

Draft Environmental Assessment

Agassiz National Wildlife Refuge Continued Aerial Herbicide Application

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Environmental Assessment for Aerial Herbicide Application at Agassiz National Wildlife Refuge

Date: March 2023

This Environmental Assessment (EA) is being prepared to evaluate the effects associated with the proposed action and complies with the National Environmental Policy Act in accordance with Council on Environmental Quality regulations (40 CFR 1500-1509) and Department of the Interior (43 CFR 46; 516 DM 8) and U.S. Fish and Wildlife Service (550 FW 3) regulations and policies. The National Environmental Policy Act (NEPA) requires examination of the effects of proposed actions on the natural and human environment. Appendix A outlines all laws and executive orders evaluated through this Environmental Assessment.

Proposed Action

The U.S. Fish and Wildlife Service (Service) is proposing to continue the use of aerially applied herbicides on Agassiz National Wildlife Refuge (refuge) in conjunction with continued use of ground application methods when appropriate. The aerial application of herbicides is used as a habitat management strategy in accordance with the Comprehensive Conservation Plan (CCP) for the refuge when other means of invasive species management are not practicable. Aerial application of herbicide is a tool used to control vast expanses of invasive and undesirable vegetation located in remote areas of the refuge often inaccessible by any other means and where other methods have proved ineffective in controlling targeted species.

A proposed action and alternatives may evolve during the NEPA process as the agency refines its proposal and gathers feedback from the public, federally recognized tribes and tribal entities, and other agencies or organizations. Therefore, the final action may be different from the originally identified preferred alternative. The agency action will be finalized at the conclusion of the public comment period after the incorporation of substantive comments received.

Background

National Wildlife Refuges are guided by the mission and goals of the National Wildlife Refuge System (NWRS), the purposes of an individual refuge, Service policy, and laws and international treaties. Relevant guidance includes the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, Refuge Recreation Act of 1962, and selected portions of the Code of Federal Regulations and Fish and Wildlife Service Manual.

Agassiz NWR was originally established as the *Mud Lake Refuge* pursuant to Executive Order 7583 on March 23, 1937, with a primary purpose to be *“a refuge and breeding ground for migratory birds and other wildlife.”* The refuge was renamed as *Agassiz National Wildlife Refuge* in 1961.

Public Law 94-557 also designated 4,000 acres as the Agassiz Wilderness, to be managed as part of the National Wilderness Preservation System. “The Wilderness Act of 1964 (Public Law 88- 577) created additional purposes for Agassiz National Wildlife Refuge.” Section 2(a) of the Wilderness Act states in part that *“... it is hereby declared to be the intent of Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness ...”* and designated wilderness areas are to be managed *“... for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness.”*

In addition, Section 4(3)(b) of the Wilderness Act provides that each agency administering wilderness areas *“...shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character. Except as otherwise noted in this Act, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.”* The refuge’s Wilderness purposes apply to the approximately 4,000 acres of the congressionally designated Agassiz Wilderness.

National Wildlife Refuge System Mission

The mission of the NWRS, as outlined by the National Wildlife Refuge System Administration Act (NWRSA), as amended by the National Wildlife Refuge System Improvement Act (16 U.S.C. 668dd et seq.), is

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

Additionally, the NWRSA mandates the Secretary of the Interior in administering the NWRS (16 U.S.C. 668dd(a)(4)) to

- Provide for the conservation of fish, wildlife, and plants, and their habitats within the NWRS;
- Ensure that the biological integrity, diversity, and environmental health of the NWRS are maintained for the benefit of present and future generations of Americans;

- Ensure that the mission of the NWRS described at 16 U.S.C. 668dd(a)(2) and the purposes of each refuge are carried out;
- Ensure effective coordination, interaction, and cooperation with owners of land adjoining refuges and the fish and wildlife agency of the states in which the units of the NWRS are located;
- Assist in the maintenance of adequate water quantity and water quality to fulfill the mission of the NWRS and the purposes of each refuge;
- Recognize compatible wildlife-dependent recreational uses as the priority general public uses of the NWRS through which the American public can develop an appreciation for fish and wildlife;
- Ensure that opportunities are provided within the NWRS for compatible wildlife-dependent recreational uses; and Monitor the status and trends of fish, wildlife, and plants in each refuge.

