

# High Tech on a Small Zoo Budget

## Alternatives to Expensive Monitoring Equipment

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Obtaining the proper technology necessary to monitor animals at a facility can be burdensome for a zoo on a budget. Thankfully, the demand for surveillance equipment in other industries has resulted in the invention of cheaper alternatives that zoos with smaller budgets can integrate into their programs. Our team has begun utilizing both inspection and capture cameras, and the results have been very beneficial to our animals' welfare. The equipment allows the keeper staff to inspect areas not typically viewable and observe rare animal behaviors. It also limits the stress put on the animals that observations with the keeper standing there can put on them.

### Inspection Camera

Inspection cameras are cameras attached to a monitor by a wire designed to help plumbers and electricians inspect the pipes and cables behind walls. Because of their maneuverability and flexibility, they are also ideal tools for nature photography. In fact, you may have seen David Attenborough or another wildlife expert using high-end inspection cameras to take a tour of an animal's den. Unfortunately, these cameras retail for a thousand dollars, which is well beyond the zoo-on-a-budget's means. Thankfully, Do-It-Yourselfers can find cheaper alternatives online or at big box stores like Lowes and Home Depot for only a hundred dollars. This is a far more reasonable price, and it allows for every facility to customize its equipment. For example, our facility never needed an inspection camera longer than three feet, but longer

cameras and extensions are on the market for facilities with the need. Our zoo, which has burrowing animals, finds that inspection cameras are a most effective tool for ensuring the safety and well being of various species. We have enjoyed success using the inspection camera with our black tailed prairie dogs (*Cynomys ludovicianus*), burrowing owl (*Athene cunicularia*), and various pest species. With our burrowing owls, we used a camera with a small LED light at least once a week to monitor the progression of their nest building. If the owls lay their eggs, the inspection camera can also allow us to inspect the owl's nest without having to climb into the exhibit and upset them. Affording the animals privacy during breeding season helps make them feel safer, but we would not have been able to effectively limit their stress level without an inspection camera.

Inspection cameras can also give keepers the ability to check areas where the animals spend most of their time but are not normally visible to the staff. For example, like most zoos, our prairie dog area is an open-top exhibit with a fence of hip height. Thus, debris sometimes is blow into the exhibit. Visible trash is easy to deal with, however, the top of a prairie dog exhibit is only 10% of the actual exhibit, and curious prairie dogs often transport trash down into their tunnels. But thanks to the inspection camera, much more becomes visible. This isn't just good for spotting debris in the burrow. After winter, we can also use the cameras to examining the burrows themselves for tunnel issues. Thus,

Keeper Eric Mahan with inspection cam in prairie dog exhibit.



Mr. Pibbs our burrowing owl.





the cameras help ensure the tunnels remain safe and clean. Finally, the cameras make it possible to ID different pest species that burrow around the zoo so that we may limit the chances of invasive species spreading disease or stealing food.

### Camera Trap

Camera traps are frequently used by hunters in order to locate the best spots to hunt. For a zoo, however, camera traps act as a cheap alternative to high-end mounted security style cameras. These pieces of equipment use a sensor to trigger the camera to take a picture or to start filming for a given amount of time. Like many small zoos, we lack the ability to continually monitor all of our animals, but with a camera trap's ability to record motion, we are at least afforded a glimpse. For this reason, camera traps have been one of the most beneficial pieces of equipment we have at our facility.

Finding a camera trap is as easy as finding a store with hunting equipment such as Wal-Mart or Dick's Sporting Goods. Online, Amazon.com also sells these tools. Camera traps can be found for fifty dollars, but these models might only take pictures and may not work at night. For only around one hundred dollars, zoos can purchase a camera trap with good resolution video and night vision. Though the animals notice them, the best thing about camera traps is that they are easily movable, where as mounted monitoring equipment is not as easily changeable and sometimes requires Wi-Fi to record. It is also important to note that proper placement of a camera trap must also be considered.

Our facility has placed camera traps all around the zoo in order to solve our various animal mysteries. For example, our grey wolves (*Canis lupus*), kept putting muddy paw prints on the ceiling of their holding pen. When they were younger, our wolves displayed aggression towards one another while in holding, so they were separated during the evenings in order to ensure that they would not fight during the night. This went on for a while, and then in the wolves' older years keepers suddenly noticed paw prints on the ceiling as if the wolves were doing back flips all night. So we placed the camera trap in front of the spot that we would find the footprints, outside the holding area of course. The next day, we learned two things from those videos. First, our one wolf periodically used her paw to test the doors to see if they were really locked. The second is that our other wolf was really doing back flips!

Part of the wolf exhibit has a section where neither wolf can see the other, and one wolf was jumping up the wall and off the ceiling to see what the other was doing. So we decided to try letting them stay together at night, and thankfully it worked. In their later years the aggression has lessened, and because of the camera traps, we don't have to worry about scrubbing muddy paw prints off of the ceilings anymore. As an

added benefit, since putting the wolves together at night, our shifting problems with them have disappeared. They went from never wanting to come in to reliably shifting in, and the response was almost immediate. Within that first month of letting them in together they shifted as if they never really had a problem.

Unlike wolves, some animals notice the camera and hate it. For example, each morning after setting the camera trap inside the burrowing owls' exhibit, we found it on its side. And after discovering a video of our male burrowing owl trying to kill the lens, we decided to let them enjoy their nights in private.

The camera trap has helped our zoo immensely. In conjunction with the stories above, we have also enjoyed success with the equipment on jaguar (*Panthera onca*), spotted skunk (*Spilogale putorius*), Virginia opossum (*Didelphis virginiana*), great horned owls (*Bubo virginianus*), and a couple others to make sure that the exhibit and enrichment was preventing stereotypical behavior and changing things around if it was not helping. We continue to use the technology to study behaviors and unexplained observations but we are planning to use it for some of our breeding programs, especially since a good portion of them are nocturnal animals, or at least are most likely performing breeding behaviors during the evening hours when we already have left for the day.

### Conclusion

One of the best outcomes of using this technology was to see a wide range of behaviors. It's interesting to learn what your animals are doing when you're not looking, or how upset they get when you try to find out. As zoo keepers, we all know how important it is to monitor these animals in order to ensure that we provide the best care possible but you only interact with your animals for a limited amount of time each day. To truly provide superior care, the ability to see all aspects of the animals' lives is critical. For those reasons this technology might be the most overlooked resource a zoo keeper can have mostly because of price, but thanks to camera traps and inspection cameras, what used to only be available for thousands, now costs hundreds. These pieces of technology have helped our facility, and without hesitation, I recommend your facility begin using monitoring equipment in order to help with the wellbeing of the animals you're responsible for now that price is really no longer a problem. 🐾

Trap camera in wolf holding.



Grey wolf (Nox) checking if the door is locked.







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