editorial comments for the lecture narrative were provided by Charles DeYoung, David Hewitt, and Christina Tewes. In particular, I appreciate the copy editing provided by Christina Tewes.

I experienced anguish and frustration at watching repeated failures in ocelot conservation over the decades. I apologize if any of this concern was brought home. I submit that if I have made any noteworthy achievements in my career, they would not have been possible except for the support of my wife, Bonnie, and daughter, Christina, who have been my ultimate supporters in many different ways through the decades.

Dedication

This lecture is dedicated to the Advisory Board of the Kleberg Institute who supported my research financially and inspirationally with their interest and engagement. Much appreciation is extended to this special group, and I look forward to your support and interactions for the coming decades.


3/01/2013 3:34 AM
Cuddeback

Ramona carries a woodrat for a fine feast.

Ramona ocelot being courted by a new male ocelot?

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