# Draft Environmental Assessment for the *Swan Lake and Squaw Creek Road Dust Abatement Project* on Swan Lake National Wildlife Refuge, Sumner, Missouri and Squaw Creek National Wildlife Refuge, Mound City, Missouri

U.S. Department of the Interior
Fish and Wildlife Service

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# 1.0 PURPOSE AND NEED FOR ACTION

## 1.1 INTRODUCTION

The United States Fish and Wildlife Service (Service) has prepared this Final Environmental Assessment (EA) to evaluate the effects associated with applying dust abatement products on the main entrance road at Swan Lake National Wildlife Refuge (NWR) in Sumner, MO & Squaw Creek National Wildlife Refuge in Mound City, MO. This EA complies with the National Environmental Policy Act (NEPA) in accordance with Council on Environmental Quality regulations (40 CFR 1500-1509) and Department of the Interior (516 DM 8) and Service (550 FW 3) policies (see Section 1.7 for a list of additional regulations with which this EA complies).

The activities described within this document are associated with improvements to the Refuge main entrance road on Swan Lake NWR & portions of the tour loop on Squaw Creek NWR. The project involves treating the gravel road surface on the Refuge roads with various dust abatement products in partnership with the US Geological Survey (USGWS) Columbia Environmental Research Center as part of a Field Test entitled *"Environmental Effects of Dust Suppressant Chemicals on Roadside Plant and Animal Communities"*.

## 1.2 LOCATION

The Proposed Action would occur in Chariton County, Missouri, within the Swan Lake NWR as identified in Figure 1. The Proposed Action would occur on the Refuge main entrance road identified as R1 and R2 in Figure 2. The Proposed Action would occur in Holt County, Missouri, within the Squaw Creek NWR as identified in Figure 3, and on portions of the Refuge tour loop identified as TR1, TR2 and TR3 in Figure 4.

## 1.3 BACKGROUND

Swan Lake/ Squaw Creek National Wildlife Refuges (Refuge) is managed by the U.S. Fish and Wildlife Service (Service) under the Department of the Interior and is a unit of the National Wildlife Refuge System (NWRS).

National Wildlife Refuge System Mission and Goals:

The mission of the National Wildlife Refuge System is (National Wildlife System Administration Act of 1966, as amended [16 U.S.C. 668dd668ee)]:

"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

The National Wildlife Refuge System Improvement Act of 1997 established several important mandates aimed at making the management of national wildlife refuges more cohesive. The preparation of comprehensive conservation plans is one of those mandates. The legislation directs the Secretary of the Interior to ensure that the mission of the National Wildlife Refuge System and purposes of the individual refuges are carried out. It also requires the Secretary to maintain the biological integrity, diversity, and environmental health of the National Wildlife Refuge System.

