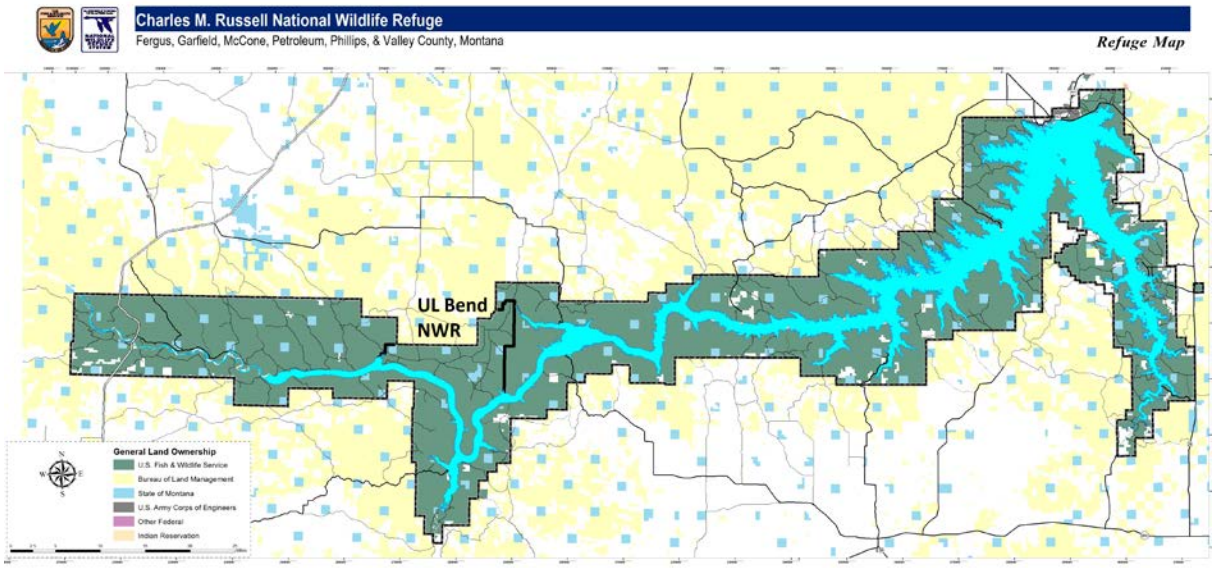
ENVIRONMENTAL ASSESSMENT
March 31, 2016

Use of Unmanned Aerial Systems to Deliver Prairie Dog Sylvatic Plague Vaccination
UL Bend National Wildlife Refuge
Charles M. Russell National Wildlife Refuge

1.0 PURPOSE FOR THE ACTION

Black-footed ferrets (*Mustela nigripes*, hereafter ferrets) have been listed as an endangered species since 1967 and are considered one of North America's rarest mammals. Recovery of endangered species is among the highest priorities of the U.S. Fish and Wildlife Service (FWS), especially on National Wildlife Refuges. Captive-reared ferrets have been reintroduced on the UL Bend National Wildlife Refuge (managed as part of the Charles M. Russell National Wildlife Refuge (CMR)) since 1994 in attempts to establish a viable population and contribute to ferret population recovery.



Sylvatic plague is a significant impediment to ferret recovery because of its lethality to ferrets, and because it can eliminate prairie dogs (*Cynomys* spp.) on which ferrets are dependent for both habitat, and as prey. An oral sylvatic plague vaccine (SPV) for prairie dogs has been shown to protect prairie dogs from plague and is proposed for operational application at management scales to black-tailed prairie dog colonies (*C. ludovicianus*) in support of ferret recovery in a separate Environmental Assessment (EA). This EA has been prepared solely for the purpose of evaluating use of Unmanned Aerial Systems (UAS) to deliver the vaccine. An Environmental Assessment[1] (EA) was prepared, and a Finding of No Significant Impact [2] was approved, for the use of SPV for efficacy field trials by the U.S. Geological Survey (USGS).

