Platform Needed To Evaluate Research Answers Similarly

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By Colleen Schreiber

ABILENE — Often referred to as the quail capital of the U.S., Texas is one of the few places left that still has huntable populations of wild quail. However, that wild population continues to face plenty of obstacles.

Tens of millions if not more has been spent on trying to stop the quail decline in Texas. There are plenty of theories as to why the decline and plenty of research has been done to try and find out what theories are fact and what are fiction. However, there remain more questions than answers.

Quail aficionados gathered at the statewide quail symposium held here recently to hear the latest updates on all things wild quail. Dr. Fidel Hernandez, research scientist and regents professor at Texas A&M-Kingsville, has been pondering how research is interpreted for the last seven to 10 years. As the chair of the Alfred C. Glassell, Jr. Endowed for Quail Research at the Caesar Kleberg Wildlife Research Institute (CKWRI), Hernandez is just one of many who have been intensively studying quail for years. These beloved game birds have been studied for more than a century now. The result is three to four thousand, if not more, research studies. However, Hernandez, told those attending the quail symposium that this amalgam of studies is a "jumbled pile of facts and observations."

He said the problem is that someone can pull out one piece of research from the pile that says one thing, then pull another piece from the same pile that says just the opposite. The conundrum then is deciding which is correct.

"It could be that both of them are correct," Hernandez stated. "However, we don't know that without a clear, consistent framework within which to interpret the observations of these studies."

Put another way there is lots of information out there, but very little understanding, he said.

"When there is no framework for interpreting research, the end result is disagreements," said Hernandez. "We have disagreements over whether supplemental feeding works or not, whether parasites are a problem, and whether translocation works."

He added that as humans we have a tendency to think that we have absolute knowledge, that when something is studied extensively and many facts exist, that there is complete understanding of the subject matter.

"In reality, we only have one sliver of the entire picture," said Hernandez.

He offered some principles that could be used to help build a framework to look at quail research, the first of which is scale. Scale, he noted, is the lens through which one views the world and the lens used influences how one perceives and understands the world.

He offered more context pointing out that relationships viewed through a broad lens, or a larger filter typically are explained by only one or two variables. However, when viewed through a small lens, many more variables become important, Hernandez explained.

Specific to quail, he used the example of rainfall. He pointed out that several studies have documented that rainfall can explain 70 to even 95 percent of the variability in a quail population. That then would indicate that things like management only account for five percent of the variability.

"In this case, it would mean that rainfall is the complete story," Hernandez told the group.

He dug deeper and found that when ordering all the studies investigating the quail-rainfall relationship over the scale continuum, an interesting pattern emerged. When studies used a broad lens and compared how many quail occurred at a regional level with how much rain fell at the regional level, rainfall explained the majority of that variation in quail abundance, some 40 to 80 percent. However, when looking at the relationship using a narrow lens, say at an individual ranch, the explanatory power of rainfall was much less, only 10 to 30 percent, said Hernandez.

"Still rainfall matters at this site level, but its influence is much less meaning that other factors such as management begin to matter," he told participants.

Thresholds were a second principle that Hernandez identified as important for developing a framework for quail research. A threshold, he explained, is just the idea that a tipping point often occurs in a system, where small changes near such a tipping point can cause the system to toggle between two drastically different states. He used water and the point at which it freezes as an example.

Specific to quail he used the principle of a threshold with respect to habitat. Ecologists have often pondered just how much habitat is enough to sustain a productive quail population. Simply, the more habitat, the larger the population, and vice versa. He said that for decades researchers also thought of it as a linear relationship in that a little loss of habitat meant only a small drop in the population size, whereas a large loss of habitat meant a large drop in population size. What researchers are now beginning to realize is that it's not linear, that there is a threshold, whereby a small loss of habitat may cause a quail population to change from one that is persisting to one in steep decline.

Hernandez further explained that with a small population, there is what conservation biologists refer to as "extinction vortex." By default, smaller populations are going to have less genetic diversity. That leads to inbreeding and inbreeding leads to lower fertility and higher mortality and ultimately an even smaller population. Dr. Fred Guthery, a noted quail researcher, referred to them as zombie populations; the populations are dead they just don't know it yet.

However, Hernandez also pointed out that it's not necessarily always inbreeding that causes the issue. There are social/demographic issues to consider. For example, in the case of the African wild dog, it's that the population simply gets so small that there are not enough adults in the pack to bring enough food back to the pups.