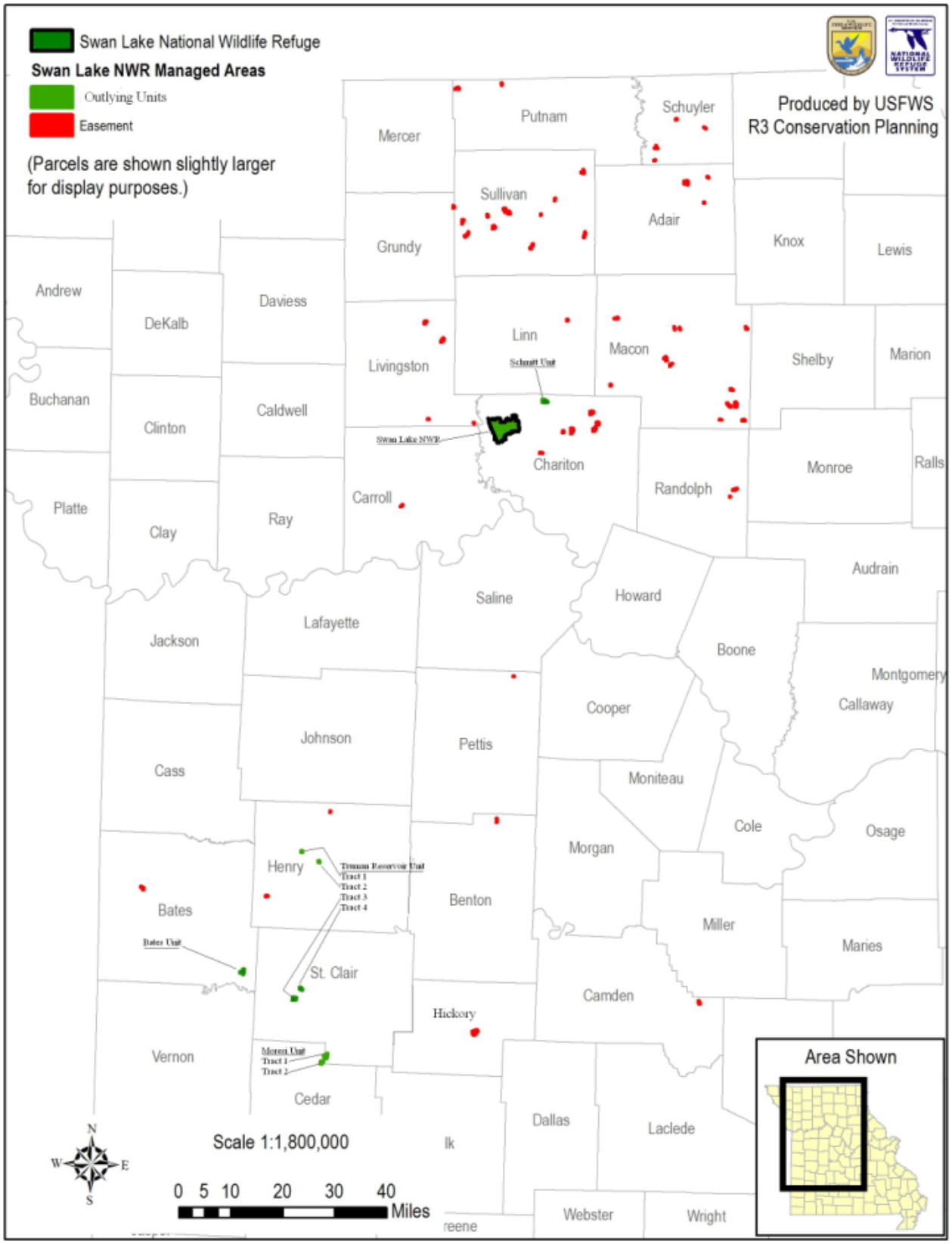


**Figure 1. Location of Swan Lake National Wildlife Refuge, Sumner, MO.**

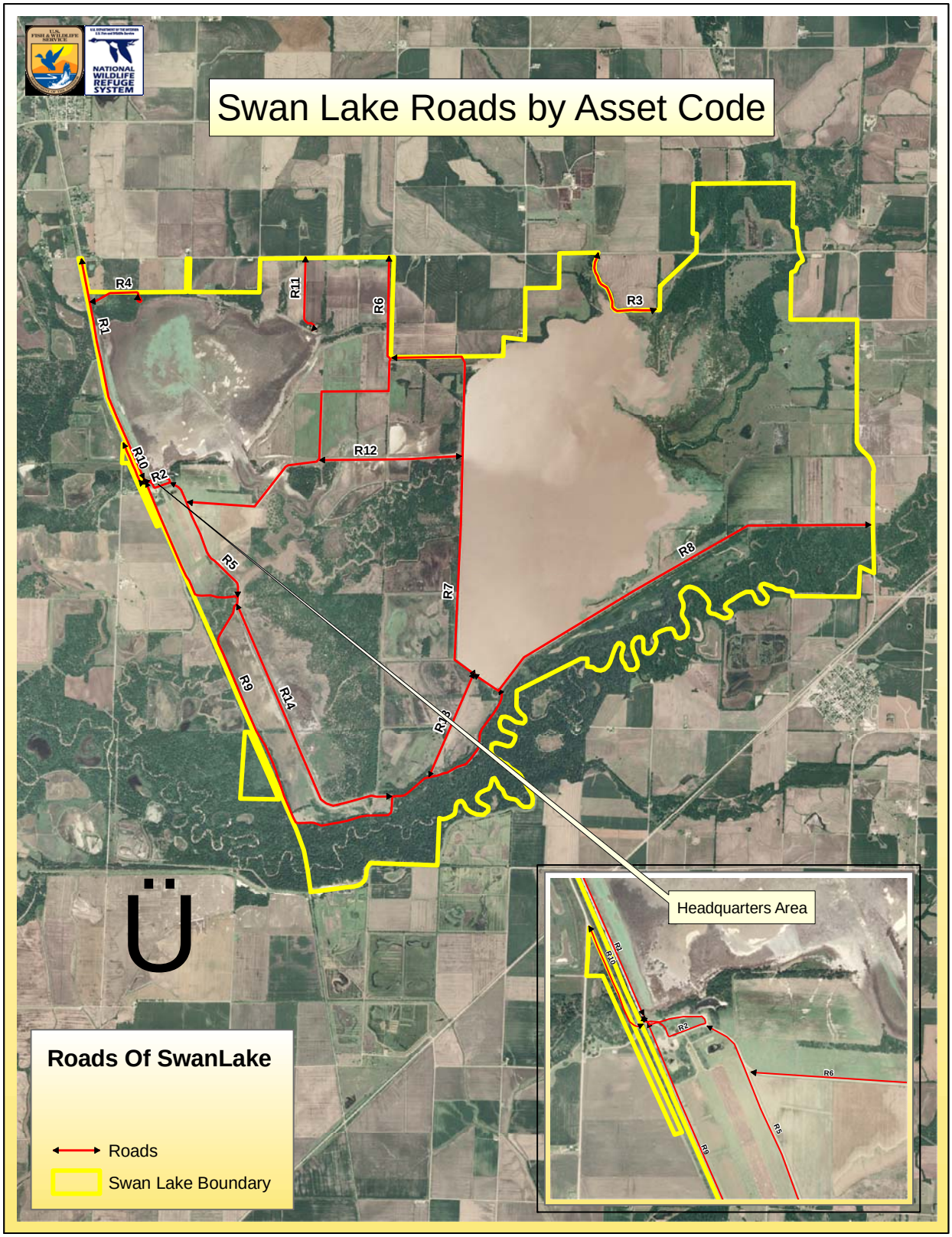


**Figure 2. Swan Lake NWR roads for the Proposed Action with R1 and R2 receiving treatment.**

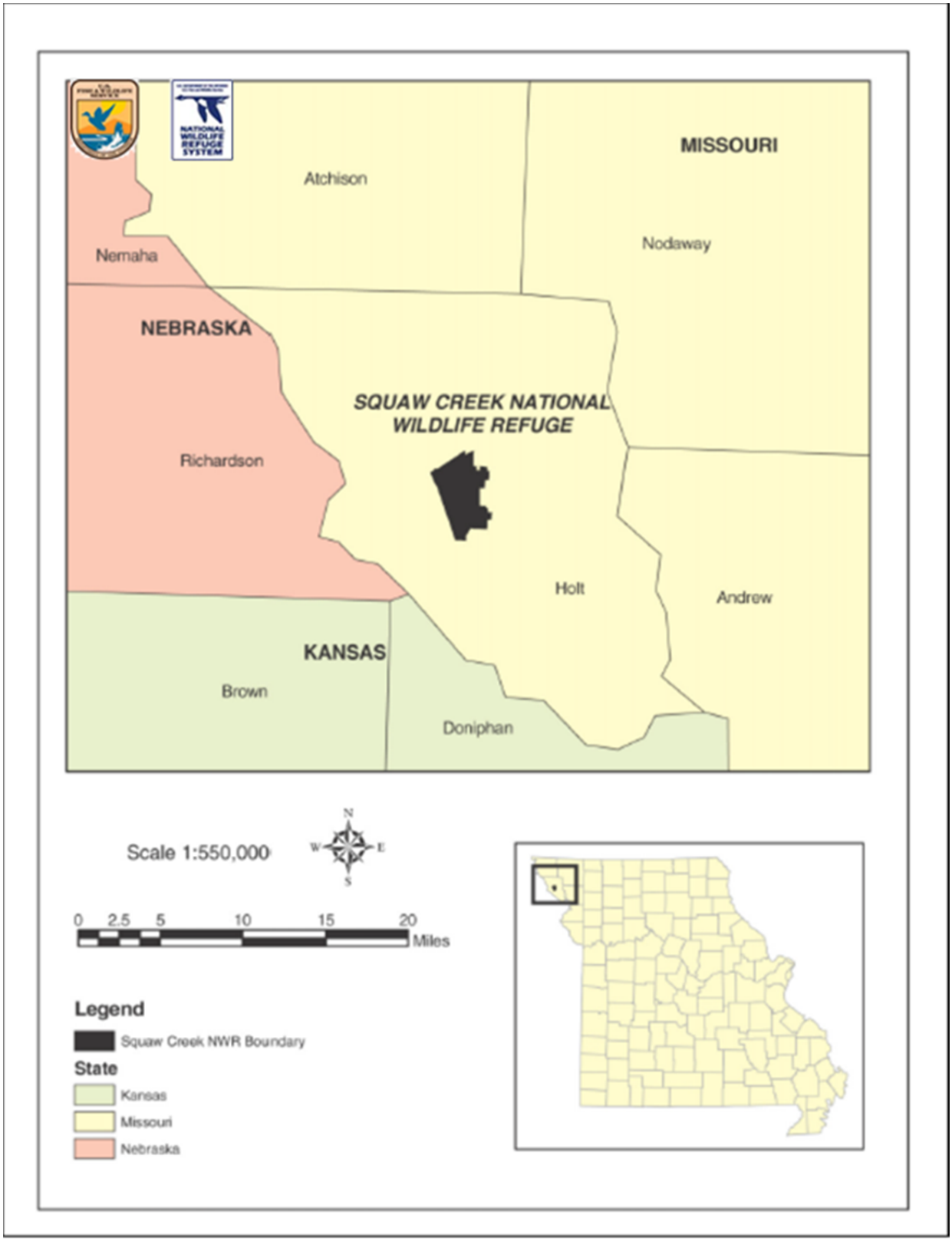


**Figure 3. Location of Squaw Creek National Wildlife Refuge, Holt County, MO.**

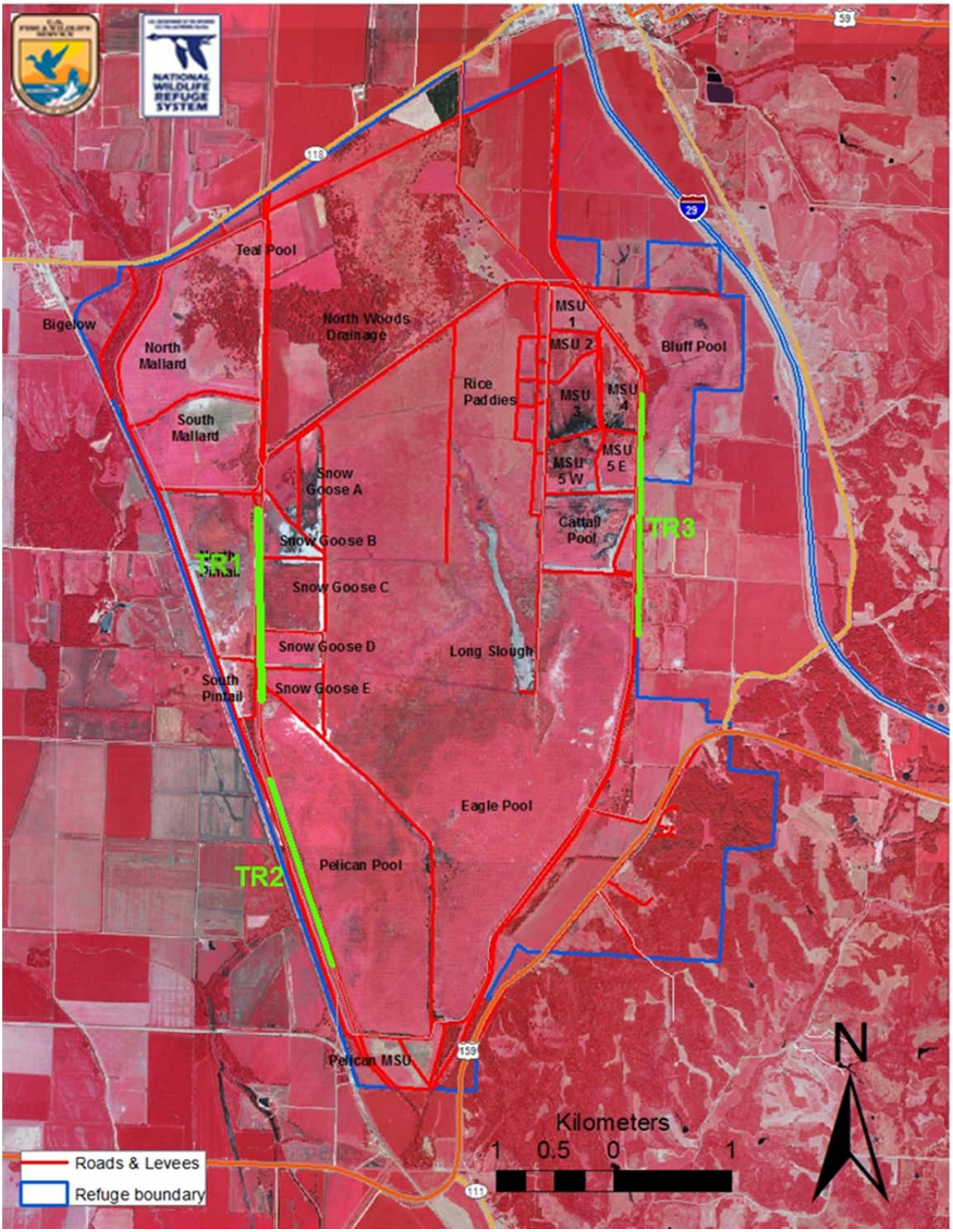


**Figure 4. Squaw Creek NWR roads for the Proposed Action with TR1, TR2 and TR3 receiving treatment.**

The Refuge System's Mission is to:

- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges.
- Provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation).
- Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

## Swan Lake National Wildlife Refuge Purposes and Objectives:

Swan Lake National Wildlife Refuge was established in 1937 by Franklin D. Roosevelt through an executive order. The legal mandates that established or describe the purposes of the Refuge include: "as a refuge and breeding ground for migratory birds and other wildlife" (Executive Order 7563), "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (16 U.S.C. ¤ 715d) and "... particular value in carrying out the national migratory bird management program." (16 U.S.C. ¤ 667b).