[1] U.S. Geological Survey. 2012. *Environmental Assessment of 'FIELD STUDIES TO ASSESS THE SAFETY OF SYLVATIC PLAGUE VACCINE IN PRAIRIE DOGS AND NON-TARGET ANIMALS', National Wildlife Health Center, Madison, Wisconsin*. April , 2012. http://www.nwhc.usgs.gov/disease_information/sylvatic_plague/publications/SPV%20Phase%20I%20EA%20with%20appendices.pdf

[2] U.S. Geological Survey. 2013. *Finding of No Significant Impact for the Environmental Assessment of 'FIELD STUDIES TO ASSESS THE SAFETY OF SYLVATIC PLAGUE VACCINE IN PRAIRIE DOGS AND NON-TARGET ANIMALS'*. May 9, 2013. http://www.nwhc.usgs.gov/disease_information/sylvatic_plague/publications/SPV%20Phase%20II%20Signed%20FONSI%2005-2013.pdf

Those trials included vaccination treatments of prairie dog colonies in 7 states and included 4 species of prairie dogs. One of the study sites included in that EA was in the UL Bend area. With the exception of aerial delivery of vaccine baits, the proposed actions regarding SPV itself are the same as already approved in the USGS EA, varying only in scope from treatments of relatively small experimental test sites on foot as described in the USGS National Environmental Policy Act (NEPA) documents, to operational use of SPV at management scales with aerial delivery that is intended to support large scale prairie dog conservation and ferret recovery. A separate EA has been developed evaluating effects of SPV itself.

The primary purpose in this proposal is to develop the equipment, protocols and experience in use of UAS to deliver SPV. It is anticipated that this approach, when fully developed, will offer the most efficient, effective, cost-conscious and environmentally friendly method to apply SPV annually over large areas of prairie dog colonies in support of black-footed ferret recovery.

2.0 NEED FOR THE ACTION

Plague is a primary obstacle to black-footed ferret recovery. After more than 20 years of intensive reintroduction efforts across 27 reintroduction sites ranging from Mexico to Canada, approximately 300 ferrets were known to exist in the wild at the end of 2015. Ferrets are constantly threatened by plague outbreaks that affect both ferrets, and their primary prey and habitat provider, prairie dogs. The primary tool to manage plague has been treatment of prairie dog burrows with pulicides to eliminate fleas, the primary vector of the bacterium *Yersinia pestis* that causes plague. Development of flea resistance to chemical control has recently been suspected and is a growing concern for usefulness of this plague mitigation tool. SPV is a complimentary strategy to mitigate plague and is proposed here to be applied operationally to maintain and promote prairie dog colonies.

SPV delivery via UAS is anticipated to eventually be the most efficient, effective, cost-conscious and environmentally friendly method of application. To date, SPV has been applied by hand with people walking pre-defined transects and uniformly dropping single SPV baits every 9-10 meters to achieve a deposition rate of 50 SPV doses per acre. Depending on vegetation and terrain, a single person walking can treat 3-6 acres per hour. Operational use of SPV in support of ferret recovery will require annual treatments across many thousands of acres of prairie dog complexes on each of more than a dozen ferret reintroduction sites distributed from Canada to Mexico. The time and labor force required for such treatments by hand on foot would be very difficult, if not impossible, to achieve and sustain over long periods of time.

Use of ATVs could speed the ability and decrease the labor force required to treat thousands of acres of prairie dogs, but their use has its own set of limitations and problems. Preliminary discussions with people experienced with UAS suggest an aerial vehicle travelling at a modest 9 meters per second could drop a single SPV bait once per second that would result in treating one acre every 50 seconds. If the equipment and expertise can be developed as proposed here, a single UAS operator could treat more than 60 acres per hour. If the equipment can be developed to deposit 3 SPV doses simultaneously every second, as we envision is possible, some 200 acres per hour could be treated by a single operator. For SPV to be a viable plague

mitigation tool at meaningful management scales for ferret recovery, delivery via UAS is potentially the most efficient, effective, cost-conscious and environmentally friendly method of application.

3.0 Public Participation

3.1 Summary of public involvement

This EA was made available for public comment during a 30 day period, from April 13 until May 13, 2016. During this time, press releases notifying the public of the comment period were posted in the local newspapers in Lewiston, Malta, Glasgow, and Jordan Montana. The EA was made available at the CMR website at: http://www.fws.gov/refuge/charles_m_russell/ or by contacting CMR to receive a copy by mail. All comments received during this period will be reviewed by refuge staff.

4.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

4.1 Alternative A – Deliver Sylvatic Plague Vaccine to prairie dog colonies using Unmanned Aircraft Systems - **PROPOSED**

Up to 10,000 acres of prairie dog colonies on CMR would be treated with SPV at least annually starting in 2016 using UAS. The FWS would provide the SPV baits and prairie dog colony perimeter boundaries to a private contractor who would use UAS to treat the specified areas. The private contractor will be in charge of all flight operations and will have secured all necessary FAA authorizations and a Letter of Authorization from FWS for operations on refuge lands. The UAS will be pre-programmed to fly transects 3-30 meters above ground level and drop baits in a pattern that results in uniform distribution at a rate of 50 baits per acre. Flight times will be limited from dawn until noon to maximize the opportunity for prairie dogs to find and consume baits prior to night when other small mammals are more active and may compete for bait consumption. Treatments will generally be during July or August each year. The expectation is prairie dog colonies would persist, and hopefully expand within biological limits and contribute habitat available for recovery of black-footed ferrets.

