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Photo 1: Market Hunters These elk were killed by market hunters. Market hunters were paid to hunt bison, antelope, deer, and elk for meat and hides that were sold around the United States. By the mid-1870s, market hunting had nearly wiped out the bison herds. By 1900, elk and deer populations were moving toward a similar fate. The U.S. government helped end market hunting when it passed the Lacey Act in 1900.

Photo 2: Market Hunting The mass hunting of game birds for the dinner table and restaurant trade pushed several species of waterfowl to the brink of extinction during the late 1800s and early 1900s, and led to a general decline in America's bird populations.

Photo 3: Modern Hunters and Anglers According to the U.S. Fish and Wildlife Service, there are as many U.S. resident hunters and anglers over the age of 16 as the entire population of California—over 37.4 million people in 2011. Sportspeople spent \$145 billion on related gear, trips, and other purchases, such as licenses, tags, and land leasing and ownership, representing 1 percent of the nation's gross domestic product. Nearly \$1 billion is collected annually in excise taxes from hunting, fishing, and shooting equipment, which in turn funds fish and wildlife management by state fish and wildlife agencies.

Photo 4: Confiscated Elk, 1930 By the early 1900s, state legislatures started to pass laws—including those establishing hunting and fishing license programs—to protect game animals. In this photo, the items on the wagon are hides of 441 illegally hunted elk. Regulations are a tool wildlife biologists use to conserve wildlife populations.

Photo 5: Confiscated Wildlife, 1989 Poaching continues to be a problem faced by state fish and wildlife agencies. This photo shows animals seized in 1989. This undercover operation was established to catch poachers and involved 275 wildlife officers from five states. Nearly 50 individuals were implicated by this operation.

Photo 6: First Fish Hatchery In 1881, natural resource agencies were operating hatcheries like this one that stocked fish in streams. Compare this photograph with Photo 8.

Photo 7: Modern Fish Hatchery The Rifle Falls Hatchery in Colorado became the largest state-owned hatchery in the world in 1955. Fish and wildlife management practices involve inventorying and monitoring populations and the propagation of species for stocking and reintroduction.

Photo 8: Fish Stocking Horses carrying buckets and cream cans filled with fish were used to stock high mountain lakes at the turn of the 20th century. Compare this photo with Photos 10, 11, 12, and 13.

Photo 9: Helicopter Since the 1950s, airplanes, and more recently helicopters, have been used to stock fish into high mountain lakes. In this photo, a biologist stocks trout fry in a high mountain lake.

Photo 10: Modern Fish Stocking These brown trout have been raised at a fish hatchery and are being loaded on a truck specially equipped to transport fish. To keep the fish alive, the tanks must have a constant flow of oxygen pumped into the water. The water must also be maintained at a cool temperature to keep the fish from being stressed. These fish are being stocked for the sole purpose of increasing the amount of fish that can be harvested by anglers.





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Photo 11: Early Fish-Stocking Truck This photo shows one of the earliest models of fish-stocking trucks.

Photo 12: Modern Fish Biologist Today, fish are often raised in hatcheries and then are transported to public waters for the public to be able to harvest. This photo shows eggs being stripped from a brown trout at the Bobby Setzer State Fish Hatchery in North Carolina. This does not harm the trout. The eggs are mixed with milt (sperm) to fertilize the eggs, which eventually develop into trout. The North Carolina Wildlife Resources Commission raises and stocks over 900,000 trout a year.

Photo 13: Early Fish Biologists In the 1920s, fish eggs were collected from productive lakes and transported back to the hatchery. These men are preparing the eggs for transport.

Photo 14: Elk Reintroduction and Management The last time elk roamed North Carolina was in the late 1700s. By 1900, North American elk were close to extinction, causing hunters and conservationists to take action. In 2001, the National Park Service began a reintroduction program to establish an elk herd in a section of the Great Smoky Mountains National Park known as Cataloochee Valley, on the border of North Carolina and Tennessee. As of 2015, there were approximately 150 elk roaming in and around Cataloochee Valley. The North Carolina Wildlife Resources Commission fit elk with radio collars so they can track and study the elk as they settle in to their new surroundings.

Photo 15: Wildlife Education Education became an important wildlife management tool in the 1990s. The more people know about the needs of wildlife, the more likely they will be willing to share their communities with wildlife.