The Refuge is responsible for managing 12,031 acres of fee title property. The largest portion consists of 10,670 acres of contiguous land located in Chariton County in north-central Missouri. This contiguous land is the original Swan Lake National Wildlife Refuge established by Executive Order 7563 in 1937.

The Refuge is also responsible for managing four "Outlying Units" consisting of 8 tracts totaling 1,361 acres. These tracts were transferred to the Service from the Farm Service Agency (formerly the Farmer's Home Administration) in the 1990's and are scattered across five southwestern Missouri counties.

<u>Operational Goals:</u>

The Refuge developed a Comprehensive Conservation Plan (CCP) to provide a 15 year management plan that is consistent with Service policy and legal mandates. The CCP was completed in 2011 and established new operational goals and objectives for wildlife, habitat, and public use. The current project is in compliance with the Swan Lake CCP.

## Squaw Creek National Wildlife Refuge Purposes and Objectives:

Squaw Creek National Wildlife Refuge was established in 1935 by Franklin D. Roosevelt through an executive order. The legal mandates that established or describe the purposes of the Refuge include: "as a refuge and breeding ground for migratory birds and other wildlife" (Executive Order 7156), "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (16 U.S.C. ¤ 715d), "particular value in carrying out the national migratory bird management program." (16 U.S.C. ¤ 667b) and "suitable for- (1) incidental fish and wildlife oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." (16 U.S.C. ¤ 460k-1).

The Refuge is responsible for managing 8,326.5 acres of fee title property. The largest portion consists of 7,415 acres of contiguous land located in Holt County in northwestern Missouri. This contiguous land is the original Squaw Creek National Wildlife Refuge established by Executive Order 7156 in 1935.

The Refuge is also responsible for managing three "Outlying Units" totaling 911.5 acres. These tracts were transferred to the Service from the Farm Service Agency (formerly the Farmer's Home Administration) in the 1980's and are scattered across three northwestern Missouri counties.

Operational Goals:

The Refuge developed a Comprehensive Conservation Plan (CCP) to provide a 15 year management plan that is consistent with Service policy and legal mandates. The CCP was completed in 2005 and established new operational goals and objectives for wildlife, habitat, and public use. The current project is in compliance with the Squaw Creek CCP.

### 1.4 PURPOSE

The U.S. Fish and Wildlife Service (USFWS) is proposing to apply dust abatement products to the gravel surface of the Refuge roads. These products are designed to prevent the loss of fine particles from the road surface, thereby reducing visibility hazards for drivers, minimizing the transport of dust into roadside habitats, and reducing ongoing cyclical maintenance to the road surface. This action is being done in partnership with the USGS Columbia Environmental Research Center as part of a Field Test entitled *"Environmental Effects of Dust Suppressant Chemicals on Roadside Plant and Animal Communities"*

**Description of Project:**

a) The proposed project includes field tests of up to four dust control products (See Appendix A) for unpaved roads. These tests are designed to identify products that could be used to control dust and stabilize surfaces on roads in sensitive habitats throughout the Refuge system. The field tests will include pre-application assessments of roadside biological communities and road condition, applications of the selected products, and follow-up monitoring of roadside organisms and product performance.

b) Pre-application surveys—In order to accurately establish biological baselines prior to product application, roadside plants and animals will be surveyed along each test section. Water quality conditions (e.g., dissolved oxygen, pH, conductivity) will be measured when roadside aquatic

habitats occur, and soil samples may also be taken. Dust production will be quantified with mobile-mounted real-time aerosol monitors. Baseline road condition (e.g., presence of wash boarding/raveling) will also be assessed.

c) Product applications—Up to four dust control/soil stabilizer products representing different product classes will be applied to road sections in a replicated design that will allow comparisons among products and between treated and untreated sections. Appropriate products will be selected through discussions between USGS, Refuge management, and product vendors (see Appendix A for information on three products previously tested at Hagerman National Wildlife Refuge, TX). Product transport/application will be performed by product vendors' crews or by appropriate contractors through arrangements made by USGS. The application procedure for each product will follow vendor recommendations, including road preparation, tank mix dilution, application rate, and compaction.

d) Post-application monitoring—Roadside plants and animals will be monitored at intervals as described above, and product performance will be evaluated concurrently, using established metrics of road condition. Mobile-mounted aerosol monitors will be used to quantify airborne particulate matter throughout the monitoring period. Samples of treated gravel will be taken as products weather in the field for use in laboratory-based tests. All biological and performance monitoring will be completed by USGS crews.

### 1.5 Need for Proposed Action

The purposes of the Proposed Action are to improve visitor experiences, reduce the amount of airborne dust being introduced into roadside habitats, and reduce the need for road maintenance and gravel replacement on the treated sections. This action is also being done in partnership with the USGS Columbia Environmental Research Center as part of a Field Test. The Refuges will benefit from dust control and surface stabilization on the selected test roads. This dust control should improve visibility and driver safety on the treated sections and increase the quality of visitor experiences at no cost to the Refuge. In addition, treatment of the roads should reduce the amount of dust deposited onto terrestrial and aquatic habitats adjacent to Refuge roads, and reduce dust-associated problems with Refuge buildings and electronics. Annual road maintenance costs may also be lower, due to a reduced need for blading and gravel replacement. Finally, the Refuge staff will have full access to the biological survey data generated by the project.

### 1.6 Decision to be made

This EA will include an evaluation of the environmental effects of the action alternatives and provide information to help the Service fully consider environmental impacts. Using the analysis in this EA, the Service will decide whether there would be any significant effects associated with the alternatives that would require the preparation of an environmental impact statement or whether the Proposed Action should be adopted.

### 1.7 Regulatory Compliance

This EA was prepared by the Service and represents compliance with applicable Federal statutes, regulations, Executive Orders, and other compliance documents, including the following:

- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996).

- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470).
- Clean Air Act of 1972, as amended (42 U.S.C. 7401 *et seq.*).
- Clean Water Act of 1972, as amended (33 U.S.C. 1251 *et seq.*).
- Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 *et seq.*).
- Executive Order 12898, Federal Action Alternatives to Address Environmental Justice in Minority Populations and Low Income Populations, 1994.
- Fish and Wildlife Coordination Act of 1958, as amended (16 U.S.C. 661 *et seq.*).
- Floodplain Management (Executive Order 11988).
- National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 *et seq.*).
- Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 *et seq.*).
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 *et seq.*).
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 *et seq.*).
- Protection and Enhancement of the Cultural Environment (Executive Order 11593).
- Protection of Wetlands (Executive Order 11990).
- National Pollutant Discharge Elimination System, as amended (33 U.S.C. 1251 *et seq.*).

Further, this EA reflects compliance with applicable State of Missouri and local regulations, statutes, policies, and standards for conserving the environment and environmental resources such as water and air quality, endangered plants and animals, and cultural resources.

# 2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

## 2.1 ALTERNATIVE A—NO ACTION

Under the no action alternative the USFWS would not participate in this project.

The Refuge roads receive the bulk of traffic on the Refuge and often create very dusty situations during dry weather times. This is especially true during Refuge events that draws heavy traffic on the roads at concentrated times when people arrive and leave for the events. This Alternative would not allow us to address this problem and take advantage of getting it addressed at little or no cost to the Refuge.

During the spring summer and fall months the roads are graded about once a month with a considerable cost for fuel and staff time. This Alternative would require continued monthly maintenance on the roadway.

## 2.2 ALTERNATIVE B—PARTICIPATION IN THE DUST ABATEMENT PROJECT (PREFERRED ALTERNATIVE)

Under Alternative B, the USFWS would participate in this project and apply the Dust Abatement products to the roads and allow the USGS staff access for monitoring of the effects of these

products. This Alternative would help reduce visitor and staff exposure to dust, reduce dust pollution in surrounding refuge habitats and reduce the need for monthly maintenance on the road surface.

### 2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED

Other Alternatives that have been considered to deal with the dust issue and maintenance on these roadways is to pave the road with either flexible (asphalt) or rigid (concrete) pavement. Either of these alternatives would have substantial upfront costs that are prohibitive with refuge budgets.

Dust can also be suppressed with the application of water. However, the dust control achieved is temporary and requires frequent reapplication (up to several times a day, depending on conditions). This alternative would require the rental or purchase of special equipment, such as an appropriately sized tank truck with spray bar. In addition to substantial water consumption, the repeated truck trips associated with this alternative would increase fuel costs, generate increased $CO_2$ emissions, and take staff away from other duties.