An Environmental Assessment was completed and published in 2005 with the refuge's Draft Comprehensive Conservation Plan (CCP). The Environmental Assessment identified management strategies to meet the conservation goals of the refuge and the preferred alternative identified in that, was Open Landscape/Natural Watercourses. This alternative focuses on providing a variety of water conditions and setting back upland succession to benefit many different wildlife species. This formed the basis for the goals, objectives, and strategies outlined in the CCP. There are specific objectives for controlling invasive and undesirable plants and Agassiz National Wildlife refuge has long used herbicides to meet the conservation and infrastructure maintenance obligations.

Purpose and Need for the Action

The purpose of this proposed action is to evaluate the continued use of aerial application of herbicide to control, prevent, and limit the spread of invasive or undesirable vegetation across Agassiz National Wildlife Refuge in response to increased pressure from invasive species and other undesirable vegetation resulting from range expansions and environmental alterations. The threats posed by emerging invasive species and other undesirable vegetation are expected to continue and potentially increase. The CCP contains specific objectives related to the control of invasive and undesirable plant species. Those objectives are:

Objective 2: Lowland Shrub and Grasslands Conversion: Achieve an increase in grasslands by a net decrease of lowland shrub (alder, willow, dogwood) within the Focus Area by 115 acres over the next 10-15 years through conversion to grasslands to benefit wildlife species like the Bobolink, Sharp-tailed Grouse, Marbled Godwit, Western Meadowlark, and nesting dabbling ducks.

Objective 2.5: Reducing Cattail and Phragmites Infestation: Experiment with decreasing cattail and phragmites vegetation by 840 acres, converting it to sedge habitat to benefit species like LeConte’s Sparrow, Sedge Wren, Nelson’s Sharp-tailed Sparrow and the Yellow Rail in the next 10 to 15 years.

The need of the proposed action is to meet the Service’s priorities and mandates as outlined by the NWRSA to “provide for the conservation of fish, wildlife, and plants, and their habitats within the System” in addition to “ensuring the biological integrity, diversity, and environmental health of refuges is maintained” (16 U.S.C. 668dd(a)(4)).

Invasive plants have been documented throughout the refuge and currently receive annual management. Invasive plant species can degrade the productivity and wildlife value of invaded habitats. The rapid growth of invasive species and other undesirable vegetation can displace native plants and significantly alter fish and wildlife habitats. This directly affects the refuge’s biological integrity, diversity, wildfire risk, and environmental health. In general, an invasive species negatively alters a landscape by outcompeting native or other more conservative species. The invasive species can form a dense monoculture, reducing botanical diversity and limiting wildlife habitat. The potential for infestation of new invasive species is also a concern.

Hybrid cattail (*Typha x glauca*) continues to expand aggressively into open water and reduce the quality of wetlands on the refuge. Factors such as its ability to grow in deeper water, robust rhizomatous root system, clonal reproduction, and high seed set (20,000-70,000 seeds annually/plant; Yeo 1964) allows it to out-compete native wetland plant species and create its own dense monocultures. Hybrid cattail is also able to store nitrogen and phosphorus in its roots, transferring it to the soil, altering soil chemistry to better support hybrid cattail growth (Newman et al. 1996). This positive feedback of cattail invasion and expansion necessitates management intervention. Native and non-native phragmites species (*Phragmites*) can also form dense monocultures under the right conditions creating similar habitat issues discussed above. Non-native phragmites species have not been detected on the refuge yet, but they have been found across other areas in Minnesota.

Open grassland and sedge meadow habitat continues to be lost by the expansion of woody vegetation; primarily cottonwood (*Populus*), alder (*Alnus*), willow (*Salix*), and dogwood (*Cornus*) species. Historically, many woody plant species were controlled and open landscapes maintained by fire which occurred more frequently than they presently do. Many of these woody plants including species of willow, dogwood, and cottonwood facilitate rapid growth and expansion due to their ability to survive in moist soils and produce new stems via suckers. Consequently, similar to hybrid cattails, these species will continue to expand forming dense

monocultures eliminating open landscapes and outcompeting other grassland and sedge meadow species.