Relating this to quail, Hernandez said researchers don't really know how much habitat quail need to sustain a population. There are a few estimates. Assuming one or two acres per bird, modeling done by Guthery suggests that 4000 to 5000 acres were enough to sustain a population for about 100 years with a 90 percent probability of persistence.

However, work done at CKWRI indicates that a genetic neighborhood for quail is on a much larger scale, from 300,000 to 500,000 acres. That means the parents of a quail born on a ranch in South Texas could have come from anywhere within an area of 300,000 to 500,000 acres.

"We're talking about a massive landscape," said Hernandez. "It really opened our eyes as to the scale in which quail populations operate."

He also noted that on the ground it may seem that, at least in South Texas, there is ample contiguous habitat as one drives along the highway. However, on a landscape scale, when viewed aerially, maps clearly show that there is a lot of fragmentation, particularly in the Rolling Plains of North Texas. Hernandez said that South Texas also has fragmentation, namely farming, but largely that farming is on the fringes of what is considered quail country.

The third principle of Hernandez's framework for analyzing research is legacy effects, which he further explained are things from the past that impact the present situation. Again, in the case of quail, the previous year's rainfall influences this year's quail population. He was reminded of 2010 when the two quail strongholds had an overabundance of rain. Parts of South Texas received 55 inches where the norm is 25. That made quail enthusiasts particularly optimistic about the upcoming season that surely there would be a boom in the quail population. There wasn't.

He then noted how in the previous year, 2009, most of Texas was in a historic drouth. Digging deeper into the boom-and-bust cycles of quail, he noted that there needs to be at least two years of back-to-back rainfall for it to be a boom year, thus the idea of considering legacy effects when analyzing research results.

Bringing the discussion full circle, Hernandez said using this conceptual framework helps better explain why one research project says predator control doesn't work and another says it does and how both can be correct in a given specific situation. In the case of a landscape with extensive amounts of habitat, the quail population will be large and "firing on all cylinders." It will be driven primarily by weather. In this scenario, predator control likely would not have an impact. However, in a landscape highly fragmented and with little habitat, populations are going to be much smaller and demographically limited such that predator control could certainly help, he said.

Same goes for translocation. In a large population, the habitat may be somewhat fragmented, but the population is still intact demographically and genetically. In that case, translocation is not likely to have an impact. Just the opposite could be true on a smaller scale.

Bringing it all together, Hernandez reiterated that humans have this innate desire for control. Humans try to control behavior through contracts, through rules, policies and regulations, he noted. That form of innate control has led to successful stable human societies.

However, that tendency for control has also flavored the ecological framework of how nature operates, he told participants. He described two general views that ecologists tend to have. One is the notion of a balance of nature in that some things go up, but other things bring them down.

"It's a stable equilibrium," said Hernandez. "It's linear, it's predictable, I push here, the system goes there. I remove the disturbance, it comes back."

Then there is nature in flux view. It's not in equilibrium; it's not predictable and there are alternative states. In this example a plant community may incur some kind of disturbance, but rather than moving back to its original state over time it moves to a different state.

"It's unpredictable," said Hernandez. "We cannot predict where that community is going."

The point he was getting to was that these two contrasting views of nature have led to two different types of management, command and control management whereby the focus is on minimizing fluctuations to maximize output, and the other is resilient-based management where the focus is on working with change to make the system resilient enough to be preserved.

"With command and control, we want to minimize variability, increase efficiency and maximize output," said Hernandez. "With resilient based management uncertainty is embraced. We know things are going to fluctuate, but we don't know how they're going to fluctuate, so we try to guide change and promote resiliency."

He went on to further point out that command and control works great in an engineering system. However, in managing an ecosystem is not so ideal.

"In an ecosystem, stability actually promotes destabilization and deterioration," he told the group. "Nature thrives on variability. It's like a muscle. It needs to be exercised, strengthened and challenged in order to maintain its resiliency."

Hernandez cited fire suppression as a prime example of how the innate desire to control has led to a form of natural resource management that suppresses environmental fluctuations. Specifically, this form of control has led to historic wildfires.

Hernandez concluded by reiterating a need to look at the available quail research through the eyes of scale, thresholds and legacy effects to better understand why contradictions exist in quail research. Additionally, he pointed out that the massive amount of quail research that is available gives a false sense of understanding the system.

"While we have lots of information through many years of research, we haven't done a good job of putting the information together. Thus, we have great information of the quail system but a poor understanding of it," Hernandez concluded.