## 3.0 AFFECTED ENVIRONMENT

### 3.1 PHYSICAL ENVIRONMENT

Swan Lake:

Swan Lake National Wildlife Refuge (Refuge) is located in Chariton County, Missouri near the town of Sumner. It encompasses almost 11,000 acres of bottomland forest, grasslands, and wetlands within the Grand River floodplain. Highways and gravel roads border the north, east, and west sides of the Refuge. Land use around the Refuge is predominantly agriculture. Soybeans, corn, and wheat are the major crops. Beef cattle and hogs are the principal livestock.

Squaw Creek:

Squaw Creek NWR is located in Holt County, Missouri near the town of Mound City. The Refuge encompasses 7,415 acres of wetlands, grasslands and forest within the Missouri River floodplain and Loess Hills. Land use around the Refuge is predominantly agriculture followed by waterfowl hunting clubs. Soybeans, corn, and wheat are the major crops. Beef cattle and hogs are the principal livestock.

#### 3.1.1 Water Resources

Swan Lake:

The Refuge presently contains three major impoundments containing spanning a combined total of about 4,300 acres and many smaller moist soil units. The largest impoundment, Silver Lake, has a surface area of 2,387 acres at full pool and is fed by a drainage area of 110 square miles (70 square miles from Turkey Creek plus 40 square miles from Elk Creek, see Figure 4 on page 17). Silver Lake waters can be drained to South Pool, Swan Lake, and other moist soil units on the

Refuge. Additional local drainage adds 13 square miles to the drainage area of South Pool (918 acres at full pool) and approximately 5 square miles to the drainage of Swan Lake (987 acres at full pool).

Flooding is a frequent occurrence at many locations within the Grand River Watershed. The Refuge is subject to flooding from local intermittent streams, the Grand River, and Yellow Creek. Two broad factors affect the flood intensity and duration within any watershed: precipitation characteristics and the physical characteristics of the basin or watershed. Precipitation characteristics describe the supply of water to a basin and include the amount, duration, intensity, and distribution. The watershed shape, topography, and soils are determined by geologic factors and are in many cases literally set in stone. Land use is the primary basin characteristic controlled by humans. Modifications to the landscape by practices such as deforestation, mining, and farming, as well as structures such as dams, levees, bridges, channels, and pavement all affect runoff and flooding. There are many such modifications within the Grand River Watershed that both speed and impede surface runoff. All of these factors interact and contribute to flood frequency and duration within the watershed.

Squaw Creek:

Squaw Creek NWR is impounded by a dam. Water management within this main dam is a result of small dikes and levees that subdivide the wetlands into marshes and moist soil units. The compartmentalizing counters the effects of long term siltation within the upper end of the large marsh created in the early 1940's. In addition to the managed wetlands, there are about 175 acres of semi-natural wetlands on the Refuge.

The Refuge contains 15 independently managed marshes in 10 designated pools of approximately 3,400 acres and 14 independently managed lowlands in three designated moist soil units of approximately 350 acres. Water levels are manipulated in each of the marshes and moist soil units to provide water depths and vegetative conditions attractive to spring and fall migrating waterfowl as well as to provide nesting habitat for waterfowl and a variety of marsh and water birds during the summer. The moist soil units are drawn down to encourage moist soil plant production and/or to prescribe burn and to permit mechanical vegetative control.

Flows from the Missouri River have limited and indirect influences on the Refuge. This is particularly true during floods. As an example, during the 1993 flood, most of the damage the Refuge sustained was a result of runoff from the upstream watershed rather than the Missouri River. However, because the River was in flood stage, the Refuge was unable to discharge adequate amounts of water and runoff from the watershed backed up and flooded most the Refuge bottom land habitat. The 2011 flood, had a direct impact on the Refuge with water backing up Squaw and Davis creeks into Refuge wetlands and bottomland units. All of the wet prairie was flooded for almost three months.

### 3.1.2 Soils / Landforms / Geology

Swan Lake:

The Refuge lies in the glacial till plain of north-central Missouri. Underlying bedrock is primarily shale and coal with occasional limestone. The topography is relatively flat with elevations ranging from 653.91 to 741.56 feet. Soil types of the Refuge are listed in Table 1 below.

**Table 1. Swan Lake NWR Soil Types by Acreage**

| Soil Type | Acreage | Percent |
|---|---|---|
| Carlow silty clay, 0 to 2 percent slopes, rarely flooded | 0 | 0.00% |
| Shannondale silt loam, 0 to 2 percent slopes | 10 | 0.10% |
| Zook silty clay loam, 0 to 2 percent slopes, occasionally flooded | 10 | 0.10% |
| Gifford silty clay loam, 2 to 9 percent slopes, eroded, rarely flooded | 35 | 0.30% |
| Grundy silt loam, 2 to 5 percent slopes | 38 | 0.30% |
| Speed silt loam, 0 to 2 percent slopes, occasionally flooded | 151 | 1.40% |
| Lagonda silt loam, 2 to 5 percent slopes, eroded | 168 | 1.50% |
| Blackoar silt loam, 0 to 2 percent slopes, occasionally flooded | 217 | 2.00% |
| Triplett silt loam, 0 to 2 percent slopes, rarely flooded | 367 | 3.30% |
| Dockery silt loam, 0 to 2 percent slopes, frequently flooded | 419 | 3.80% |
| Tice silt loam, 0 to 2 percent slopes, frequently flooded | 440 | 4.00% |
| Tina silt loam, 0 to 2 percent slopes, rarely flooded | 797 | 7.20% |
| Carlow silty clay, 0 to 2 percent slopes, occasionally flooded | 1125 | 10.20% |
| Water | 2782 | 28.50% |
| Tuskeego silty clay loam, 0 to 2 percent slopes, occasionally flooded | 4110 | 37.30% |
| Totals | **11,025** | **100.00%** |

Squaw Creek:

The Refuge lies in the Glaciated Plains of northwestern Missouri in which the soils are formed from glacial till, loess and alluvium. Underlying bedrock is primarily shale, limestone, sandstone and coals. The topography in the flood plain is relatively flat (~0-5% slope) compared to that of the Loess Hills (up to 90% slope) the elevation range of Squaw Creek NWR is from 850 to 1167 feet. Soil types of the Refuge are listed in Table 2 below.

**Table 2. Squaw Creek Lake NWR Soil Types by Acreage**

| Soil Type | Acreage | Percent |
|---|---|---|
| Monona silt loam, 2 to 5 percent slopes | 0.8 | 0.0% |
| Monona silt loam, 5 to 9 percent slopes, eroded | 29.8 | 0.4% |
| Timula-Hamburg silt loams, 14 to 90 percent slopes | 327.5 | 4.4% |
| Colo silty clay loam, 0 to 2 percent slopes, occasionally flooded | 212.8 | 2.9% |
| Dockery silt loam, clayey substratum, 0 to 2 percent slopes, rarely flooded | 1,810.2 | 24.3% |
| Dupo silt loam, 0 to 2 percent slopes, rarely flooded | 13.1 | 0.2% |
| Blencoe silty clay, 0 to 2 percent slopes, rarely flooded | 205.7 | 2.8% |
| Motark silt loam, 0 to 2 percent slopes, rarely flooded | 4.2 | 0.1% |
| Napier silt loam, 1 to 7 percent slopes | 247.7 | 3.3% |
| Wabash silty clay, 0 to 2 percent slopes, rarely flooded | 3,128.8 | 42.1% |
| Napier-Gullied land complex, 5 to 14 percent slopes | 45.8 | 0.6% |
| Water | 1,413.5 | 19.0% |
| Totals | **7,439.8** | **100.0%** |

## 3.2 Biological Resources/Environment

3.2.1 Vegetative Communities

Swan Lake:
With the exception of the small hills on the north east side of the Refuge, most of the area is subject to seasonal flooding and is wet during at least a portion of each year. Vegetation varies along a narrow elevation gradient that corresponds to duration of flooding and management practices carried out by refuge staff. Eight community types are delineated within the Refuge based on dominant species, elevation, and inundation.

Bottomland Forest-There are more than 3,100 acres of bottomland forest on the Refuge with the largest contiguous block found along Yellow Creek. This cover type consists of bottomland closed-canopy hardwood forest generally occurring on wet soil and in floodplains. It is dominated by pin oak, silver maple, swamp white oak, and shagbark hickory with green ash,

elm, black willow, river birch, and honey locust. The understory varies from open areas dominated with sedges and woodland forbs to denser areas with a shrub layer composed of Missouri gooseberry (Ribes missouriense), Western snowberry (Symphoricarpos occidentalis), and common prickly ash (Zanthoxylum americanum). These areas are subject to seasonal flooding.