Undesirable vegetation can also impact refuge facilities and infrastructure degrading roads, trails, dams, buildings, kiosks and other improvements. The refuge also has the need to maintain infrastructure for meeting the refuge purpose, vision and goals to manage the refuge.

Alternatives

Alternative A – Continued use of Aerial Application Equipment (No action - Preferred Alternative)

Under this no action alternative, aerial application of herbicides would continue to be used as a tool to control, prevent, and limit the spread of invasive, non-native, and undesirable vegetation. Herbicide application is needed to effectively control and reduce the overall presence of invasive species and other undesirable vegetation and a suite of tools can be used to apply herbicide for management needs. Ground herbicide applications on the refuge would be done with tractors, ATV/UTVs, specialized trucks, and by hand (e.g., cut stump, basal bark, hack and squirt, backpack sprayers, etc.). Aerial applications would be done with fixed-wing aircraft, rotary-winged aircraft, and unmanned aerial vehicles (UAVs). Under the No Action and Preferred Alternative, herbicide applications would continue to be integrated with non-herbicide control methods including mowing, prescribed fire, hand-pulling and biological control when possible. Areas within the refuge to be considered for aerial treatment include monotypic stands of invasive species, such as cattails, and open grassland/shrubland habitat containing undesirable woody species with low native plant diversity. Given the geographical location of the refuge, broadcast aerial spraying would typically take place between July and October. During this timeframe, the targeted plant species begin the process of senescence, in which they are re-distributing nutrients to other parts of the plant (typically roots) for winter. This is an effective time to apply herbicides as the plant carries the chemical down into the root system. The refuge would continue with an integrated approach by utilizing other control methods, when feasible, in addition to aerial herbicide application.

The USFWS's Integrated Pest Management (IPM) Policy (569 FW 1) requires a sustainable approach to managing pests that uses the following kinds of tools to minimize health, environmental, and economic risks: (1) **Biological** (e.g., predators, parasites, and pathogens), (2) **Cultural** (e.g., crop rotation, alterations in planting dates, and sanitation), (3) **Physical** (e.g., barriers, traps, hand-pulling, hoeing, mowing, and tilling), and (4) **Chemical** (e.g., pesticides, such as herbicides, insecticides, or fungicides). The IPM Policy also requires review and approval of a pesticide use proposal (PUP) prior to all herbicide applications. All PUPs require a site-specific Endangered Species Act (Section 7) consultation. All herbicide applications on Agassiz NWR are required to follow product label restrictions (see below) and regionally approved best

management practices (BMPs). The BMPs are designed to minimize environmental and safety risks and include:

- **Slopes** - Do not apply pesticides to slopes greater than 5% if significant rainfall is predicted within 24 hours.
- **Wind speed** - Do not apply pesticides when wind velocity exceeds 7 miles per hour or when inversion conditions exist.
- **Buffers** - Use a minimum 25-foot vegetated treatment buffer around all surface water resources.
- **Air temperature** - Do not spray pesticide containing 2,4-D when air temperatures exceed 85°F.
- **Droplet size** - Select nozzles and operate application equipment with boom pressures such that spray droplets produced medium (236 - 340 microns) or coarser (341 - 403 microns) sized droplets.
- **Boom Height** - Do not allow boom height to exceed 20 inches above target canopy.
- **Dye** -Where possible, use a dye for non-crop spot treatment to indicate treated areas.

The Federal Insecticide, Fungicide, and Rodenticide Act [7 U.S.C. §136 et seq. (1996)] requires all herbicide applications follow product label restrictions. These restrictions detail measures to minimize the potential for contamination and non-target effects. The Environmental Protection Agency is the lead agency for approving herbicide product labels (40 CFR; 156) and this process includes NEPA analysis and Endangered Species Act (Section 7) consultations with the USFWS. Therefore, all ground and aerial herbicide applications included in this alternative have received prior environmental analysis and review via the NEPA and Endangered Species Act consultation processes.

