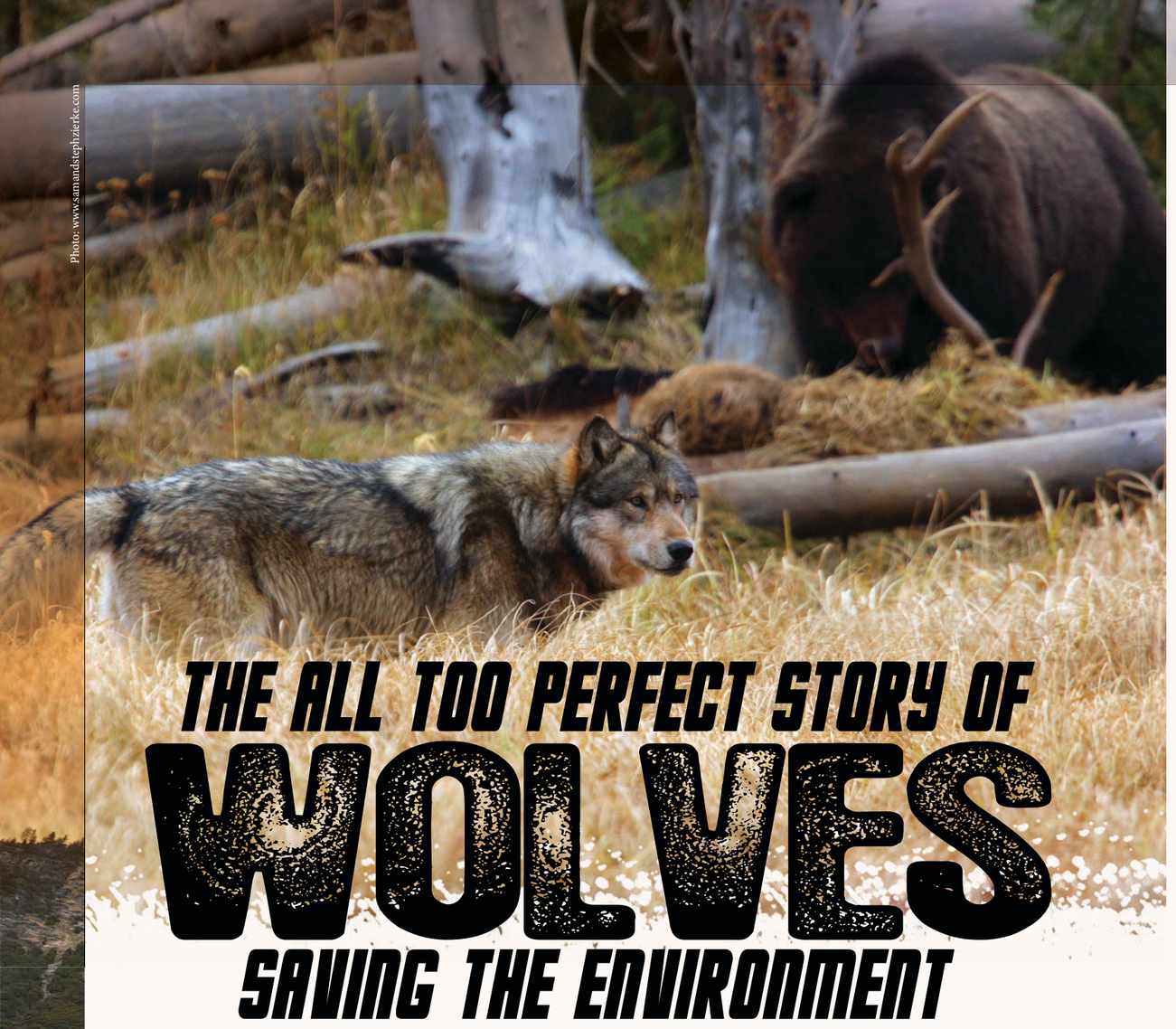

Photo: www.samandstephzierke.com

THE ALL TOO PERFECT STORY OF WOLVES SAVING THE ENVIRONMENT

By Jim Heffelfinger

Wolves weren't always polarizing, at the beginning of our human existence there was probably general agreement that wolves were bad. They ate and chased away the animals we relied on early in human evolution and no doubt snagged one of us from time to time. At some point a wolf pup was domesticated and so began our closer relationship with canids. Enough of the early fear and hatred for wolves carried forward through time to result in their demise in the most settled places of the world. A slow gradual change began whereby half of the people on the "hate" end of the spectrum slowly shifted toward the "love" end, separating themselves from those who are still negatively impacted by wolves. We now have people occupying both ends of this love-hate spectrum with disappointingly few in the middle. Now wolves are portrayed inaccurately by most people except for a minority who simply see them as native carnivores that belong on the landscape, managed along with all the other species of wildlife.

There is a concerted effort to paint them as blood thirsty killers that will lay waste to our big game populations and a simultaneous media blitz to hold them high on a pedestal and worship them as religious symbols of wilderness. In a scientific paper in 2012, famed wolf biologist L. David Mech wrote: *"The wolf is neither a saint nor a sinner except to those who want to make it so."* Although promoting their killer image is still a pastime of some, the other end of the spectrum is winning the battle to canonize wolves to sainthood in the public eye. A widespread campaign is afoot in the popular media, and unfortunately, the scientific literature in recent years to convince the public that wolves are not just good but "needed" to make the ecosystem balanced or functional again and to heal all scars on the landscape that man has perpetrated. Bringing back wolves, they say, will bring back the aspen, willows, butterflies, song birds, beavers, and change the course of rivers. This wolf marketing campaign has branded this healing process a "trophic cascade."

Trophic Cascades

In relation to wolves, the term "trophic cascade" refers to the notion that when wolves are returned to the landscape they will chase around and eat plant-eaters such as elk and deer resulting in more vegetation growth. Vegetation recovering from fewer herbivores then cascades into a magical restoration of the entire ecosystem back to a pristine condition with all the forest animals returning like some Disney production.