Emergent Wetland-There is over 2,000 acres of emergent wetland habitat on the Refuge. Emergent wetlands, commonly referred to as marshes and sloughs, are characterized by erect, rooted water plants that are present for most of the growing season in most years. These wetlands normally contain standing water, though at times they will dry up. Common perennial plants found in emergent wetlands include cattail, bulrushes, arrowheads, and sedges. Presently more than 800 acres of this habitat are managed using moist soil practices in which water levels are manipulated to create optimum wetland habitat conditions for migratory birds.

Open Water-Silver Lake contains nearly all of the more than 2,100 acres of open water on the Refuge. This cover type is defined as having less than 4 percent visible vegetation, which is either floating or submerged.

Agricultural Fields-There is 1,365 acres of agricultural fields on the Refuge. These are cultivated areas that consist of a variety of grasses and forbs or row crops such as wheat, corn or annual/perennial mixtures mowed for hay. Some of these areas are subject to occasional flooding.

Grasslands-The Refuge contains approximately 1,000 acres of grasslands. Flooding and surface water is often present during much of the year. These grassland sites are grassy fields dominated by reed canary grass, sedges and native grasses with a small number of scattered shrubs and small trees.

Wet Meadow-Wet meadow habitat occurs on about 110 acres of the Refuge. It is a type of wetland that commonly occurs in poorly drained areas such as shallow lake basins, low-lying farmland, and the land between shallow marshes and upland areas. Wet meadows often resemble grasslands, but are typically drier than other marshes except during periods of seasonal high water. For most of the year wet meadows are without standing water, though the high water table allows the soil to remain saturated. A variety of water-loving grasses, sedges, rushes, and wetland wildflowers proliferate in the highly fertile soil of wet meadows.

Shrub Swamp-There are approximately 410 acres of shrub swamp habitat on the Refuge, most of which occurs along the perimeter of open water and emergent wetland habitats. Shrub swamp is dominated by deciduous woody vegetation less than 20 feet in height. Dominant species are mostly buttonbush *(Cephalanthus occidentalis)* and willow *Salix* spp. with an underlying mix of sedges and grasses and/or emergent vegetation, depending on water depth. The shrub layer varies from mostly open (25 percent) to closed (80 percent) and may contain scattered trees.

Old Fields-The 240 acres of old field habitat occurs on disturbed soils and is dominated by reed canary smooth brome, quack grass and weedy herbaceous species. These areas are usually drier than those of wet meadow habitats and were once regularly cultivated for crops but now are left fallow. They are subject to occasional flooding.

Squaw Creek:
The Refuge is a 7,415 acre area of wetlands, wet and mesic prairie, bottomland forest, and upland forest. It lies in the floodplain of the Missouri River and extends into the hillside prairie and woodlands of the Loess Hills of northwestern Missouri. Six primary community types are delineated within the Refuge based on dominant species, elevation, and inundation.

Forest- The Refuge has approximately 1,000 acres of bottomland forest and 375 acres of upland loess hill forest. Common trees on the Refuge include Hackberry, Eastern cottonwood, black willow, and silver maple.

Emergent and Managed Wetlands-
The Refuge contains 15 independently managed marshes in 10 designated pools of approximately 3,474 acres and 14 independently managed lowlands in three designated moist soil units of approximately 350 acres. Water levels are manipulated in each of the marshes and moist soil units to provide water depths and vegetative conditions attractive to spring and fall migrating waterfowl as well as to provide nesting habitat for waterfowl and a variety of marsh and water birds during the summer. The moist soil units are drawn down to encourage moist soil plant production and/or to prescribe burn and to permit mechanical vegetative control. Common plants include smartweed, millet, cattails, river bulrush, arrowhead, and American lotus.

Primary water source for wetlands is rain fail, gravity flow from Davis and Squaw creeks, and two pump stations. Squaw Creek NWR is directly influenced by a 60,000 acre watershed (Squaw Creek ~45,000 acres and Davis Creek ~15,000 acres). The Refuge lies at the base of highly erodible upland in the loess bluff hills runoff coming primarily from Squaw and Davis creeks.

Open Water- Eagle Pool contains almost all of the 225 acres of open water on the Refuge. This cover type is defined as having less than 4 percent visible vegetation, which is either floating or submerged.

Agricultural Fields-There is 325 acres of agricultural fields on the Refuge. These are cultivated areas that consist of row crops such as wheat, corn or soy beans. Some of these areas are subject to occasional flooding.

Grassland- Grasslands on the Refuge consist of approximately 290 acres of bottomland mesic prairie, 220 acres of loess hill prairie, and 1,077 acres of wet prairie.

The diversity of plants on the Refuge includes such plants as smooth sumac, coralberry, false indigo, swamp milkweed, blue wild indigo, swamp buttercup, monkeyflower, blue lobelia, downy painted cup (Indian paintbrush), prairie larkspur, dotted blazing star, hoary puccoon, round-headed bush-clover, soaptree yucca, prairie ragwort, goldenrods, sunflowers, asters, and numerous grasses (including big and little bluestems, and hairy grama). Additional species include Dutchman's breeches, wild columbine, prairie smoke, blue-eyed grass, showy evening primrose, wild sweet-William (Phlox), Solomon's-seal, mayapple, Jack-in-the-pulpit, beardtongue, butterflyweed, lead plant, rose verbena, spiderwort, black-eyed Susan, coneflowers,

wild petunia, queen-of-the-prairie, shrubby St. John's-wort, rattlesnake master, and white snakeroot.

Developed Land- Squaw Creek NWR contains 252 acres of developed land. This area consists of roads, levees, dams and infrastructure.

3.2.2 Fish and Wildlife

Swan Lake:

A variety of birds are year-around residents of Swan Lake NWR, including many waterfowl. During the spring and fall migrations, there is a great diversity of migrants due to its location between two major migratory bird corridors, the Central Flyway and the Mississippi Flyway. It is not uncommon for the Refuge to host up to 100,000 ducks, comprised mostly of dabblers, during the fall migration. The Eastern Prairie Population (EPP) of Canada Geese used Swan Lake NWR as their main wintering grounds until the late 1980s. In recent years winter distribution of the EPP flock has shifted farther north, but thousands of geese still winter on the Refuge. Wintering waterfowl also attract Bald Eagles. The Refuge also provides habitat for thousands of migratory shorebirds and is designated as a regionally important site under the Western Hemisphere Shorebird Reserve Network. The shallow water wetlands and moist soil units on the Refuge provide critical habitat for many species of waterfowl, shore birds, and marsh birds while the grasslands, forested wetlands, and farmland provide habitat for a variety of passerine birds.

There are 46 mammals documented as occurring on the Refuge. The mammals include the federally listed endangered Indiana bat as well as the White-tailed deer, a species popular for hunting and wildlife viewing. Seven mammal species: plains pocket gopher, Franklin's ground squirrel, Eastern chipmunk, hispid cotton rat, Norway rat, Eastern spotted skunk, and gray fox are known to have occurred but have not been documented in recent years.

A variety of salamanders, toads, turtles, lizards, frogs, and snakes inhabit the Refuge including the western massasauga rattlesnake, a state endangered species in Missouri.

A 2007 fisheries survey of Silver Lake found 15 species including white crappie, freshwater drum, flathead catfish, and short nose gar. Flood events dramatically affect the number and composition of the Silver Lake fishery. An earlier survey of Silver Lake conducted in 1996 identified 16 fish species, but only 9 of these were reported again in the 2007 survey. No fisheries surveys have been conducted on other Refuge waters. (*Anodonta suborbiculata*) is a species listed as imperiled within Missouri. No comprehensive survey of invertebrates has been completed on the Refuge, but 20 species of butterflies and 24 species of dragonflies are documented as occurring on the Refuge.

Squaw Creek:

As many as 310 species of birds have been documented on the refuge. Waterfowl are the most prominent and economically important group of migratory birds using the Refuge. As many as 476 Bald Eagles, 200,000 ducks and over 1,000,000 snow geese use the refuge annually. Non-consumptive use of bird resources is important on the Refuge. Birdwatching on the Refuge accounted for approximately 25 percent of public-use days in 2001.

Squaw Creek NWR is home to many resident mammal species. A total of 41 mammals have been observed on the Refuge since. This includes northern long-eared bat (*Myotis septentrionalis*) which is proposed for federal listing.

Thirty-seven species of amphibians and reptiles are known to use the Refuge. Species regularly seen are common snapping turtles, painted turtles, fox snakes, water snakes and various garter snakes. State endangered Blanding's Turtle (*Emydoidea blandingii*) and western massasauga rattlesnake (*Sistrurus catenatus tergeminus*) are also present.

The Refuge lies within the floodplain of the Missouri River. Temporary wetlands do not typically hold enough water to support fisheries, and species found at Squaw Creek NWR come mostly from Davis and Squaw creeks. There are at least 10 species of fish present on the Refuge. About three species are common or abundant in certain pools or reaches. Carp, gar and bullhead are the most common species. Although the Refuge still hosts most of the species that were present historically, the relative abundance and distribution of some species has changed dramatically in the last 100 years. Some of these changes are attributable to events such as the introduction of the common carp, reduction in overall wetland abundance, and sedimentation. Additional species found on the Refuge include: shortnose gar, common carp, smallmouth buffalo, largemouth buffalo, river carpsucker, channel catfish, black bullhead, largemouth bass, white crappie, and green sunfish.