This alternative fulfills the Service's mandate under the NWRSA and the Integrated Pest Management Policy.

Alternative B – No Aerial Spraying

Under Alternative B, the refuge would discontinue use of aerial herbicide application and use only ground based methods to control invasive, non-native, and undesirable vegetation. Current methods for invasive species control include herbicide application from ground equipment such as tractor, truck, UTV/ATV and hand-spraying. Other methods used to remove biomass and reduce top growth are prescribed fire, grazing, mechanical mowing, and water level management. Limited, if any, herbicide would be applied on large infestations or in areas

with limited access, resulting in the expansion of invasive and undesirable species and further degradation of the habitat.

Affected Environment and Environmental Consequences

This section is organized by affected resource categories and for each affected resource discusses both (1) the existing environmental and socioeconomic baseline in the action area for each resource and (2) the effects and impacts of the proposed action and any alternatives on each resource. The effects and impacts of the proposed action considered here are changes to the human environment, whether adverse or beneficial, that are reasonably foreseeable and direct, indirect and cumulative. Direct effects are those which are caused by the action and occur at the same time and place. Indirect effects are those which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Cumulative impacts result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.

This EA includes the written analyses of the environmental consequences on a resource only when the impacts on that resource could be more than negligible and therefore considered an “affected resource.” Any resources that will not be more than negligibly impacted by the action have been dismissed from further analyses.

Agassiz National Wildlife Refuge consists of approximately 61,500 acres in Marshall County, Minnesota. (See Figure 1. for location)

The refuge contains a diverse mix of wetland, shrubland, and grassland habitat types. The proposed action would take place across any of these habitat areas as needed. For more information regarding and the general characteristics of the refuge environment, please see Chapter 3 of the Refuge’s Comprehensive Conservation Plan which can be found here:

<https://ecos.fws.gov/ServCat/DownloadFile/1347>.

The associated Environmental Assessment that was completed in conjunction with the CCP can be found here:

<https://ecos.fws.gov/ServCat/DownloadFile/168986>

The following resources either (1) do not exist within the project area or (2) would either not be affected or only negligibly affected by the proposed action (See Appendix A for additional information):

- Floodplains
- Cultural Resources
- Environmental Justice

- Socioeconomics
- Geology and Soils
- Air Quality

Natural Resources

Habitat and Vegetation (including vegetation of special management concern)

Affected Environment

Description of Affected Environment for the Affected Resource

Agassiz National Wildlife Refuge is situated within an ecological transition zone or ecotone, specifically, the aspen parkland transitional zone between the coniferous or boreal forest to the north and east and the tall grass prairie and prairie pothole provinces to the west and south. The refuge is primarily comprised of the following four habitat types.

Wetlands and Open Water – This includes cattail/mixed emergent marsh, bulrush emergent, open water/mudflats, and sedge meadow. Wetlands and open water are crucial to many of the migratory birds found at the refuge, either during the nesting season or in transit during migration. Ducks, geese, shorebirds, wading and some songbirds and raptors are all heavily dependent on various kinds of wetland, open water and mudflat habitat. A number of mammals, especially furbearers, utilize or depend on these habitats as well.

Lowland Shrub – This plant community is dominated by willows, speckled alder, and dogwoods. Among the species that commonly utilize lowland shrub habitat are the moose, white-tailed deer, Le-Conte's Sparrow, and Black-billed Cuckoo. The use of this habitat by moose and deer means that it indirectly benefits the gray wolf, which preys on these two ungulates. Certain migratory birds and waterfowl also use this habitat for nesting and cover.

Woodland – Upland woodlands at the refuge consist primarily of aspen and mixed hardwood forest patches and bur oak savanna. They tend to be partially open forests with abundant undergrowth. Fire has always been integral to their maintenance. Included in the woodlands are 2,380 acres of coniferous bog. Refuge woodlands are utilized by many bird species in the summer, including the Ovenbird, Northern Saw-whet and Great-horned Owls, Red-tailed Hawk, Cooper's Hawk and Broad-winged Hawk, and various sparrows and warblers. Winter residents are much fewer but include Gray Jays, Crows, Ravens, Chickadees, Nuthatches, finches, Ruffed Grouse, Downy Woodpecker, Hairy Woodpecker, Black-backed Woodpecker and Pileated Woodpecker. A number of mammals also utilize woodlands, including shrews, bats, squirrels, voles, mice, red foxes, porcupines, raccoons, fishers, weasels, skunks, bobcats, moose, deer, and wolves.

