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Drones for Wildlife Conservation

Unmanned aircraft vehicle has been a positive attribute for wildlife conservation. When it comes to managing wildlife the one thing that might not stand out is the efforts that humans take to properly manage healthy wildlife populations. They do this by documenting populations, surveying habitat, and take samples to test animals' health and wellbeing. However, managing wildlife can be very dangerous.

One such aspect of wildlife conservation that is harmful to the scientist is flying in smaller aircraft to monitor wildlife. One of the leading causes of death to wildlife biologists is that of aircraft. They are required to fly at low altitudes to see the wildlife they are monitoring. On the Audubon website, it states in the article *Drones Take Off as Wildlife Conservation Tool* that "light-aircraft crashes are the No.1 killer of wildlife biologists. Between 1937 and 2000, 91 biologists and other scientists died in the field, according to a 2003 study in the *Wildlife Society Bulletin*, and 60 of them were killed in plane or helicopter crashes". (Averett, 2014) UAV's provide are accurate, also a safer method of monitoring wildlife. They can go places that most or all aircraft can't go. These unmanned aircraft vehicles that biologist use is equipped with cameras and sensors so that they can capture video from the animals. A way to find wildlife can be by signals, it means sometimes animals are collared to monitor migration patterns and how that particular animal uses its habitat. The radio

collar method is becoming as common and could say its diminishing for monitoring wildlife on a short-term basis because scientists do not want to disturb the wildlife by capturing it and placing a collar on it, and releasing it back into the wild just to monitor them for a short time. It's still a common practice for long term single animal research.

When it comes to drones there are several different kinds, used for all sorts of reasons; from recreation use to commercial. Most of the drones that are used to survey, and monitor wildlife are commercial grade, to name a few there are fixed-wing drones and hexacopter. These drones are equipped with thermal and a high-powered lens to detect animals in all conditions. Elk and Mule deer in the Rockies use pines and other dense wooded areas for cover and the thermal optics can spot them from the air. The BLM (Bureau of Land Management) has a specific job title for an aviation manager. "They manage unmanned aircraft systems and pilot drones that gather crucial data for resource management and fire operations support". ("Careers in BLM," n.d.) Unmanned aircraft systems are used in a wide range of services for wildlife and the land or water they live. In Oregon, the ODFW (Oregon Department of Fish and Wildlife) was doing an elk survey, and they used drones; in this population survey, they could tell the age and gender of these elk in the coastal habitat of Oregon. ("Oregon Wildlife Officials, 2017). If they were to do this survey with smaller aircraft, it would be harder for them to identify the gender and age of elk through the timber because of the constant moving of the plane. Instead, the drones were able to hover at a relatively low altitude.

Another research study that drones were used is National Geographic. They did a study on the Union Caribou of Canada. In this study they watched the herd moved as a whole while focusing on each caribou's role as they moved. The traditional way of doing this study was to use radio collars on either a single caribou or several in a herd. It was a good method to track where the specific animal goes, but when scientists want to look at the overall herd, the best way and safest way to do

this is by using unmanned aircraft systems. National Geographic captured 12 hours and 40 minutes of footage of the running caribou herd (in short clips, limited by drone battery life)". (Holland, 2018) They then can take that footage and study it more in-depth, by focusing on certain caribou and their role within the herd dynamics. In the same National Geographic article, Iain Couzin says "these are very difficult data to get. Drones are opening up a new opportunity for us biologists, giving us access to systems that are incredibly hard to study". (Holland, 2018)

The use of drones in conservation has opened new opportunities for studying wildlife across the world. One such animal is the snow leopard in the mountains of Mongolia. The snow leopard is a nearly extinct predator that is very difficult to see with the naked eye, and especially when trying to spot them from an aircraft. Using drones with high powered lenses and thermal optics is very effective. However, when it comes to finding snow leopards it's extremely difficult. The snow leopard Conservancy targeted the snow leopards' prey instead of trying to spot the elusive predator. They stated that "given that it's very difficult and expensive to count the cats, and an easier, less expensive alternative is assessing the abundance of their large prey species like ibex, argali, and blue sheep". (Slcadmin, 2020) They did this because the prey of a Snow Leopard roams open country and the sides of mountains. While the leopard stays hidden with their camouflage fur and other natural covers.