This concept is not complete fantasy and has a credible scientific basis in theory. There are two primary ways restoring wolves could result in vegetation changes cascading into other benefits. First wolves could eat so many elk that there are simply fewer mouths eating vegetation and the vegetation flourishes (Density Mediated Trophic Cascade). Another thought is that maybe just having wolves chasing elk out of meadows and away from streams will reduce their feeding in those areas and allow the vegetation to recover (Behaviorally Mediated Trophic Cascade). Both of these scenarios are possible under some circumstances. There is no disputing that wolf restoration has the potential to affect populations of the elk and deer they hunt and therefore plants, but the real question is how much of the vegetation changes are due solely to the return of wolves. Just how much credit does the wolf get?

The Yellowstone Experience

Most studies of trophic cascades have been conducted in National Parks in the U.S. and Canada, with Yellowstone National Park being the most famous showcase for selling the trophic cascades story. By 1994, the Yellowstone elk

Photo: Jeff Albright

When hunters reduce prey populations to appropriate levels they can also keep the ecosystem in balance

population had grown to about 19,000, which was way too many for the range. The very next year, after being wolfless for 60 years, 14 wolves were reintroduced into the park with another 17 wolves added the following year. The number of wolves grew steadily for a dozen years and peaked in 2007 at 171 wolves. The elk population, however, began to decline the year before wolves were released until they hit rock bottom at 3,900, a mere 20% of the 19,000 estimated before the wolves arrived.

The decline of elk as the wolf population grew was the subject of a flurry of research for the next two decades. During that time researchers were radio collaring as many wolves as possible, and most everything else that moved, as well as measuring plants and running computer models. As researchers furiously researched, many species of plants and animals in Yellowstone National Park were changing in number and distribution.

Some researchers tried to identify and map where it was more dangerous for elk to hangout – places where they had a higher chance of being killed by a wolf. They concluded elk avoided the more dangerous streamsides and open areas and thus wolves were acting to move elk around and reduce overgrazing in these preferred areas. As the research results began to document the wildlife and landscape changes in Yellowstone, some people immediately started to attribute all ecological changes in the Park to the return of the wolf.

In the mid-2000s, researchers from Oregon State University measured aspen and willow growth along streams in Yellowstone and concluded that these shrubs were growing back at a higher rate in the core versus periphery of wolf territories. Other studies documented that the abundance of birds, beetles, butterflies, and beavers increased when the wolf returned. Wolves were even credited with improving ground water condition, changing the course of rivers, and reducing the effects of global climate change.