Grassland – Prairie grasslands at Agassiz NWR are dominated by tall and medium-height grasses, but also contain forbs as well as several low shrub or sub-shrub species. Taller brush and trees are absent or scattered, but at Agassiz NWR, brush or woodland areas can be

interspersed with grasslands as part of the aspen parkland complex. Grasslands provide feeding, foraging, or breeding habitat for numerous species of birds, including geese, nesting dabbling ducks, Marbled Godwit, several species of hawks and owls, American Kestrel, Northern Harrier, Sharp-tailed Grouse, Killdeer, American Woodcock, Eastern Bluebird, Bobolink, Western Meadowlark, and various sparrows. Mammals that particularly utilize grasslands include a number of small and medium-sized rodents, rabbits, red fox, badger, white-tailed deer, and wolves.

A full description of the refuge habitats and management actions and strategies used within these habitats can be found in the Habitat Management Plan (2007).

Impacts on Affected Resource

Alternative A

The continuation of aerial herbicide application under the Alternative A will allow for larger, more remote areas to be treated annually resulting in an acceleration of invasive, non-native, and undesirable vegetation control across the refuge. Aerial application will allow for efficient application, more even coverage, reduced levels of overspray, and increased safety for the applicator. This alternative would maximize the refuge's ability to control and prevent the expansion of invasive plants and other undesirable vegetation promoting not only suitable, but desirable habitat for wildlife species. This alternative would be expected to directly benefit refuge forests, grasslands, and wetlands.

Potential negative effects of herbicide treatments would be indirect and include herbicide inadvertently being applied to non-target plants while treating invasive species and other undesirable vegetation. The greatest potential for non-target effects occurs when herbicides are applied aerially. This is because the potential for drift is much higher for aerial herbicide applications. Aerial applications would be used in areas that would limit the potential for non-target drift and thus this impact would be mitigated to minor effects

The potential for non-target effects can be minimized using plant phenology. Many invasive species begin actively growing before native species in the spring and continue active growth after native species have gone dormant in the fall allowing minimal, if any, non-target treatment damage to native plants. Ground herbicide applications would be used in areas that are not logistically feasible for aerial application, such as with tractors along perimeter roads, and areas safe for access. Spot treatment of undesirable plants by foot using backpack sprayers and cut stump treatments would be used in areas that are safe for foot entry.

The refuge has a long history of herbicide use with non-target impacts limited in scale and duration. Agassiz National Wildlife Refuge has been using herbicide as a habitat management tool for decades, this includes applications with a variety of herbicides including aerial applications beginning in 2005. As noted above, the potential for non-target effect has been analyzed (NEPA) as part of the labeling process for all herbicides and measures to minimize

those effects, including restrictions, are included in the product label. Because the label is the law, the potential for indirect negative effects on forests, grasslands, and wetlands are expected to be very minimal. This potential negative affect is further minimized by the refuge following regionally approved BMPs and all PUPs being reviewed and approved as detailed above. The indirect benefits of herbicide applications through improved habitat diversity and health are expected to benefit forests, grasslands, and wetlands.

Under both alternatives, herbicide applications may be combined with non-herbicide methods like prescribed fire which could have cumulative effects. Following combined treatments, a reduction in plant abundance and diversity could occur. Such reductions would be localized but could result in a reduction in habitat quality. Such cumulative effects are expected to be temporary, lasting no more than one year as the habitat recovers from unaffected perennial root stock, seed bank resources, and immigration from surrounding untreated sites. As noted above, cumulative impacts can be negated through timing of management options, amount, and location of treatments to minimize or eliminate the compounding influence of multiple management programs. Long-term cumulative impacts could be positive as the health and diversity of the ecosystems on the refuge improve.

