

Puma Research

Now that you have it, what do you do with it?

The following article was derived from a speech delivered by the author at the Denver Museum of Nature & Science on April 18, 2006. The forum was a panel discussion involving biologists, ranchers, environmentalists, and resource managers entitled "Sharing a Home with Predators: How Well do Humans and Mountain Lions Co-exist in Colorado?"

By Harley Shaw, Biologist

When Carol Cochran asked if I would participate in this workshop, I had just finished a phone call with a friend who worked for many years as a predator control agent in California. He is a rather independent thinker and home-spun philosopher and always enjoys rattling my cage. We were discussing the recently-published *Cougar Management Guidelines*, a synthesis of research and management experience that Ken Logan and I, along with 11 other biologists, helped write. While my friend didn't openly disagree with the guidelines, his comment regarding their use was, "Why should we bother? We've been managing cougars successfully for 100 years without all of this information. Why change now?" His solution is simple – just take out the problem cats, and let the rest take care of themselves. His question was rhetorical, intended to make me think. He didn't expect an argument or an answer. But make me think, he did. Should new knowledge always create change?

A host of agencies and universities have been doing research on the puma

in the United States, Canada, and Latin America since the mid-1960s, when Maurice Hornocker broke the methodology barrier in his Idaho Primitive Area study. Over time, more efficient methods of capturing puma, improved radio-tracking equipment and, more recently, population genetics and camera traps have contributed to our research abilities. We know a lot more about the basic biology of the species than we did in the 1960s.

At the same time, the conflicts surrounding the puma have changed and grown. In 1970, when I first began working with the puma, the main questions in Arizona involved its numerical status, the effect it was having on livestock and deer, and the effect hunting was having on it. Other states addressed these same questions more or less about that time. As a result of these studies, few people are now worried about the immediate extinction of the puma in the western United States, and we have pretty much defined the circumstances under which they become troublesome with livestock. While these issues still exist, they are no longer the ones that make news. We still struggle over

appropriate regulations for hunting the puma, but these seem to be centered more upon ethics and politics than upon the long-termed welfare of the species. What seems to have most of our attention is the continued movement of humans into puma habitat and the resultant conflicts between the two species, including rare but frightening attacks on humans and, conversely, the ongoing loss and fragmentation of habitat. Added to this is the reappearance of the species in historic ranges to the East, which has created fear, concern over livestock loss, and conflicts regarding recommended puma hunting in these re-expansion areas. Do we have the knowledge we need to address the new problems that are arising? If so, how do we implement that information, and to take up my California friend's question, why should we? Can't we just continue to apply our old tools of control and/or regulated hunting, and leave the rest to nature or fate?

I am convinced that my friend was intentionally, perhaps a little facetiously, presenting a pretty common point of view in wildlife management ranks. Our profession and

much of the public that supports it are by nature conservative. We do not change our mores easily or implement new knowledge quickly. This isn't necessarily bad. Certainly any apparent, new knowledge requires some seasoning and testing before it can be trusted. Nonetheless, we do our best to convince all stakeholders involved in puma management that our judgments are based upon "good science," with the unstated implication that by using "good science," we use the latest knowledge to make ethically sound decisions.

But, while "good science" must have its own ethical basis, in that it purportedly seeks objective truth, science alone cannot determine human values. Ethical behavior, like beauty, is to some extent in the eye of the beholder. My favorite example here is a ranch manager I worked closely with during the early Spider Ranch puma study. He was elated when we confirmed a large number of calves in the puma diet and felt that this would end once and for all any conflict over the species. If pumas ate beef, they should be eliminated – a simple conclusion deriving from the value system he espoused. Of course others, with other values, drew other conclusions from exactly the same set of data. Those wanting to protect the puma or those opposed to grazing on public lands saw it as proof that cattle shouldn't be raised in puma country. While the study laid to rest the question of effects of pumas on cattle on some Arizona ranges, it didn't modify many people's values. It merely shifted the focus of the arguments. I'm not taking sides here, I just want to emphasize that facts alone do not necessarily change people's goals.