4.2 Alternative B – Deliver Sylvatic Plague Vaccine to prairie dog colonies on foot or from All-Terrain Vehicles (ATV)

Prairie dog colonies on CMR would be treated with SPV with people walking transects and/or from ATVs distributing baits uniformly at a rate of 50 per acre.

4.3 Alternative C – No Action

Prairie dog colonies on CMR and nearby lands would not be treated with SPV.

5.0 AFFECTED ENVIRONMENT

Physical Environment

The areas to be treated are located in South Phillips County, Montana. The Missouri River/Fort Peck Reservoir form the south boundary of the treatment area. The topography consists of flat to rolling hills to the north and steep river breaks adjacent to the Missouri River/Fort Peck Reservoir to the south. Air quality is excellent. The climate is continental

with warm, dry summers and cold winters. The frost-free season is about 120 days. Average annual precipitation is 12 inches.

Biological Resources

Vegetation

Vegetation is primarily sagebrush-grassland. Riparian vegetation consists primarily of the plains cottonwood/willow community type. Upland grasses are western wheatgrass, bluebunch wheatgrass and blue gramma. Major upland shrubs are big sagebrush and greasewood.

Wildlife

A diversity of prairie wildlife occurs. Big game species include mule and white-tailed deer, elk, pronghorn antelope and bighorn sheep. Bird life includes sage and sharp-tailed grouse, prairie passerines and numerous raptors. Burrowing owls, mountain plovers, ferruginous hawks and golden eagles nest in the area.

Federal Threatened and Endangered Species

Listed threatened or endangered species occurring within the project area include the black-footed ferret and pallid sturgeon. A resident population of at least 9 black-footed ferrets was present during fall 2015.

Socioeconomic Environment

Cultural Resources

Some historic, paleontological and some important Native American sites occur in the vicinity.

Special Designations

Portions of UL Bend NWR are Wilderness Areas. Several of the refuges wilderness areas are adjacent to or bordered by unimproved 2 track roads that are open to public travel.

Public Uses

Recreation in the project area consists mainly of upland game bird and big game hunting, although some wildlife viewing occurs. Fishing on Fort Peck Reservoir is popular.

Local Economy

The economy of the land adjacent to the refuge is predominately agricultural, livestock grazing and small grain farming along with recreation and tourism.

6.0 ENVIRONMENTAL CONSEQUENCES

6.1 Alternative A – Deliver Sylvatic Plague Vaccine to prairie dog colonies using Unmanned Aircraft Systems – **PROPOSED**

The effects of SPV itself are described and evaluated in the EA addressing the proposed action to apply vaccine. Discussion of Environmental Consequences here is limited to delivery mechanisms.

Potential Impacts to Physical Environment

No physical impacts to the site will occur. Use of UAS will eliminate or minimize soil disturbance and impact to any archaeological or paleontological resources. Soils will not be affected and no air quality impacts will occur.

Potential Impacts to Biological Resources

Vegetation

There are no known risks to vegetation.

Wildlife

Black-tailed Prairie Dogs

Like any human presence, UAS overflights may cause prairie dogs to seek shelter and safety in their burrow systems. Such behavior would be temporary, if at all, and very short in duration.

Birds

There are no known risks to birds. UAS flight speeds are expected to be less than 20 m/s and line of sight contact/control will be maintained with the aircraft at all times.

Insects

There are no known risks to insects.

Fish

There are no known risks to fish.

Reptiles and Amphibians

There are no known risks to reptiles and amphibians.

Federal Threatened and Endangered Species

Federal Threatened and Endangered Species present on CMR and UL Bend are:

Pallid Sturgeon- UAS flights would be used in xeric, upland habitats. There would be no impact to the endangered pallid sturgeon.

Black-footed Ferrets- UAS flights to deliver vaccine would be conducted during daylight morning hours and have no influence on ferrets as they remain almost exclusively underground in prairie dog burrow systems during daylight hours.

Potential Impacts to Socioeconomic Environment

Cultural Resources

There are no known risks to cultural resources in the proposed area. UAS flights would minimize soil disturbance and impact to any archaeological or paleontological resources.