3.2.3 Threatened & Endangered Species
Swan Lake:
Special status species found within the project area that are listed as being either *threatened* (T), *endangered* (E) or as *candidates* (C) for being listed include: Indiana bat (*Myotis sodalis*), piping plover (Charadrius melodus), and the least tern *(Sternula antillarum)*. The northern long-eared Bat (Myotis septentrionalis) has been proposed to be listed.

The presence of a reproductively active female Indiana bat was documented on the Refuge in 2003. Several additional summertime sightings have been made of these bats roosting in dead and decaying trees in the bottomland forest around Yellow Creek. Mist netting surveys were conducted by the Columbia Ecological Services staff in July 2013 in which no Indian Bats were observed. There are no documentations of Indiana Bats hibernating on the Refuge and it is highly unlikely they do.

The interior least tern is an uncommon visitor to the Refuge during spring and early fall migration. It prefers habitats in or near wide and open river channels and nests in sandy or graveled beaches and sandbars with sparse vegetation. These types of habitats do not occur on Swan Lake NWR and Interior Least Terns have never been sighted on the Refuge during the open season dates for deer and goose hunting, including the conservation order light goose season.

A Section 7 Consultation was completed for this project with a "May Effect but Not Likely to Adversely Affect" determination.

Squaw Creek:
Federally listed species found within the project area are designated as being either threatened (T), endangered (E) or as candidates (C) these include: piping plover (Charadrius melodus), and the least tern (Sternula antillarum). The northern long-eared bat (Myotis septentrionalis) has recently been proposed to be federally listed. The closest documented occurrence of Indiana bat (Myotis sodalis) to Squaw Creek NWR is in Nodaway County.

Current effort is being made by both Refuge staff and Missouri Department of Conservation to document all bat species present on the Refuge using bat detectors. Northern long-eared bats were first documented in summer of 2013. No winter hibernation sites exist for either listed or proposed bat species.

The interior least tern and piping plover is an uncommon visitor to the Refuge during late spring and early fall migration. Interior least tern prefer habitats in or near wide and open river channels and nests in sandy or graveled beaches and sandbars with sparse vegetation. These types of habitats do not occur on Squaw Lake NWR. Piping plover prefer mud, sand and algal flats. They nest on sand bars and flats. Nesting habitat for piping plover do not occur on Squaw Creek NWR.

A Section 7 Consultation was completed for this project with a "May Effect but Not Likely to Adversely Affect" determination.

### 3.3 Socioeconomic Considerations

Swan Lake:

A comparison of socioeconomic information for Chariton County and the state of Missouri is presented in Table 2 (2012: United States Census Bureau http://quickfacts.census.gov/qfd/states/29/29041.html).

**Table 3. Socioeconomic Information for Chariton County and the State of Missouri.**

| Measure, Date | Chariton County | Missouri |
|---|---|---|
| Population, 2011 estimate | 7,734 | 6,010,688 |
| Population, 2010 (April 1) estimates base | 7,831 | 5,988,927 |
| Population, percent change, April 1, 2010 to July 1, 2011 | -1.20% | 0.40% |
| Population, 2010 | 7,831 | 5,988,927 |
| Persons under 5 years, percent, 2011 | 6.10% | 6.40% |
| Persons under 18 years, percent, 2011 | 22.30% | 23.50% |
| Persons 65 years and over, percent, 2011 | 21.60% | 14.20% |
| Female persons, percent, 2011 | 50.80% | 51.00% |
| White persons, percent, 2011 (a) | 96.50% | 84.00% |
| Black persons, percent, 2011 (a) | 2.20% | 11.70% |
| American Indian and Alaska Native persons, percent, 2011 (a) | 0.30% | 0.50% |
| Asian persons, percent, 2011 (a) | 0.10% | 1.70% |
| Native Hawaiian and Other Pacific Islander persons, percent, 2011 (a) | *Z* | 0.10% |
| Persons reporting two or more races, percent, 2011 | 0.90% | 1.90% |
| Persons of Hispanic or Latino Origin, percent, 2011 (b) | 0.60% | 3.70% |

| | | |
|---|---|---|
| White persons not Hispanic, percent, 2011 | 96.00% | 80.80% |
| Living in same house 1 year & over, 2006-2010 | 91.30% | 83.20% |
| Foreign born persons, percent, 2006-2010 | 0.80% | 3.70% |
| Language other than English spoken at home, pct. age 5+, 2006-2010 | 0.80% | 5.90% |
| High school graduates, percent of persons age 25+, 2006-2010 | 84.70% | 86.20% |
| Bachelor's degree or higher, pct. of persons age 25+, 2006-2010 | 14.20% | 25.00% |
| Veterans, 2006-2010 | 817 | 511,253 |
| Mean travel time to work (minutes), workers age 16+, 2006-2010 | 23.2 | 23.2 |
| Housing units, 2010 | 4,167 | 2,712,729 |
| Homeownership rate, 2006-2010 | 80.10% | 70.00% |
| Housing units in multi-unit structures, percent, 2006-2010 | 6.30% | 19.60% |
| Median value of owner-occupied housing units, 2006-2010 | $76,500 | $137,700 |
| Households, 2006-2010 | 3,145 | 2,349,955 |
| Persons per household, 2006-2010 | 2.39 | 2.45 |
| Per capita money income in past 12 months (2010 dollars) 2006-2010 | $19,978 | $24,724 |
| Median household income 2006-2010 | $41,558 | $46,262 |
| Persons below poverty level, percent, 2006-2010 | 14.30% | 14.00% |
| *(a) Includes persons reporting only one race* | | |
| *(b) Hispanics may be of any race, so also are included in applicable race categories* | | |
| *Z: Value greater than zero but less than half unit of measure shown* | | |

Squaw Creek:

A comparison of socioeconomic information for Holt County and the state of Missouri is presented in Table 3 (2012: United States Census Bureau http://quickfacts.census.gov/qfd/states/29/29087.html).

**Table 4. Socioeconomic Information for Holt County and the State of Missouri.**

| Measure, Date | Holt County | Missouri |
|---|---|---|
| Population, 2013 estimate | 4,568 | 6,044,171 |
| Population, 2010 (April 1) estimates base | 4,912 | 5,988,923 |
| Population, percent change, April 1, 2010 to July 1, 2013 | -7.00% | 0.90% |
| Population, 2010 | 4,912 | 5,988,927 |
| Persons under 5 years, percent, 2012 | 5.40% | 6.30% |
| Persons under 18 years, percent, 2012 | 20.00% | 23.30% |
| Persons 65 years and over, percent, 2012 | 21.90% | 14.70% |
| Female persons, percent, 2012 | 50.60% | 51.00% |
| White alone, percent, 2012 (a) | 97.50% | 83.90% |
| Black or African American alone, percent, 2012 (a) | 0.20% | 11.70% |
| American Indian and Alaska Native alone, percent, 2012 (a) | 1.00% | 0.50% |
| Asian alone, percent, 2012 (a) | 0.40% | 1.80% |
| Native Hawaiian and Other Pacific Islander alone, percent, 2012 (a) | Z | 0.10% |
| Two or More Races, percent, 2012 | 0.90% | 2.00% |
| Hispanic or Latino, percent, 2012 (b) | 0.80% | 3.70% |
| White alone, not Hispanic or Latino, percent, 2012 | 96.70% | 80.60% |
| Living in same house 1 year & over, percent, 2008-2012 | 84.10% | 83.60% |
| Foreign born persons, percent, 2008-2012 | 0.40% | 3.90% |
| Language other than English spoken at home, pct age 5+, 2008-2012 | 1.70% | 6.10% |
| High school graduate or higher, percent of persons age 25+, 2008-2012 | 89.50% | 87.20% |
| Bachelor's degree or higher, percent of persons age 25+, 2008-2012 | 15.20% | 25.80% |
| Veterans, 2008-2012 | 492 | 494,876 |
| Mean travel time to work (minutes), workers age 16+, 2008-2012 | 21.3 | 23.2 |
| Housing units, 2012 | 2,794 | 2,719,951 |
| Homeownership rate, 2008-2012 | 75.30% | 69.00% |
| Housing units in multi-unit structures, percent, 2008-2012 | 8.10% | 19.70% |
| Median value of owner-occupied housing units, 2008-2012 | $78,900 | $138,400 |
| Households, 2008-2012 | 2,233 | 2,358,270 |
| Persons per household, 2008-2012 | 2.12 | 2.46 |
| Per capita money income in past 12 months (2012 dollars), 2008-2012 | $23,943 | $25,546 |
| Median household income, 2008-2012 | $42,706 | $47,333 |
| Persons below poverty level, percent, 2008-2012 | 14.70% | 15.00% |
| *(a) Includes persons reporting only one race* | | |
| *(b) Hispanics may be of any race, so also are included in applicable race categories* | | |
| *Z: Value greater than zero but less than half unit of measure shown* | | |

3.3.1 Cultural Resources/Environment
Swan Lake:

North-central Missouri contains archeological evidence for the earliest suspected human presence in the Americas, the Early Man cultural period prior to 12,000 B.C.; and extending

through the Paleo-Indian, Archaic, Woodland, Mississippian, and historic Western cultures. Although a complete cultural survey of the Refuge has not been performed, earlier partial surveys have located 30 historical and archeological sites.