Maintaining the refuge's plant and structural diversity maintains its resilience to current and any future environmental stressors. This would directly affect the refuge's environmental health and would be a cumulative effect of continued herbicide use. Continued herbicide use has the potential of contributing to herbicide resistance of target plants. This indirect effect can be minimized by using herbicides with different modes of action and/or using tank mixes of different herbicides.

Aerial application of herbicides would allow for larger areas to be treated more efficiently which should result in less chemical being used over time and therefore less exposure to non-target plants and wildlife over time. The risk of damage to non-target plant species may be elevated; however, this can be mitigated with the proper prescription of this method. Disturbance to the ground and vegetation such as rutting from equipment in wet areas would not occur. Habitat objectives identified in the CCP, will have a higher likelihood of being met with the use of aerial application.

Alternative B

Under Alternative B, only ground application of herbicides with truck, tractor, ATV/UTV, amphibious vehicle or hand sprayers would be allowed. Treatments would be primarily limited to the drier, smoother terrain portions of the refuge. Invasive and undesirable vegetation species located in the inaccessible portions of the refuge would remain largely untreated, continuing to provide a seed source that will promote expansion across the refuge. Grasslands that contain woody vegetation that is too dense or large to treat with ground equipment would remain largely untreated. Ground pressure from heavy equipment would increase soil

compaction and could potentially create ruts in wet areas. In some cases, amphibious tracked vehicles may be used, however, these vehicles are costly to operate and soil compaction and rutting would also occur. Herbicide can be applied in some areas using an airboat; however, this generally only involves spot treatments of small patches.

The amount of area treated annually using ground spraying applications is limited due to the time it takes to treat an area. Further, applying herbicides evenly on the landscape can be difficult using ground equipment due to uneven terrain which reduces the operator's ability to maintain a constant speed. There is also chance for overlap due to difficulties in navigating terrain and vegetation features leading to more herbicide being used. Furthermore, the increased duration of application and the increased amount of chemical used, elevates the chemical exposure to the applicator.

Under this alternative, wildlife habitat will continue to degrade in some areas with the limited application of ground spraying. Encroachment of invasive plants and other undesirable vegetation would likely result in a reduction in forest, grassland, and wetland plant diversity. More specifically large expanses of monotypic stands would remain untreated and would continue to spread. Hybrid cattail would further decrease the amount of open wetland habitat and the extent of desirable aquatic vegetation would continue to decline. In grassland habitats, undesirable woody vegetation and invasive species will continue to outcompete native plant species, thus reducing the amount of available habitat to grassland-obligate species.

Terrestrial Wildlife and Aquatic Species

Affected Environment

Description of Affected Environment for the Affected Resource

The refuge with its diverse mix of habitat types supports a wide variety of wildlife species native to northwestern Minnesota. An abundance of birds, mammals, fish, reptiles, and amphibians inhabit the refuge as described above in the description of the habitat types.

The refuge is designated a Globally Important Bird Area by the National Audubon Society for its outstanding value to wild birds and their habitats. The refuge is very important for migratory birds, both during the nesting season and migration. It is known to support 17 species of nesting or breeding ducks and frequently supports one of North America's largest colony of Franklin's Gulls. Overall, more than 120 species of birds have been recorded breeding and nesting at the refuge.

Forty-nine species of mammals have been documented on the refuge. A few of the larger more iconic species include moose, gray wolves, white-tailed deer, and black bear. Mammal populations have remained consistent, with short term fluctuations for most species on the refuge except for moose. The refuge along with adjoining wildlife management areas historically averaged around 275 animals, but the population has been in a steady decline since

1984 and is currently less than 50 animals. This is not specific to the refuge or adjacent area; moose populations have steadily declined across the entire state. Research has been ongoing in parts of Minnesota to determine exact causes.

The refuge contains twelve species of amphibians, eight species of reptiles, and approximately thirty species of fish. Twenty of the fish species are smaller fish, such as minnows, sticklebacks, and darters. Small scale amphibian surveys have been completed on the refuge in the past, otherwise none of the above species have been the subject of management efforts.