Special Designations

UAS flights would be used to apply vaccine to prairie dog colonies adjacent to wilderness areas, but not within wilderness areas. Application with UAS flights near wilderness could create noise disturbance within the wilderness. The wilderness areas that are adjacent to prairie dog towns that will be treated with SPV are bordered by roads open to vehicle traffic, currently. Prairie dog populations in wilderness areas could potentially benefit from UAS applications adjacent to the wilderness.

Public Uses
There are no expected impacts to public uses.

Economy
There is no expected impact to local economy. We anticipate significant cost savings delivering SPV via UAS compared to delivery by foot, or even from ATVs. As described in the Need For Action section, UAS delivery of SPV will be 10 to 30 times faster than delivery on foot and has the potential to be a significant cost savings. Because the ability to apply SPV via UAS has never been attempted, the magnitude of those cost savings cannot be estimated yet, but they are expected to be significant, and become even more significant as equipment, technology and experience with such innovations continue.

6.2 Alternative B - Deliver Sylvatic Plague Vaccine to prairie dog colonies on foot or from All-Terrain Vehicles (ATV)

Potential Impacts to Physical Environment

No physical impacts to the site will occur. Land-based transportation methods will minimize soil disturbance and impact to any archaeological or paleontological resources, but have the potential to be greater than aerial deliver systems. Soils will not be affected and no air quality impacts will occur.

Potential Impacts to Biological Resources

Vegetation
Use of ATVs to deliver SPV could cause a minimal, temporary disturbance resulting from the impacts of ATV tires on vegetation within prairie dog colonies.

Wildlife

Black-tailed Prairie Dogs
Like any human presence, ATV or foot travel may cause prairie dogs to seek shelter and safety in their burrow systems. Such behavior would be temporary and very short in duration.

Birds
There are no known risks to birds, other than the potential for inadvertent nest destruction through trampling from land-based transportation.

Insects
No impact to other insects would occur.

Fish

No impacts to fish would occur.

Reptiles and Amphibians

There are no known risks to reptiles and amphibians, other than the potential for inadvertent nest destruction through trampling from land-based transportation.

Federal Threatened and Endangered Species

Pallid Sturgeon- No impacts to Pallid Sturgeon would occur.

Black-footed Ferrets- Land-based travel to deliver vaccine would be conducted during daylight morning hours and have no influence on ferrets as they remain almost exclusively underground in prairie dog burrow systems during daylight hours.

Potential Impacts to Socioeconomic Environment

Cultural Resources

No impacts to cultural resources would occur.

Special Designations

No impacts to Wilderness Area would occur.

Public Uses

No impacts to public uses would occur.

Economy

No impacts to local economy would occur.

6.3 Alternative C - No Action

Potential Impacts to Physical Environment

No physical impacts to the site will occur.

Potentail Impacts to Biological Resources

Vegetation

No impacts to the vegetation will occur

Wildlife

Black-tailed Prairie Dogs

The risk of plague affecting black-tailed prairie dogs would likely be greater than under Alternative A.

Birds

No impact to birds would occur.

Insects
No impact to other insects would occur.

Fish
No impacts to fish would occur.

Reptiles and Amphibians
No impacts to reptiles or amphibians would occur.

Federal Threatened and Endangered Species

Pallid Sturgeon- No impacts to Pallid Sturgeon would occur.

Black-footed Ferrets- The risk of plague affecting black-footed ferrets would likely be greater than under Alternative A or B.

Potential Impacts to Socioeconomic Environment

Cultural Resources
No impacts to cultural resources would occur.

Special Designations
No impacts to Wilderness Area would occur.

Public Uses
No impacts to public uses would occur.

Economy
No impacts to local economy would occur.

SUMMARY TABLE OF ENVIRONMENTAL CONSEQUENCES

ACTION	PRAIRIE DOGS	FERRETS	BIRDS	OTHER LISTED	OTHER NON-LISTED	PHYSICAL
A – UAS	+	+	0	0	0	0
B - LAND	+	+	0	0	0	0
C - NONE	-	-	0	0	0	0

This table summarizes the anticipated impacts of each potential action. '+' represents beneficial effects, '-' represents negative effects, and '0' represents no effect.

7.0 LIST OF PREPARERS

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8.0 List of Agencies, Organizations, and Persons Contacted

USGS Fort Collins Science Center, Dr. Dean Biggins
USGS National Wildlife Health Center, Dr. Tonie Rocke
Montana Department of Fish Wildlife and Parks, Lauri Hanuska-Brown
Colorado Parks and Wildlife, Dr. Mike Miller and Dan Tripp
World Wildlife Fund, Kristy Bly