As a young research biologist, I naively assumed that the science-

based facts I was obviously destined to discover would be welcomed by those in power, and that I'd receive their unending thanks and appropriate compensation for my contributions. I hoped to improve species management and, of course, eliminate conflict. Slowly, however, I came to realize:

1. New knowledge isn't always that easy to come by. Much of what we do in wildlife research centers on quantifying what we already knew qualitatively from years of experience.
2. Should you come up with something new, not everyone will accept your information, no matter how good your science.
3. Even when findings are compelling, the power hierarchy is just as likely to resist or ignore them as they are to thankfully apply them.
4. Scientific knowledge by its nature does not always simplify decisions or resolve conflict, and what you learn does not automatically benefit a species.

The truth of this latter statement, in fact, can make science rather unpopular. Dr. Daniel Sarewitz, Director of the Consortium for Science, Policy, and Outcomes at Arizona State University recently wrote in *American Scientist*:

"The idea that a set of scientific facts can reconcile political differences and point the way toward a rational solution is fundamentally flawed. The reality is that when political controversy exists, the scientific enterprise is ideally suited to exacerbating disagreement, rather than resolving it."

To me, coming from one of our most prestigious general science journals, that's a rather discouraging statement!

Dr. Sarewitz further notes that science can have its own biases:

1. For every value, there is often a legitimate supporting set of scientific results. That is, if you look hard enough, you can usually find a set of data to support your preconceived notions.
2. Specific scientific disciplines often turn out to be especially compatible with particular interests and values. This can be exacerbated by a tendency for agencies supporting research to ask only safe questions. One of my earliest disillusionments as a young biologist occurred when a supervisor rejected a study proposal, quite honestly stating, with a shrug, that the agency might not want to have to deal with the findings, should they go the wrong way.
3. Science rarely provides simplistic or uniform answers but more often reveals the complexity in natural systems and our uncertainty in our knowledge of them. The cliché oft heard here is that the longer one works with a species, the less they know for sure.

Dr. Sarewitz suggests: "...the most proper role for science in support of decision making comes only after values are clarified through political debate and after goals for the future are agreed upon through democratic means."

At a seminar similar to this last year in Prescott, Arizona, I heard a research biologist from the Arizona

Game and Fish Department say this differently to a very large and politically diverse group of people: "...we are scientists. We have knowledge of species, but you, the public, have to tell us what you want. We can only use our knowledge to carry out your goals."

With all due respect to my California friend, Dr. Sarewitz, and to my fellow biologist, I disagree. In a world as polarized and complex as the one in which we live, that is changing as fast as it is, we cannot simply use science as a tool to carry out the goals of whatever regime happens to be in power. Certainly, ample examples exist in history of misuse, even evil use, of science and technology. Scientists must constantly attempt to inform the public and, especially, decision makers, about what the ramifications of their decisions will be, *while* the values are being established.

I would venture that hope of relying on the democratic process to establish wildlife-related values is rather naive. First, in our money-driven world, defining our goals for the future is rarely determined through simple democratic means. Furthermore, where the welfare of wildlife is concerned, the public at large has neither the time nor the ability to sort through the amount of information (but not necessarily truth) that flows from the Internet, television, newspapers, popular magazines, books, and so forth. Please don't think I'm being arrogant in saying this. Take me away from my narrow area of expertise, and ask me to clearly understand the issues surrounding foreign policy or, for that matter, conflicts over some other environmental issue, and I'm as uncertain as the next guy. It becomes very easy to cling to old issues, old facts, old values, old ethics, and hope

the new ones will go away.

A mentor once told me that those of us who do wildlife research shouldn't expect to see our results used in our lifetime. "Research results are for the next generation," is the way he put it. This was back in the 1960s, when things still seemed pretty simple. The speaker was a second-generation wildlife biologist with a much longer perspective than mine, and for many years I comfortably accepted his philosophy, worrying little if no one paid attention to my work. Nonetheless, I have come to question this maxim. We now deal with a highly polarized public that often pressures wildlife agencies to carry out programs and to react to issues in ways that are not necessarily in keeping with their best knowledge about a species. Perhaps our most important role as scientists lies in emphasizing that the species we manage, the puma included, have very real, evolved, biological characteristics that constrain what our management efforts can accomplish. These may not be discrete, absolute numbers, such as we find in the physical sciences (Hydrogen atoms always have one electron; pumas do not always have a litter of exactly three young. The sun rises and sets on a 24-hour cycle. Pumas do not always hunt at night or always have a litter exactly every 24 months. Our Earth circles the sun with a closely predictable orbit. Female pumas do not always have a home range of 37.33 miles, or whatever average some particular study might find.), but they do operate within biological limits upon variations that we are beginning to understand, and management programs that do not recognize these natural limits are destined, if not to fail, at least to be wasteful of funds and personnel.