It appeared the wolves were both reducing elk numbers and moving them around to allow the formerly overgrazed and over-browsed park to recover. This made the wolf a legitimate hero for single-handedly restoring the crown jewel of our National Parks. A unified wolf marketing message emerged from

Photo: NPS/Cindy Gonterman.

There is no doubt wolves can reduce big game populations in some circumstances, but they are not the cause of widespread destruction as sometimes feared.

environmental groups, and like-minded researchers, that wolves were not decimating elk herds, they were changing their behavior by moving them around. This behaviorally mediated change in where they grazed and browsed was said to have caused a fundamental and comprehensive restoration to a pristine environment. A saint was born. This storyline made some people simply giddy. It is such a perfect story that makes perfect sense and people started to fall over one another to share it, write about it, and repeat it over and over. It was an irresistible message for those in the popular media who had no training, nor interest, in the science.

Trouble in Paradise

It has been said that one should never let a beautiful story be ruined by the facts. This particular story started to unravel in 2010 when Matt Kauffman and coworkers made more rigorous measurements of streamside vegetation and showed there was no widespread recovery of aspen in the park despite a 60% decline in the elk population. They reminded everyone that the height of aspen and amount of browsing was influenced by many factors besides wolves. In fact, it should come as no surprise that aspen grew taller near wet streamsides than on drier areas away from streams.

About the same time, Arthur Middleton was researching the idea that wolves scared elk so much it reduced grazing and browsing in certain areas and vegetation recovered. He found little or no cascading effects of wolves harassing elk out of favored feeding areas in the greater Yellowstone ecosystem. Drought and nutrition during pregnancy was more likely to affect pregnancy rates than the fear of wolves. The dramatic reduction in the number of elk in Yellowstone has relaxed browsing pressure on some plants, but the recovery of streamside vegetation has been very inconsistent and not related to the risk of being eaten by a wolf.

Further eroding the legend of Saint Lobo was the work of Thomas Hobbs and his colleagues on the recovery of willows in Yellowstone. They concluded wolves haven't had much effect on willow recovery since they were introduced. Instead, rising water tables, precipitation patterns, changes in stream flow and changes in the floodplains where the primary influences that allowed willow to recover in some areas. It seems obvious that the loss or reduction of wolves, grizzlies, and other top predators allowed elk and bison populations to overpopulate the Yellowstone landscape for decades. The hands-off mandate of the National Park Service allowed them to overbrowse the willows and other plants. Uncontrolled elk populations contributed to the loss of willows from Yellowstone and as willows disappeared so did the beavers.

By the mid-1980s beavers were returning to the drainages along the south edge of the Park, but wolves didn't bring beavers back to the Northern Range of Yellowstone, biologists did. Between 1986 and 1999, biologists released 129 beavers on the Gallatin National Forest in 7 drainages just miles north of the Yellowstone boundary. Through their alteration of the water table and streamflow, beavers had more to do with the recovery of streamside vegetation than wolves did, but they lacked an organized public relations effort to give them rightful credit.

Many other ecological changes have occurred that contribute to a far more complex picture of Yellowstone than is being told to the public. Moose abundance also declined dramatically after 36% of the Park burned in 1988. The grizzly population has increased tremendously accompanied by a 3-fold increase in predation of newborn elk. The worst drought in a century hit the region in the mid-1990s which reduced the number of elk calves produced. The harvest of cow elk outside of the park in December continued too long because of uncertainty in whether the reduction in winter survey numbers accurately reflected a declining elk population. Cougar and bison populations have grown and heavy winter snows during some winters affected elk survival and reproduction. All these factors worked together to cause a decline in the Yellowstone elk populations, but that is not the story being told.

In 2014 a video emerged, complete with classic nature-show British narration, that told a story about how the return of wolves created a cascading effect throughout the entire plant and animal communities in the Yellowstone ecosystem. The narrator weaves a masterful tale which purports to show how the wolf single-handedly changed the course of rivers with its divine intervention. The video went wildly viral and warmed the hearts of many as documented by the comments posted on YouTube. Unfortunately, the fact that the video was full of outright lies and exaggerations was not noticed by its nearly 40 million viewers.

