





# A Watchful Eye

DNR keeps careful tabs on our state's most precious animals using everything from eyewitness accounts to the latest GPS technology

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**I**t was a chilly day in December 2016 when Randy Kelley, a Division of Natural Resources biologist and leader of the agency’s elk restoration project, opened the gates of a specially fenced containment area holding 24 Kentucky elk and let them escape into the hills of the state’s first protected elk habitat. “For the first time in 150 years, we had free-ranging elk in West Virginia,” he says.

It was a beautiful but terrifying sight. DNR had spent years planning for this moment, and it had taken many months to acquire the animals. They were meant to become the foundation for an entirely new population of animals in the region, unwittingly representing the hopes and dreams of conservationists, hunters, and other animal lovers who longed to hear their haunting bugle in the wild. And they were now free to roam across more than 35,000 acres—alone.

But like many other rare or protected species in the state, this elk herd carried with it a tracking technology that allows Kelley and others to keep a watchful eye on the animals without disturbing their daily lives.

Animal tracking programs are nothing new in West Virginia. Everything from black bear to channel catfish are routinely tagged and monitored, using everything from basic tags and public reporting, a method over 100 years old, to durable reliable radio transmitters and the newest computer-aided GPS technology.

## From Tags to Transmitters

More than 70 species of wild mammals, 57 species of amphibians and reptiles, 178 species of fish, and nearly 300 species of birds call this state home. Of that, some 20 animal species and six plant species are considered either threatened or endangered, and many others are protected by specific hunting and fishing regulations. But how can we know for sure that these species are healthy and thriving? How does DNR know when to update its regulations? Tracking and monitoring programs are one way. But not all animals can be easily watched.

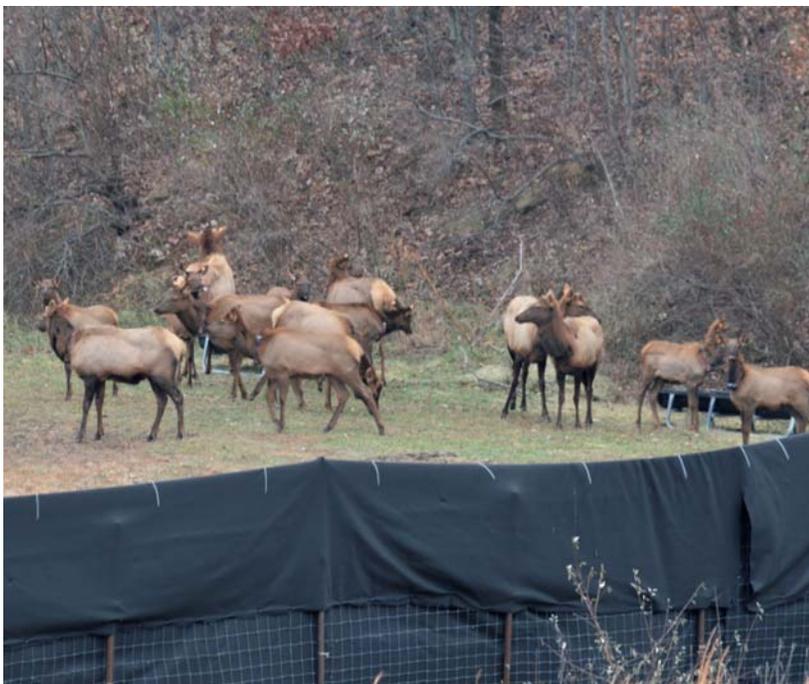
Fish, for example, are difficult to assess visually. DNR needs to understand the health of each species and how current fishing regulations are affecting them. Wildlife biologists often rely on anglers to help them with specific studies.

Recreationally important species such as channel catfish, flathead catfish, and smallmouth bass are fitted with small tags that include individual fish tag numbers. Anglers are then asked to report any tagged fish they capture, including the tag number, water body location, date, and other information like whether the angler released the fish back into the water or took it home.

The data helps DNR understand how these fish move through their habitats and into others, the success of stocking programs, and how often fish are harvested. DNR has studied many fish species this

Some animal tags emit radio signals that can be tracked using directional antennae. Animals that move great distances quickly often have to be tracked from a car or plane.

ANTONIO MARCUS CONSTANTINO



**TOP** An elk cow wears a GPS collar that allows biologists to pinpoint her exact location and track her trajectory over time.

**BOTTOM** Elk from Land Between the Lakes National Recreation Area await their release at the Tomblin Wildlife Management Area along the Logan–Mingo County line.

way, from walleye to sauger to trout, in bodies of water such as the Ohio River, the New River, and the South Branch of the Potomac.