Impacts on Affected Resource

Alternative A

Under Alternative A, the continuation of aerial herbicide application will allow for larger areas to be treated. Additionally, aerial application enables the treatment of remote portions of the refuge inaccessible by other means. This will accelerate the refuge's ability to control and prevent the expansion of invasive species and other undesirable plants promoting not only suitable, but desirable habitat for wildlife species. Increasing the quality of habitat across the refuge would lead to increased wildlife use and abundance. This also will increase the refuge's ability to achieve CCP objectives as described above.

Wildlife exposure to pesticides needs to be considered at all times regardless of application methods. Wildlife can be exposed in a number of ways including direct spray and drift, direct exposure to contaminated water or vegetation, or ingestion of contaminated water, vegetation or prey animals. Direct spray contact of larger wildlife species is more likely to occur using aerial application given the faster application rate. Direct spray contact with larger wildlife species is less likely given the slower application rate while using ground equipment. However, the louder sound of certain aerial application equipment such as fixed-wing aircraft and helicopters may give wildlife advanced warning to move out of the area.

This alternative would result in the direct effect of wildlife disturbance during herbicide applications. Because aerial treatments can cover much larger treatment areas, they could result in more wildlife disturbances, however the disturbance duration would most likely be shorter as compared to ground application methods. Disturbance to wildlife and short-term displacement would likely occur during aerial application. Given that aerial application would allow for larger remote areas to be treated, potential exists for a higher number of wildlife species to be disturbed. The disturbance duration would most likely be shorter and less impact would be observed to soil and desirable vegetation due to the absence of tires or tracks from ground equipment. Timing of aerial applications within the target plant's susceptibility window could also be modified to reduce disturbance issues.

Under both alternatives, herbicide applications may be combined with non-herbicide methods such as prescribed fire which could have cumulative effects. Following combined treatments, a reduction in plant and invertebrate abundance and diversity could occur. Such reductions

would be localized but could alter the food and cover requirements for wildlife and result in displacement as organisms move to other areas on the refuge to locate necessary habitat requirements. Such cumulative effects are expected to be temporary, lasting no more than one year as the habitat recovers from unaffected perennial root stock, seed bank resources, and immigration from surrounding untreated sites. Cumulative impacts can be negated through timing of management options, amount, and location of treatments to minimize or eliminate the compounding influence of multiple management programs.

Maintaining the refuge's plant and structural diversity maintains its resilience to current and any future environmental stressors. This would directly affect the refuge's environmental health and would be a cumulative effect of continued herbicide use. Indirectly, maximizing habitat diversity on the refuge maximizes insect diversity including pollinators. Improved pollination directly benefits plants and increased insect diversity has trophic level, cumulative benefits. Continued herbicide use has the potential of contributing to herbicide resistance of target plants. This indirect effect can be minimized using herbicides with different modes of action and/or using tank mixes of different herbicides. The desired habitat diversity and structural conditions detailed above would be maximized under this alternative because invasive species and other undesirable vegetation would not be allowed to alter them.

Alternative B

Under Alternative B, only ground application of herbicides with truck, tractor, ATV/UTV, amphibious vehicle or hand sprayers would be allowed. Treatments would be primarily limited to the drier, smoother terrain portions of the refuge. Invasive and undesirable vegetation located in the inaccessible portions of the refuge would remain largely untreated and their populations would continue to expand across their respective habitats on the refuge. Cattail expansion would continue to eliminate open water habitat, reduce native plant communities and negatively impact wetland dependent wildlife species. Undesirable woody vegetation would continue to expand in both presence and size, outcompeting native grassland and wet meadow communities and altering the habitat suitability for resources of concern. Ultimately, desirable habitat would continue to be degraded, leading to a decline in wildlife use and abundance across the refuge.

Disturbance to wildlife and short-term displacement would occur while applying herbicide from the ground and traveling to and from application sites. Soil and desirable vegetation impacts could be observed on the ground from equipment tires or tracks. The disturbance would be temporary, lasting approximately the amount of time it would take for treatment application. Under most circumstances, ground applications will have a longer application timeframe and therefore have a greater disturbance impact, compared to aerial application.

