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pressoffice@faa.gov

7 Ways That Drones Foster Sustainability

Drones for good are on the rise across the country

For the past six years, pecan trees have been a reliable source of income for the Choctaw Nation in Oklahoma. The tribe harvests 150,000 pounds of nuts a year from thousands of trees and sells them to support tribal services, so the tribal government had reason to be concerned when a disease attacked the trees.

As a lead participant in the FAA's Unmanned Aircraft Systems Integration Pilot Program, the Choctaw Nation put drones in the air to inspect the trees. The mission revealed plenty of healthy pecans in the treetops — a win for the tribe -- and they improved the crop yield for those trees by 200 percent.

The bird's-eye view of pecans the Choctaw Nation gained via its drones is one of many ways that UAS are enhancing sustainability efforts. Here are seven such uses by the government and in the private sector:

1. **Manage plant and animal diseases:** Organic pecan growers in New Mexico, the largest U.S. producer of the nut, have released ladybugs into pecan treetops by drone. As predators of aphids, mites and other insects that destroy pecan crops, ladybugs are an environmentally friendly alternative to insecticides. The U.S. Fish and Wildlife Service, meanwhile, has dispensed vaccine pellets by drone to help prairie dogs fight off the flea-borne sylvatic plague. Prairie dogs are the primary food source of the endangered black-footed ferret, so shoring up the prairie dog population indirectly helps the ferrets.

2. **Bolster wildlife conservation efforts:** Researchers have taken to the air to study numerous ecologically important creatures on the land and in the sea. The National Oceanic and Atmospheric Administration has used drones to: measure the length and width of bluefish tuna and killer whales; collect spray from North Atlantic right whales to study their health; and count the populations of sea lions, seals and penguins. The benefits of drones include precision imagery, access to remote areas, more accurate counts of wildlife for less money than surveys by airplane, and less disturbance of wildlife in their natural habitats.

3. **Manage, monitor and recover from wildfires:** Innovators have brainstormed multiple ways to incorporate drones into firefighting strategies. One technique is launching fire starters from drones to ignite controlled burns. Both the U.S. Geological Survey and Department of

Interior do this. The U.S. Forest Service and local emergency responders also increasingly deploy drones to monitor and help suppress blazes. And once wildfires are out, drones can be used for reforestation. DroneSeed has an FAA a waiver for that. The company also was part of a YouTube-inspired Arbor Day campaign to plant 20 million trees. *[Today Show video about DroneSeed.]*

4. **Manage livestock and croplands:** The high-end imaging technology built into some drones makes them ideal for an emerging specialty field — precision agriculture. By capturing thermal imagery from above, drones help farmers and ranchers gauge the health of their animals and crops, identify threats from diseases and pests, better predict yields, and cultivate crops more efficiently. This knowledge helps foster sustainable farming practices that reduce the climate impact of agricultural activity. Drones also can be used to apply pesticides precisely, which reduces the use of chemicals and kills more pests, and researchers are exploring the practicality of artificial pollination by drone.

5. **Inspect solar cells and wind turbines:** The equipment that generates renewable energy has to be maintained and repaired, and it can be safer, cheaper and more efficient to capture high-resolution images with drones than to conduct manual inspections. A report by the drone software provider Skyward found that drones cut the costs of solar farm inspections by 30-40 percent and the time to inspect a wind turbine by up to 50 percent. Drones also provide better data to help companies manage their assets. The Department of Energy's Sandia National Labs hired a drone provider to validate blade damage to wind turbines.

6. **Map and monitor natural resources:** Numerous entities have incorporated drones into projects aimed at better managing land, air and water resources. Last year, for instance, drones tracked the path of a harmful Red Tide algae bloom in Florida. Also in the Sunshine State, Embry-Riddle Aeronautical University researchers attached air-quality sensors to drones to study pollutants. The U.S. Agricultural Research Service, meanwhile, analyzes drone imagery and water samples to pinpoint potential problems in irrigation water. And the town of Oak Island, North Carolina, uses drones to document the status of fragile dunes. *[USDA video about E. coli inspections.]*

7. **Deliver packages:** With major corporations like Alphabet, Amazon and UPS exploring the possibilities, commercial package delivery is one of the more prominent drone use cases — and one the FAA tested in its UAS Integration Pilot Program. Delivery packages via battery-powered drone would reduce the use of fossil fuels and curtail carbon emissions. The RAND think tank estimated that nearly 47 gallons of diesel fuel could be saved by shifting 20 percent of deliveries from trucks to drones.