Squaw Creek:

Northwest Missouri, where the Refuge is located, contains archeological evidence from the earliest suspected human presence in the Americas, the Early Man cultural period prior to 12,000 B.C.; and extending through the Paleo Indian, Archaic, Woodland, Mississippian, and historic Western cultures including the New Deal period. Although a complete cultural survey of the Refuge has not been performed, earlier partial surveys have located less than 20 historical and archeological sites. For instance, the Munkres tract contains 2 archaeological sites and 196 artifacts have been documented. As May 2014, no properties on the National Register of Historic Places are located on Refuge.

3.3.2 Economic/ Public Use/Recreation
Swan Lake:

The Refuge is tied to the local economy largely through the public's use of the Refuge for recreational opportunities. These opportunities typically come in the form of fishing, hunting, wildlife viewing and sightseeing. The project site and surrounding areas are popular fishing sites.

Squaw Creek:

Agricultural land dominates Holt County, representing over 75 percent of land use. Other prevalent land use includes grassland and deciduous forest. Squaw Creek NWR annually visitation is over 250,000 visits. Visitor activities include bird watching, photography, hiking, interpretation, environmental education, fishing and deer hunting. Waterfowl hunting and duck clubs outside Refuge property are important sources for recreation and economic impact.

## 4.0 ENVIRONMENTAL CONSEQUENCES (ALTERNATIVES A, AND B)

This section reviews and documents the potential direct, indirect, and cumulative effects that implementation of each of the alternatives described in Section 2.0 of this EA would likely have upon the physical, biological, and social aspects of the human environment (as described in Section 3.0 of this document).

**Direct effects** are considered to be impacts that would be caused by the alternative at the same time and place as the action, whereas **indirect effects** are impacts that occur later in time or at a distance from the triggering action. **Cumulative effects** are incremental impacts that result from other past, present, and reasonably foreseeable future actions, including those taken by federal and non-federal government agencies, as well as those undertaken by private groups and individuals. Cumulative impacts may result from singularly minor but collectively significant actions taking place over a period of time.

## 4.1 EFFECTS TO PHYSICAL ENVIRONMENT

### 4.1.1 Water Resources--Discussion of Direct and Indirect Effects

Alternative A--No Action:

Under this alternative, there will be no effects to water resources other than the continued deposition of airborne dust particles into surrounding water resources.

Alternative B--Proposed Action:

Under this alternative, there could be impacts to water resources from product application due to either runoff of precipitation on treated sections or flood events that inundate the roads. Because of this possibility, all products under consideration for the project were evaluated by USGS in a screen for acute aquatic toxicity with rainbow trout (*Oncorhynchus mykiss*). In order to evaluate potential toxicity associated with weathering after application, products were tested in the as-received (original) condition, as well as after a simulated weathering period under UV-radiation. Products were subsequently tested with two or more additional species in expanded tests: newly transformed fatmucket mussels (*Lampsilis siliquoidea*), juvenile northern crayfish (*Orconectes virilis*), pond snails (*Lymnaea stagnalis*), or gray treefrog tadpoles (*Hyla versicolor*).

All products under consideration were classified as “practically non-toxic” according to USEPA aquatic organism toxicity categories for pesticides (see Appendix A for testing summaries). In addition, in a previous field test at Hagerman National Wildlife Refuge, TX, samples of gravel treated with three of the products were taken immediately after application, four months after application, and one year after application. These samples were soaked in water for 48 hours as a simulated “worst-case-scenario” inundation, and the overlying water was used in rainbow trout acute toxicity tests. Exposure to the overlying water did not result in mortality or abnormality of juvenile trout for any of the tested products.

If product applied to the road did enter roadside aquatic habitats through either precipitation runoff or flood inundation, the product introduced would be extremely dilute, given the large volume of roadside impoundments. Therefore, any negative effects on water resources are expected to be minor and temporary. Application of the products is expected to positively impact water resources by reducing the deposition of dust into roadside aquatic habitats.

### 4.1.2 Soil \ Landforms \ Geology -- Discussion of Direct and Indirect Effects

Alternative A--No Action:

There are no expected direct or indirect impacts to soils, landforms or geology associated with this alternative.

Alternative B--Proposed Action:

There are no expected direct or indirect impacts to soils, landforms or geology associated with this alternative. All applications and work performed will be on existing roadways with no offsite impacts.

## 4.2 BIOLOGICAL RESOURCES/ENVIRONMENT

4.2.1 Vegetative Communities--Discussion of Direct and Indirect Effects:

Alternative A--No Action:
Under this alternative, there will be no effects to vegetative communities other than the continued deposition of airborne dust particles onto roadside plants.
Alternative B--Proposed Action:

With this alternative, based on previous USGS toxicity tests and field tests, no direct or indirect negative impacts to vegetative communities are expected under recommended product use conditions. All applications and work performed will be on existing roadways with no offsite impacts. This alternative may positively impact vegetative communities by reducing the deposition of dust on roadside plants.

4.2.2 Wildlife--Discussion of Direct and Indirect Effects

Alternative A--No Action:
Airborne dust from the road surface does impact wildlife utilizing the adjacent habitats. Since this is impact is infrequent and of short duration these impacts should be minimal. Under this Alternative this impact will continue to be an issue.

Alternative B--Proposed Action:
This Alternative would address the dust issue associated with use of the roadway during high traffic times. It would result in less impact to wildlife utilizing the adjacent habitats from dust created by road traffic.

4.2.3 Threatened and Endangered Species--Discussion of Direct and Indirect Effects

Alternative A--No Action:
There are no expected direct or indirect impacts to threatened and endangered species associated with this alternative.

Alternative B--Proposed Action:

A Section 7 Intra-service Consultation has been completed for both Refuges under this Alternative. A *"May Affect but not Likely to Adversely Affect"* determination was made and concurred by the USFWS Ecological Services Columbia, MO Field Office. By eliminating impacts of airborne dust from the roadways adjacent to both Swan Lake and Squaw Creek NWR's wetland impoundments it may have positive effects on any endangered species utilizing those habitats.

## 4.3 SOCIOECONOMIC EFFECTS

4.3.1 Cultural Resources/Environment--Discussion of Direct and Indirect Effects

Alternative A--No Action:

Under this alternative, there are no anticipated direct or indirect impacts to the cultural environment, as current conditions would be maintained, and no soil disturbance would occur.

Alternative B--Proposed Action:

Under the Proposed Action, there would be no impacts to cultural resources, the construction area is along existing roadways. The Service has conducted partial cultural and archeological resources surveys on the Refuge's and these sites will not affect any of these areas.

4.3.2 Economic/Public Use/Recreation--Discussion of Direct and Indirect Effects

Alternative A--No Action:

The current economic role that the Refuge plays in the local economy would continue. There would be no immediate changes expected regarding fishing and wildlife viewing opportunities.

Alternative B--Proposed Action:

Under this Alternative wildlife viewing opportunities would be improved as there would be less dust impacts to surrounding wildlife habitats. This will have short term impacts to visitors as the roadways will be closed for a few days during application of products. There are other alternative routes that visitors will be able to access the Refuge during the application period. Therefore these impacts will be a minimal inconvenience.

**Table 5 Summary of Environmental Consequences by Alternative**

| Environmental Resource | Alternative A: No Action Alternative | Alternative B: Proposed Action |
|---|---|---|
| Water Resources: Water management | No Affect | No Affect |
| Water Resources: Water quality | Long-term moderate negative impact | Long term impacts, both minimally negative and beneficial impacts |
| Soils/Landforms/Geology | No Affect | No Affect |
| Biological Resources: Vegetation | No Affect | No Affect |
| Biological Resources: Wildlife and fish | Moderate long-term negative impacts | Moderate short-term negative & beneficial long-term impacts |
| Biological Resources: Special status species | Moderate long-term negative impacts; minor short-term beneficial impacts | May Affect with short-term & long-term beneficial impacts |
| Cultural and Historic Resources | No Affect | No Affect |
| Economic/Public Use/Recreation | Moderate long-term minor negative impacts | Moderate positive impacts (short- and long-term); minor short-term negative |

### 4.5 Assessment of Cumulative Effects by Alternative

A cumulative impact is defined as an impact on the environment that results from the incremental impact of a [proposed] action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Cumulative impacts are the overall, net effects on a resource that arise from multiple actions. Impacts can “accumulate” spatially, when different actions affect different areas of the same resource. They can also accumulate over the course of time, from actions in the past, the present, and the future. Occasionally, different actions counterbalance one another, partially cancelling out each other’s effects on a resource. But more typically, multiple effects add up, with each additional action contributing an incremental impact on the resource.