Photos 16 and 17: Nationwide Research Efforts

In 2006, a deadly fungus was discovered in a cave in New York. Almost every bat in the cave was dead. Since then, White Nose Syndrome, as the disease came to be called, has spread across the Eastern United States and Canada. Over 6 million bats are estimated to have been killed by this disease that often causes a white fungus to grow on the muzzle, and other parts, of a bat. A nationwide effort, supported by national funding, is underway to try and stop the spread of this disease that has not only severe environmental impacts but economic ones as well.

In the first photo, biologists are surveying bats hibernating in their winter cave. The second photo is a researcher taking a bat out of a mist net. Nets are set up in the summertime to catch bats so they can be identified, weighed, evaluated, and fitted with an identification band before they are released.

Photo 18: Watching Wildlife The Watchable Wildlife Program began during the 1980s. Wildlife agencies are making efforts to fund programs that focus more on viewing wildlife (non-consumptive uses such as canoeing, hiking, birdwatching, etc.) than harvesting (consumptive uses such as hunting, fishing, trapping). According to the U.S. Fish and Wildlife Service, 71.8 million U.S. residents observed, fed, and/or photographed birds and other wildlife in 2011. Almost 68.6 million people watched wildlife around their homes, and 22.5 million people took trips of at least 1 mile from home primarily to watch wildlife.

Photo 19: Watching Wolf Movements with Radio Transmitters A 130-pound gray wolf watches biologists in Yellowstone National Park after being captured and fitted with a radio collar in 2013. Biologists use radio transmitters, such as the one attached to this collar, to track the movement of many species of wildlife.



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Photo 20: Development The biggest challenge facing most wildlife biologists today is the loss of wildlife habitat because of human population growth. Wildlife habitat is disappearing as habitat is converted into developments and agricultural production. Although regulations are a necessary tool, protection and restoration of habitat are considered to be the most successful and cost-effective long-term techniques for managing wildlife species.

Photo 21: Tracking Movement with PIT Tags Passive Integrated Transponder (PIT) tags are small electronic tags that are used by scientists to monitor wildlife. Due to their small size, PIT tags can be safely inserted into an animal's body surgically or with a large-gauge needle, or in some cases, attached to the exterior of an animal's body. Once an animal has been tagged, the unique alphanumeric code associated with the tag can be read by a special scanning device that emits a radio signal. Similar to how barcodes provide access to information about merchandise in a store or warehouse, when a PIT tag moves near an automated reading station, the scanned codes can allow scientists to gather data relating to a species' migration patterns, predator-prey relationships, growth rates, and mortality rates. These Higgins eye pearly mussels have PIT tags glued to their sides, thereby enabling biologists to find and record the locations of the tagged pearly mussels.

Photo 22: Environmental Monitoring with Drones Scientists recently began using unmanned aerial vehicles, more commonly known as drones, for monitoring wildlife. A drone, for example, might be equipped with a camera to transmit images or video from remote or hard-to-access locations. In this image, a drone equipped with a water filter is monitoring water for zebra mussels, an invasive and non-native species in North America that is causing significant damage to ecosystems.

Photo 23: Wildlife Management Technology: Deer Crossing This photo from 2013 was taken by a motion-activated camera with digital infrared technology at a highway undercrossing. The camera was set up to capture photos of animals attempting to cross the highway.

Photo 24: Bears and Garbage, Oh My! In the early 1900s, at the Curry Village Dump in Yosemite National Park, garbage was regularly made available to bears. Park visitors were then allowed to stand around and watch the bears. In many parks, this was a common practice that not only attracted bears but attracted the visitors as well.

Photo 25: Wing Tags The wing tag fastened to this great frigate bird represents a technique used for many years. These tags are typically made of brightly colored vinyl and labeled with alphanumeric codes that can be read from a distance. Scientists use these tags to monitor the movements of large birds and other wildlife. Smaller birds are often captured in nets and fitted with small bands around a leg that also use color and codes.

Photo 26: Modern Management Issue: Human-Wildlife Conflict Human-wildlife conflict is a current issue of wildlife managers today. Many animals, with our help, are making a comeback. Bears are a great example of this. At the same time, however, many areas are becoming more densely populated by humans. This often leads to negative interactions between humans and wildlife. Education is playing a more prominent role in wildlife management as we try to preventatively respond to these interactions. This photo is an example of one of the many signs posted on public lands to educate visitors on how to safely coexist with the wildlife around them.