Our second important task is to emphasize that within the larger range of variation, the host of other traits affecting species and their management vary both geographically and even temporally within areas. Prey density, weather, and disease are in themselves variables that ultimately affect the behavior and survival of pumas during any given period. You can't have one-size-fits-all, never changing, programs. In managing wildlife populations, including those of pumas and their prey, we are therefore dealing with extremely complex, perhaps chaotic systems that do not necessarily react in a predictable, linear fashion to our anthropogenic nudgings. And effects of decisions we make now may radiate unpredictably far into the future. Considering that puma management invariably is driven by the interaction of a host of fairly narrow and immediate motives – protecting livestock, protecting game animals, protecting human life, protecting puma populations, anxiety over human treatment of individual animals, or, too often, just winning a political battle – the hope that we might be able to manage wisely and objectively becomes tenuous at best. We need to monitor closely the results of our decisions.

It is another cliché among researchers that studies of populations are never long enough. The typical research project lasts only one to three years. A few have gone 10 to 15. They are invariably limited in geographic scope by economic, personnel, and political constraints. We start a study, usually rather spontaneously, when funds are allocated because some political flap focuses attention on the species. The very fact that a project is issue-driven means that it is probably being started after the prob-

lem can be easily solved – that we are already behind the curve. A good example of this is my own work on the North Kaibab, where we executed a three-year study to assess the impact of the puma on that famous deer population after the population had been declining for nine years. We found pumas present. We even watched the puma population crash. But we were too late to understand why the deer population had gone into decline nine years earlier. And we pulled out before the population began to increase. You can interpret our three years of data just about any way you want to. Too often in such studies, even though focused on some single issue, the information provided will be all that is available for a state or a region, and is therefore in danger of becoming widely applied gospel, simply because no other information exists. But there are no guarantees that the information fits another place or even future conditions in the same place, so we must be extremely careful how we apply population and ecological research. Again, this isn't physical sciences.

Our *Cougar Management Guidelines* emphasized the need for “adaptive management,” which is simply a modern buzzword for trying something, watching closely what happens, and adjusting your management to improve results. Some would simply call this common sense. However, if we delve into the history of wildlife management, we find that very few management programs have been adequately evaluated and that once established, whether good, bad, or indifferent, they can persist for decades. Even in the face of the increasingly advanced research technology, *puma management* involves a relatively limited repertoire of tools, and management programs, whether in the form

of direct control, sport hunting strategies, or increased species protection, are rarely adequately monitored for their effectiveness, much less tweaked for improvement.

This is not necessarily the fault of the agencies. For much of what they do, good methodology does not exist for monitoring the outcome. On the whole, with their polarized public, they are under siege and may be forced into making decisions that have little to do with available biological information. Personally, I believe that we have studied puma populations over a wide enough array of conditions to understand the range of their basic biological traits. We also know that our ability to predict factors affecting wildlife populations and their trends is extremely limited. We desperately need better methods of monitoring conditions on a year-to-year basis and to bring our knowledge of the basic biology of the species to bear on predictive models.

However, wildlife managers cannot be expected to apply the intensive and usually expensive methods used in research. Pumas are only one of many creatures with which they have to deal. What they need are methods that can be applied fairly quickly. Even more, they need to be able to interpret the results of these methods in terms of what our now long period of research and field experience with cougars has taught us. Frankly, I don't believe that we can do this through the traditional avenues of technical in-house reports or journal articles. As specialists with special experience and knowledge, we must take our knowledge directly to the field biologists and to the decision makers, and ultimately to the public, whether they ask for it or not. Those of us who produced the *Cougar*

Management Guidelines offered them as a beginning for such a *process* of evaluating and implementing new knowledge. We don't expect them to perform miracles or to necessarily change stakeholder values, but we hope they serve to dispel myths and constrain puma management practices within the realm of practicality.