Photo: Wikimedia Commons

It was thought that wolves might make elk fearful of open areas where they hunted and reduce grazing pressure there, but proof has been elusive.

The truth is that after 20 years of extensive and intensive research, we still do not have support for the notion that wolves were the primary agents reducing the elk, nor do we have support for the idea that the fear of wolves was driving vegetation recovery. Although wolves certainly contributed to the decline in elk, we have very little scientific support for the idea that the wolf brought back the next trophic level of birds, butterflies, beetles, and beavers. There are far too many complex and complicating things that affect plants and animals at each trophic level to pick one saviour.

And yet, the band played on. As scientific support for this wolf-caused Yellowstone transformation failed to materialize from all this research, the public relations campaign for wolves just became louder and more repetitive, sticking to the same talking points either out of ignorance of the research or an erroneous fear that good science was the enemy of wolf recovery.

Wolf haters attribute the massive decline in Yellowstone elk to wolves and use it to raise money for their cause. Wolf activists attribute the recovery of the entire ecosystem to wolves and use it to raise money for their cause.

Unfortunately, neither side is on the right side of science. Flying the flags of heroism or destruction does not reflect science or truth, only personal bias. When it comes to wolves, the truth is always in the middle.

An Honest Look at the Wolf's Role in Trophic Cascades

So many want to point to what has happened in Yellowstone National Park since the mid-1990s as a model of what the natural world can return to when we return wolves to the landscape. The trophic cascades story is not even entirely true in Yellowstone, let alone more complicated multiple use landscapes.

Photo: Tim Rains/NPS

Ed Bangs, who led the recovery of wolves in the Northern Rockies referred to Yellowstone National Park as **"3,400 square miles of paradise… surrounded by reality."** It is naïve to think the Yellowstone experience, no matter how it is interpreted, can be duplicated everywhere wolves are released. The notion of a wolf-caused "trophic cascade" restoring the integrity of the landscape is certainly not likely to happen outside of large protected areas. In the reality that exists where we have ranching, farming, hunting, and rural communities, wolves won't be able to reach the high densities they can in large protected areas. On a human-dominated landscape, "social carrying capacity" will determine the number of wolves that exist on the landscape.

Overpopulations of deer and elk in many national parks have impacted vegetation for decades and that is what set the stage for a trophic cascade effect. If deer and elk are already maintained well below the carrying capacity of the habitat, then adding more predators to prey on them would not affect the vegetation because it is not being suppressed by over-browsing. When deer and elk populations are impacting their habitat, hunters can also reduce herbivore populations and keep them moving out of their favored feeding areas to allow vegetation to recover.

Unfortunately, personal desire to make the wolf look good has resulted in a

Photo: samandstephzierke.com

growing body of research papers that lack the rigor we expect in the scientific literature. Some scientists are trying hard to promote the wolf. It almost appears that some researchers are afraid that if they don't produce science to "prove" the wolf is necessary to a fully functioning ecosystem then no one will support wolf recovery. The truth is, the wolf is not necessary to have a healthy landscape, but it belongs there with the other native species we have all helped to restore. David Mech wrote in 2012: "We don't have to make the wolf out to be a hero to justify recovery."

Recently, several scientific papers have been published that highlight the short-comings of past research in this area and call for more rigorous science when researching trophic cascades. There is certainly a need to understand this topic better and not accept or dismiss any claims on either side of the issue without the support of good science. The public needs to hear the truth about trophic cascades; it can be a real phenomenon but it can't be assumed by jumping ahead of the research. The removal or elimination of both predators and active wildlife management can certainly allow herbivore populations to increase to harmful levels. But, after such a long absence, the mere return of the wolf will not be enough to undo decades of ecological changes.

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Jim has authored or coauthored more than 200 magazine articles, dozens of scientific papers, and 20 book chapters in regional, national, and international publications. He is Chair of the Mule Deer Working Group, Full Research Scientist at the University of Arizona, Professional Member of the Boone & Crockett Club, and currently works as Wildlife Science Coordinator for the Arizona Game and Fish Department.