Now when most people hear the word drone they think of a flying aircraft, but there are underwater drones as well. Underwater marine drones can be used to monitor marine life and marine habitats. There are studies all around the world that biologists and conservation groups are using underwater UAV's. Such examples are California's coast, the Mexican Caribbean, British Columbia, New England, and the Mediterranean. (Nunez, 2020) In all of these cases, the main goal is to monitor marine life and their habitat by using drones. The drone that was covered in that

National Geographic article was called the "Trident" and it was given to National Geographic by a grant via James Cameron's Avatar Alliance Foundation along with other groups. Without the use of underwater UAV's, the accessibility would be nonexistent. There is minimal use for sub divers when using UAVs for marine life.

Drones have played a large part in the fight against poaching. All over the world wildlife has been at a threat of poaching. Poaching is defined by the act of killing an animal illegally. Poachers do this to get valuables from the animal such as ivory, furs, or in some cases, it's just to kill an animal. Animal poaching is the most common in the dark and it's very hard for officials to catch them when in manned aircraft or on foot. These officials use drones equipped with infrared cameras to spot the poachers during the nighttime. Even to noise and presence of a drone during a poaching activity will decrease the chance the killing takes place because of the fear that poachers have for drones. This fear is generated from their thought that drones have weapons attached to them. Wild game poaching is common where locals rely on animals for their living. For example, in Africa, wild game poaching is very common, and it hurts local villages that rely on these animals for tourism and other resources. In America outfitters in the Rocky Mountains rely on elk and mule deer for business, but poaching can hurt their business. Common animals that are taken illegally are rhinos, elephants, sharks, and most of the big cat species around the world. However, poaching is a relevant issue for all kinds of species.

Talking about Unmanned aircraft systems and wildlife there is one lingering question; are drones disruptive against wildlife and a threat? Drones for conservation in Protected Areas: Present and Future mentions "remotely sensed capabilities of drones offer a less invasive, non-hazardous, repetitive and reliable monitoring technique". (Jiménez López, 2019) That question can be answered by the drone pilot. The pilot is the one person who has the responsibility to make the animals feel safe when flying near them. Drones are smaller and quiet, meaning they can stick around animals

longer without them getting spoked or experience high-stress levels. In a study on Chester Island counting birds, they were able to get closer to these ground-nesting birds. It is a better method of counting these birds than the traditional way (from a boat). The biologist can fly a quite fixed-wing drone over the nesting area without disrupting the birds, taking overhead pictures to spot nested birds. In the United States, the FAA regulations state that “Domestic drone flights, especially for conservation, must also comply with the Endangered Species Act and Marine Mammal Protection Act, and flights must stay below 400 feet, remain within sight of the pilot and can’t occur at night or in national parks or wilderness areas”. (“Eyes in the Sky,” n.d.) The regulations for biologists and other researchers that use UAV’s for conservation are strict on disturbing wildlife. Unfortunately, it’s a common occurrence that hobby pilots run into the opposite, they disturb and harass wildlife.

The use of unmanned aircraft systems for conservations is a relatively newer concept, but it brought positive attributes to wildlife conservation. A safer way to survey animals, less expensive than small manned aircraft, and the ability to access regions that weren’t accessible before with manned aircraft. There are several examples of unmanned aircraft systems being used for conservations stated above with positive results. Drones bring a lot to the table for biology research. They have can be used for tons of different wildlife applications. The growing popularity of unmanned aircraft systems through commercial uses will bring more FAA certified pilots to the conservation field to fly UAVs for a scientist. With the use of drones in conservation, we as the public can learn about wildlife in ways we could never. Viewing animals in their natural habitat is way different than looking at them when they know you’re there. This is why using drones for wildlife conservation is beneficial to wildlife and humans.

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