Alternative A--No Action:

Cumulative impacts from this Alternative would be long term effects of dust pollution to the adjacent wildlife habitats. Over time this could impact wildlife use of these habitat areas especially as traffic flows to the Refuge may increase in the future.

Alternative B--Proposed Action:

Cumulative impacts from this Proposed Action would be minimal. Testing has been completed on these products as identified in Appendix A as to their environmental effects. Monitoring will also be conducted at the site to determine any affects these products may have to the surrounding habitat areas.

# 5.0 ENVIRONMENTAL JUSTICE

No one group or Tribe represented in the community would be disproportionately impacted by this project. Thus, Alternatives A or B would not result in any environmental justice issues.

# 6.0 CONSULTATION, COORDINATION AND DOCUMENT PREPARATION

## 6.1 AGENCIES AND INDIVIDUALS CONSULTED FOR THE PREPARATION OF THIS DOCUMENT

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## 6.2 DOCUMENT PREPARATION

Document prepared by U.S. Fish and Wildlife Service's Swan Lake National Wildlife Refuge staff, Sumner, MO

Technical preparers of the document included:

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## 7.0 PUBLIC COMMENTS

The Service is soliciting public comments for the Draft Environmental Assessment *Swan Lake Main Entrance Road Dust Abatement Project* on Swan Lake NWR. A 30-day comment period will begin on May 8, 2014 and ends on June 8, 2014. Copies of the document will be posted on the Refuge websites and be available at the Chillicothe, Brookfield, and Mound City Public Library's and the Swan Lake and Squaw Creek NWRs Visitor Centers. A link to the document is also placed on the Swan Lake and Squaw Creek NWRs Facebook pages. News releases, web site and social media will be used to notify the public of this event. A letter will be sent to the Chariton County Commission.

Upon closing of public comment period comments will be listed and addressed on final Environmental Assessment.

# Appendix A: Potential product list for field applications

USGS-USFWS Field Test Collaboration

## Potential product list for field applications

*Prepared by: Bethany K. Kunz, USGS, Columbia Environmental Research Center bkunz@usgs.gov*

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**Background**

All listed products were evaluated by USGS in a screen for acute aquatic toxicity with rainbow trout (*Oncorhynchus mykiss*). In order to evaluate potential toxicity associated with weathering after application, products were tested in the as-received (original) condition, as well as after a simulated weathering period under UV-radiation. Products were subsequently tested with two or more additional species in expanded tests: newly transformed fatmucket mussels (*Lampsilis siliquoidea*), juvenile northern crayfish (*Orconectes virilis*), pond snails (*Lymnaea stagnalis*), gray treefrog tadpoles (*Hyla versicolor*), and lettuce seedlings (*Lactuca sativa*). Test results are reported in terms of 96-hour median lethal concentrations (LC50s), which represent the concentration required to kill 50% of test organisms in 96 hours. Median lethal concentrations are a standardized way to compare toxicity across products, with higher LC50 values indicating lower toxicity. Although there is no accepted ranking of toxicity for dust suppressants, the USEPA aquatic organism toxicity categories for pesticides are listed below for reference (http://www.epa.gov/oppefed1/ecorisk_ders/toera_analysis_eco.htm#Ecotox).

**Aquatic organism acute toxicity**

| Concentration (mg/L) | Toxicity Category |
|---|---|
| <0.1 | very highly toxic |
| 0.1 – 1 | highly toxic |
| >1 – 10 | moderately toxic |
| >10 – 100 | slightly toxic |
| >100 | practically nontoxic |

**All selected products are classified as "practically nontoxic," with the exception of undiluted CBR Plus (see explanation in CBR Plus summary below).**

**Final product selection for field tests will depend on 1) compatibility with the road surface, climate, and traffic patterns at the Refuge, 2) vendor willingness to participate in the field**

**trials, 3) approval by Refuge management for use in the trial, and 4) other input from USGS, USFWS, product vendors, and contractors, as appropriate.**

Following the product list, Table 1 lists recommended dilution and application rates for each product, as well as notes on application procedures.

**Product list**

Product: Dust Stop* *Used in Hagerman NWR field tests
Category: Organic non-petroleum
Composition: Modified cellulose blend
Vendor: Cypher Environmental Ltd.
391 Campbell Street
Winnipeg, MB R3N 1B6
Canada
www.cypherenvironmental.com

Summary of previous testing: In rainbow trout tests, the 96-hour LC50 for Dust Stop was >10,000 mg/L for both the as-received product and the UV-weathered product. In expanded species tests, the 96-hour LC50 values for mussels, crayfish, and snails were >5000 mg/L, and the LC50 for tadpoles was 4559 mg/L. In growth chamber tests with lettuce seedlings, treatment with Dust Stop did not affect seed germination or 7-day root elongation, relative to control seeds.

Product: EnviroKleen* *Used in Hagerman NWR field tests
Category: Synthetic fluid
Composition: Biodegradable iso-paraffin and binder system
Appearance: Clear liquid
Vendor: Midwest Industrial Supply, Inc.
1101 3rd St. SE
Canton, OH 44707 USA
www.midwestind.com

Summary of previous testing: In rainbow trout tests, the 96-hour LC50 for EnviroKleen was >4,000 mg/L for both the as-received product and the UV-weathered product.

Product: Durablend* *Used in Hagerman NWR field tests
Category: Salt-based
Composition: Magnesium chloride plus binding polymer
Vendor: EnviroTech Services, Inc.
910 54th Avenue, Suite 230
Greeley, CO 80634 USA

www.envirotechservices.com

Summary of previous testing: In rainbow trout tests, the 96-hour LC50 for Durablend was 8960 mg/L for the as-received product and 11,465 mg/L for the UV-weathered product. In expanded species tests, the 96-hour LC50 value for mussels was 1283 mg/L. In trials with lettuce seedlings, directly soaking seeds in Durablend decreased both germination rate and 7-day root elongation relative to control seeds. We do not expect Durablend to have detrimental effects on plants under realistic use conditions.

Product: X-hesion DC
Category: Organic non-petroleum
Composition: Agriculturally derived complex polymers
Vendor: EnviroTech Services, Inc.
910 54th Avenue, Suite 230
Greeley, CO 80634 USA
www.envirotechservices.com

Summary of previous testing: In rainbow trout tests, the 96-hour LC50 for X-hesion was >12,500 mg/L for both the as-received product and the UV-weathered product. In expanded tests, the 96-hour LC50 value for mussels was >12,000 mg/L. In growth chamber tests with lettuce seedlings, directly soaking seeds in X-hesion did not affect seed germination, but did decrease 7-day root elongation by approximately 35%, relative to control seeds. We do not expect X-hesion to have detrimental effects on plants under realistic use conditions.

Product: Soil-Sement
Category: Synthetic polymer
Composition: Acrylic vinyl acetate emulsion
Vendor: Midwest Industrial Supply, Inc.
1101 3rd St. SE
Canton, OH 44707 USA
www.midwestind.com

Summary of previous testing: In rainbow trout tests, the 96-hour LC50 for Soil-Sement was approximately 1900 mg/L for the as-received product and 2100 mg/L for the UV-weathered product. In expanded species tests, the 96-hour LC50 values were 810 mg/L for mussels, >5000 mg/L for crayfish, 2382 for snails, and 2038 mg/L for tadpoles. In growth chamber tests with lettuce seedlings, treatment with Soil-Sement did not affect seed germination or 7-day root elongation, relative to control seeds.

Product: Durasoil
Category: Organic petroleum
Composition: Complex mixture of branched alkanes and alkylated saturated ring compounds
Vendor: Soilworks, LLC.
2450 South Gilbert Road, Suite 210
Chandler, Arizona 85286-1595 USA
www.soilworks.com

Summary of previous testing: In rainbow trout tests, the 96-hour LC50 for Durasoil was >5000 mg/L for both the as-received product and the UV-weathered product. In expanded species tests, the 96-hour LC50 for crayfish was >10,000 mg/L. Durasoil was not tested with mussels, tadpoles, or snails. In growth chamber tests with lettuce seedlings, treatment with Durasoil did not affect seed germination, but did reduce 7-day root elongation by approximately 30%, relative to control seeds.

Product: CBR Plus
Category: Surfactant
Composition: Organic sulphonate
Vendor: CBR PLUS LLC .
8512 Brightfield Cl.
Portland OR 97223 USA
www.cbrplus.com

Summary of previous testing: In rainbow trout tests, the 96-hour LC50 for CBR Plus was approximately 23 mg/L for both the as-received product and the UV-weathered product. In expanded species tests, the 96-hour LC50 values for mussels, crayfish, snails and tadpoles were between 35 and 45 mg/L. In growth chamber tests with lettuce seedlings, treatment with CBR Plus did not affect seed germination or 7-day root elongation, relative to control seeds. CBR Plus was considered a low-toxicity product for expanded testing because, although the toxicity of the undiluted CBR Plus was considerably greater than many of the other products, CBR Plus is applied at a much higher dilution rate (i.e., 150:1 water-to-product, as opposed to 9:1 or undiluted for other products). Therefore, the risk of toxicity under realistic use conditions is expected to be very low.