

Counting Critters in the White Mountains

By Dan Groebner

As the monsoon season begins to wind down, elk and antelope herds are often seen from our mountain highways and forest roads. Some herds can be enormous. We also see the fruits of wildlife courting behavior, with flocks of turkey poults (chicks) hunting down crickets and other insects in grassy fields like a school of piranha in the Amazon. You might even get lucky with a visual of a pair of twin fawns with their mother. And we have all been “serenaded” with the raucous and rowdy calls of young fledgling acorn woodpeckers as they begin to collect acorns to cache in holes, cracks and excavations for use during the long winter months.

So, obviously, Mother Nature produces lots of new animals every year. We haven't been overrun or out-competed by any wild animals yet so what happens to all these new animals? That's what wildlife biologists try to figure out. Sometimes the biologists count game animals to determine how many can be harvested during the hunting season to maintain the population at the desired level. Other times, biologists need to count animals to determine if they are so rare they need special protections and intense management. No matter what the purpose, trying to calculate the actual population of wildlife can be a very difficult endeavor.

When wildlife are abundant, distributed over large areas and well camouflaged or nocturnal, obtaining a total count of all animals would be extremely expensive, if not impossible. In this case, biologists analyze just a small subset of the entire population with a sample that is used to represent the entire population. Elk, deer, pronghorn and bighorn sheep are counted on the same road, horseback and aircraft survey routes year after year. This method provides an index, or measure, of change in animals counted from year to year, even though less than 5% of the entire population is actually seen.

A more useful tool for monitoring big game is measuring the ratios between males, females and young of the year. Since big game are polygamous (each male mates with multiple females), fewer males than females are needed in the population to maintain maximum pregnancy rates in the females. So, bucks and bulls can be harvested every fall without affecting next year's reproduction if male to female ratios remain above the thresholds for that species. The sex ratio target can also be adjusted if the objective is to reduce or increase the local big game herd. Arizona Game and Fish wildlife managers in the White Mountains aim for about 30-40 bull elk per 100 cows.

Since reproduction is essential for wild animals to persist, many population surveys concentrate on looking for young of the year. Many hunters send the wings of the waterfowl they harvest into the Fish and Wildlife Service where trained technicians can determine the age and sex of the duck just from feather wear, color and other cues. Game and Fish field personnel record how many turkey hens they see with young poults and how many Canada geese they see tending to young goslings. The age structure, or percentage of young, middle and old-aged individuals within a population, can tell biologists if the animals are increasing, decreasing or probably staying the same. A higher than normal percentage of young animals in a population can indicate an expanding or growing population. A population composed mostly of geriatric geese is likely declining rapidly.

Sometimes, biologists don't even have to see the animals to study their populations. Doves, songbirds, owls and frogs can be counted through their vocalizations. Even bat calls can be recorded with ultrasonic microphones and identified to species through their unique frequencies. Prairie dog populations can be measured by counting the number of active burrows. Communal nesting birds such as great blue herons and cormorants are surveyed by counting their numerous visible nests concentrated in small groves of both live and dead trees. If surveys are conducted for the same length of road or hiking transect every year under similar conditions, these counts can be used as an index which provides an idea which areas hold more animals or if the population is changing from year to year. So, a few miles or minutes of sampling can tell you a lot about the entire area's population.

More complex, but also more accurate, methods of counting critters involves catching as many of your subject species as possible and marking them with something like an ear tag, a number dyed on their fur, colored and numbered leg bands on birds or a PIT tag like your vet injected under the skin of your dog or cat to identify it in case it gets lost. Biologists then return to the same area later and try to recapture, or re-sight, these same animals. Using some simple math, the population of marked animals can be estimated based on the assumption that if you keep seeing or capturing the same animals, the population is not that large. The more "new" or unmarked animals observed means a larger population.

Some wildlife may occur in small enough numbers and be highly visible so a complete count, or census, of their entire population is possible. In Arizona, the bald eagle and osprey fit this description as biologists count the number of active nests and nestlings that successfully hatch and grow old enough to fly away from the nest. This kind of information helped provide the justification to remove the bald eagle from the endangered species list. Some wildlife can be radio-tagged and then periodically observed to count other animals hanging out with the radio-tagged one, like with California condors living near the Grand Canyon.

The most rare or hard to detect critters, like the reclusive fish eating narrow-headed garter snake or native mussels embedded in the soft bottoms of White Mountain streams, can now be detected though cutting-edge technology. We learned from CSI shows that even small amounts of DNA can identify a suspect. Aquatic animals constantly shed their DNA downstream where it can be collected in a special filter and sent to a lab, allowing scientists to identify unique DNA markers for each species. Currently, this method can only tell us if the animal is present or not in the stream and has not been refined enough to provide a number estimate in the population. But sometimes a survey that only documents the presence of a species is very valuable. On the contrary, confirming the absence of a particular animal is often very difficult and can prove to be nearly impossible.

Even the general public gets involved with wildlife counting. Have you ever been interviewed by a biologist at the dock after your fishing trip? Or how about returning that short questionnaire about the results of your latest hunt? Fishing and hunting success rates with filling creels with fish and tagging big game is another more subjective method to estimate relative sizes of animal populations. Fish populations are also estimated through netting and electro-fishing methods which are not prone to finicky fish appetites but much more expensive to use compared to the creel census. Angler and hunter input through

questionnaires and creel census provide essential information from a public perception viewpoint which is important to understand in modern wildlife management.

Special research projects with dedicated funding can use more intensive methods of counting critters than the ones listed above which are used by most wildlife management agencies on a large scale. For example, raptor numbers can be estimated through intensive grid searches to find all nests within a measured area. Small mammals can be detected when they eat bait from an inked “track pad” and they leave their distinctive footprints on sticky white contact paper. But it takes lots of track pads placed in the best habitats.

So, the next time you wonder how they decide the number of bull elk tags to issue or if a particular critter is in trouble and needs additional help to recover, you might just understand the survey science behind the decision a little better. But getting reliable estimates takes dedicated biologists, proven methods and hours of grueling field work as estimating wildlife populations is still one of the biggest challenges in managing Arizona wildlife.

Counting Critters

How You Can Help

Are you interested in becoming a citizen scientist and help count White Mountain wildlife? Arizona Game and Fish can sometimes use volunteer help with counting many species including:

- Marshbirds and colonial nesting birds like great blue herons and cormorants
- Songbirds and raptors
- Turkey, grouse and other game birds
- Trout, walleye and other fish
- Reptiles and amphibians like garter snakes and leopard frogs

To get your name on the volunteer list, call the Pinetop Regional office of the Arizona Game and Fish Department at (928) 367-4281 and ask for the volunteer coordinator.