DNR often asks for the public’s help when assessing rare, protected, or endangered species, too. In 2017, biologists began studying declining species like the West Virginia timber rattlesnake, an incredibly beneficial snake that helps control populations of potentially disease-carrying small mammals like mice and chipmunks. DNR asks that West Virginians report any rattlesnake observations, including precisely where the sighting happened, to help create a better picture of the species’ status in the state.

But Kelley says most larger species that can support electronic tags are tracked using Very High Frequency (VHF) radio transmitters, sometimes called pulse collars. Animals are caught, often sedated, and fitted with relatively small electronic tags that emit radio signals. Using a handheld receiver and directional antennae, biologists can home in on the signal and locate the animal. But the process isn’t always easy. “When I was doing my master’s, I worked with wild turkeys. We tagged them and tracked them. But if they left the area, you’d spend hours looking for them,” Kelley says.

Depending on the strength of the signal, directional antennae typically have to be within a few miles or several hundred yards of the animal to detect a signal—which means animals that move great distances quickly often have to be tracked from a car or plane.



But VHF tags are still an ideal method of tracking, for many reasons. They are lightweight, relatively affordable, reliable, and have long battery lives.

For these reasons, VHF transmitters are an important part of the elk tracking program. “The elk were given the VHF transmitters before being released, which come on during a limited time each day. That way we can track them using the traditional antennae if we need to,” Kelley says.

But that’s not the only technology keeping watch over West Virginia’s new elk herd.

### From Satellites to Smart Collars

The day Brian Satterfield saw his first elk release in Kentucky, he was hooked. “I was standing on a hillside on a cold, wet morning with a thousand other people just to see them. It was so moving. I knew we had to make this happen in our state.”

As West Virginia volunteer state chairman for the Rocky Mountain Elk Foundation for more than 25 years, Satterfield knew DNR would need to use state-of-the-art tracking technology if it wanted to help elk gain a foothold in the state. The foundation, whose mission is to ensure the future of wildlife, habitat, and hunting heritage, has supported elk projects in West Virginia and many other states.

Volunteers like Satterfield often travel to help states capture, tag, and release elk. So he’d seen the latest

technology firsthand—a mixture of GPS and computer technology that allowed real-time data gathering and interpretation of animal movement and herd health. He knew GPS was the way to go in West Virginia. So together, the foundation, DNR, and other organizations came together to finance the GPS trackers.

Paired with special computer programs, the collars collect movement data and send it to a satellite, which transmits it back to Kelley. “The collars are set up so the data collection can be adjusted from a computer remotely. You don’t have to go looking for the animals on foot, which saves us a lot of time,” he says.

Which is fortunate, since elk often move great distances in short amounts of time. “We had a cow go 14 miles from the release site the first year,” Kelley says. “But you turn on the satellite, and it shows exactly where she went.”

Currently, the herd’s collars send Kelley data about four times a day. Kelley can download that data onto a Google Earth image and see not only where a single animal is at the time of the last upload, but also its trajectory over time. He can even look at the entire herd’s movements at once.

The collars also warn Kelley when their batteries are low. They alert him when the animals haven’t moved for a long time, a clear sign of distress or death. “You actually can set them to drop off when the battery gets low, or you can send them a command

The collars elk wear combine VHF and GPS technologies. The former can be located using directional antennae in the field, but GPS collars can be tracked from anywhere, using the Internet.



Eventually, once the herd is large enough and self-sustaining, DNR might not need to track elk. In the meantime, biologists continue to keep a watchful eye on these important animals.

to drop off automatically. We've had a couple collars we put on young animals before they were released. With bulls in particular, they can gain a lot of weight, and during the rut their necks swell, so we've had to drop a couple of the collars just to give the animal room."

Dropped collars aren't wasted, though. They transmit their location once released, and Kelley can pick them up. "We can later locate the animal using the VHF signal, recapture it, and put a collar back on at the right time."

All this information isn't merely to keep track of the animals. Long-term, the GPS technology will help form the basis of a sustainable management program. "This will give us a better handle on what we should do to improve the habitat. Knowing their home range sizes will allow us to build models and better manage the elk in the future," Kelley says.

## The Future is Here

Like all conservation efforts, tracking requires many hands and lots of patience. But the efforts are paying off for the elk, Satterfield says.

With luck and a bit of help from some old and new technology, the herd will grow big enough to no longer need such a watchful eye, just like many other species DNR has watched over in the past. "When my wife and I went to visit the elk area in mid-September we saw something really special: a young, untagged elk," Satterfield says. "That means it was probably born here, in West Virginia. A real native."

Check out the list of rare, threatened, and endangered species in West Virginia at [www.wvdnr.gov/wildlife/endangered.shtm](http://www.wvdnr.gov/wildlife/endangered.shtm) and report any sightings you have at [www.wvdnr.gov/Wildlife/RepRareSpec.shtm](http://www.wvdnr.gov/Wildlife/RepRareSpec.shtm). 🐾