Black-footed Ferret Sylvatic Plague Vaccine Trials:

Frequently Asked Questions

What is a black-footed ferret?

The black-footed ferret (*Mustela nigripes*) is a medium-sized member of the weasel family, typically weighing 1.4 to 2.5 pounds and measuring 19 to 24 inches in total length. It is a slender, wiry, animal with black feet, a black face mask, and a black-tipped tail. The black-footed ferret is entirely dependent upon prairie dogs for survival, using their burrows for shelter and raising young, and deriving more than 90% of its diet from prairie dogs. The black-footed ferret is an endangered species and is one of the rarest mammals in North America.

Why are they endangered?

The primary reasons the species remains at risk are the same that nearly caused the animal's extinction: loss of habitat, related declines in prey, and disease. Conversion of native grasslands to agricultural land, widespread prairie dog eradication programs, and fatal, non-native diseases, such as sylvatic plague, have reduced black-footed ferret populations to a tiny fraction of their original range. Much of the remaining habitat is now fragmented, with prairie dog colonies separated by expanses of agricultural land and other human developments.

Why is the vaccine needed?

The oral vaccine, deliverable via peanut butter flavored baits, is needed to protect prairie dogs from sylvatic plague so that black-footed ferrets have a reliable food source. Sylvatic plague is a non-native disease against which prairie dogs and black-footed ferrets have little to no natural immunity. Once a prairie dog colony is infected with plague, it can quickly spread, devastating populations of both species if the disease is not managed.

Why use ATVs and UAVs?

During the team's four-years of field trials, technicians manually distributed vaccine baits by hand on 50-acre test plots. Although this is an effective method, much faster, and efficient methods are needed to distribute the vaccine baits over the many thousands of acres of prairie dog colonies needed to support healthy populations of black-footed ferrets.

To test the effectiveness of the vaccine on a broader scale, U.S. Fish and Wildlife Service, World Wildlife Fund, U.S. Geological Survey National Wildlife Health Center, Model Avionics, and Support XXL developed three mechanized vaccine bait delivery methods: the first drops one bait at a time from an unmanned aerial vehicle (UAV); the second drops one bait at a time from an all-terrain vehicle (ATV); and the third drops three baits simultaneously from an ATV.

How effective and safe is the vaccine?

The vaccine is very safe. It has been tested in numerous species and no adverse effects have been seen in any of them. We have demonstrated in laboratory challenge trials that the vaccine is effective in protecting prairie dogs from plague. Preliminary results of field trials are promising and suggest that ingestion of vaccine baits may improve survival of prairie dogs during plague outbreaks, although application to larger and entire prairie dog complexes will be more effective than partial treatment.

How effective are the ATV and UAV delivery systems?

The newly created UAV and ATV delivery systems were very effective in distributing vaccine baits across 4,200 acres of prairie dog colonies in Montana, Colorado, and South Dakota during August - October 2016. The next round of trials is scheduled for summer 2017, during which time the partnership will fine tune various aspects of the vaccine baits and their delivery mechanisms and test new delivery methods in an effort to maximize the technology's ability to treat larger areas.

What kind of drone are you using?

We are using a 750mm umbrella style multi-rotor copter in an X8 (coaxial) configuration. The total flying weight is 18lbs and maximum flight time is 25 minutes.

Has anything like this been done before? Have other organizations vaccinated one species to protect it so another species, its predator, has a viable food source?

We are unaware of other similar efforts. This is a creative approach and it demonstrates that the black-footed ferret recovery team is committed to saving the species and will consider safe and effective strategies to achieve recovery.

I read that you are shooting peanut butter M&Ms from drones. Is this true?

No, some reports mistakenly suggested that our peanut butter flavored baits were peanut butter M&M candies. This is not true. We are distributing peanut butter flavored vaccine baits from a UAV and an ATV in an effort to vaccinate prairie dogs against a lethal disease known as sylvatic plague. Prairie dogs are the primary food base for the endangered black-footed ferret and this effort is designed to help save the black-footed ferret, which is the only ferret species native to North America.

What if other animals eat the vaccine baits?

While the baits are designed specifically for prairie dogs and are distributed so that they are primarily consumed by prairie dogs, other small rodents and squirrels associated with prairie dog colonies have been documented eating the baits. These species will not suffer any ill effects from eating the baits, and some species (particularly members of the squirrel family) may actually benefit from the resulting immunization.

How do you know if the prairie dogs are eating the baits?

In our preliminary field trials, the baits contained a biomarker which marks hair and whiskers within a day of ingesting it. The mark was visible by microscopy and we found 60-90% of the prairie dogs had consumed the bait. The final baits will not contain this biomarker, but we can take blood samples from animals to test for antibodies to the vaccine antigens to confirm they are ingesting it.

Won't the drones interfere with aircraft travel?

No. Our operations do not interfere with aircraft. We are required to stay below 400 feet above ground level and during our tests we have flown at approximately 60 feet. Our standing operating procedure is to notify the local airport to let them know where, when, and during what hours we will have flight operation so they can alert any aircraft travelling above us that there are UAV operations in that area.

This sounds like a lot of work. Why should we protect black-footed ferrets?

Recovering an endangered species involves many partners, time, and effort. But preventing the extinction of an iconic species like the black-footed ferret is worth the effort! The black-footed ferret is an important member of the Great Plains prairie ecosystem and their presence indicates healthy habitat that supports many other associated species. Without black-footed ferret conservation efforts, prairie dogs and other associated species such as burrowing owls, swift foxes, mountain plovers, ferruginous hawks, and many others could easily succumb to current threats. In short, by conserving black-footed ferrets, we are indirectly conserving an entire ecosystem and its inhabitants!

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