Threatened and Endangered Species, and Other Special Status Species

Affected Environment

Description of Affected Environment for the Affected Resource

Currently there are one federally-listed endangered, one threatened, and one candidate species that may occur on the refuge:

- Northern Long-eared Bat (NLEB), *Myotis septentrionalis* (Federally Endangered- FE)
- Gray Wolf, *Canis lupis* (Federally Threatened - FT)
- Monarch Butterfly, *Danaus plexippus* (Federal Candidate - FC)

The action area proposed lies within the White-Nose Syndrome buffer zone identified on the Service website for the NLEB. The NLEB has not been documented within Agassiz NWR. There are also no documented maternity roost trees or hibernacula within Marshall County.

Gray wolves are habitat generalists and populations can thrive in any type of habitat as long as there is abundant prey and controlled human-caused mortality. There have been two documented wolf packs on the Refuge and adjacent WMAs. The first became established in 1981 and the second in 1994. The Refuge intends to maintain both documented wolf packs per the Habitat Management Plan, primarily by fostering habitat conditions favorable to Gray wolves preferred prey. The Minnesota population of Gray wolves was de-listed in 2020 and recently re-listed in February of 2022.

Monarch butterfly numbers have been declining across North America over the past two decades. An extensive status assessment was completed by the U.S. Fish and Wildlife Service in 2020 which determined that listing the monarch under the Endangered Species Act is warranted but precluded by work on higher-priority listing actions at that time. Widespread habitat loss and fragmentation is believed to be one of the contributing factors of the species decline. Monarchs rely on milkweed plant species as their obligate host plant to lay eggs on.

The bald eagle was removed from the endangered species list in 2007 (USFWS 2021). This species' recovery was largely the result of removal of the insecticide DDT from the environment and efforts to restore bald eagles to their former range. Illegal shooting of bald eagles led Congress to pass the Bald Eagle Protection Act in 1940, which prohibited killing, selling, or possessing the species. In 1962 the Act was amended to include the golden eagle, and the law became the Bald and Golden Eagle Protection Act. Although no longer included as a threatened or endangered species, the bald eagle maintains protection under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Bald eagles utilize the refuge seasonally. There are usually 2-5 active nests annually.

As noted above, this potential non-target effect has been analyzed (NEPA) as part of the labeling process for all herbicides and measures to minimize those effects, including restrictions, are listed on the product label. Common to both Alternatives, every approved

specimen label has gone through Section 7 consultation with the USFWS per the Environmental Protection Agency's (EPA) label approval process. Also as noted above, each pesticide application is individually reviewed and approved prior to treatment as part of the PUP approval process. This includes regionally approved BMPs. Because all label restrictions and regionally approved BMPs must be followed and because each herbicide application is reviewed and approved, the potential for indirect negative effects from herbicide application is mitigated to negligible levels under both alternatives.

Impacts on Affected Resource

Alternative A

Under Alternative A, herbicide application would continue to occur using aerial application equipment. With no known maternity roost trees or hibernacula in Marshall County, Northern Long-eared Bats may be effected but not likely to be adversely effected. No loss of habitat would occur.

The population of Gray Wolves within the refuge and surrounding area is healthy. Wolves use mostly forested habitats but may also be found in the open areas where we are applying chemicals within the refuge. Most chemicals are rain-fast in one hour, and reentry for humans is immediately once dry or up to 48 hours. The chemicals are not being applied to any food items that the wolves may eat or ingest. Although wolves may be in the areas where chemicals are being applied, no impacts are expected to a large mammal such as a wolf from these applications.

The Monarch Butterfly, is more of a generalist as milkweed plants can grow in multiple habitats. Aerial herbicide application would only be prescribed in situations where large monocultures of a target species exist. The minimal impacts to monarch butterflies are likely to be mediated by increased plant diversity and overall habitat quality improvements. Aerial spraying would allow for more acres of invasive and undesirable species to be controlled across the refuge leading to habitat more suitable for greater suite of species. Therefore, it is not anticipated for this species to be impacted by this action.

As noted above, this alternative would result in the direct short-term effects of wildlife disturbance (including listed species). The desired habitat diversity and structural conditions detailed above would be maximized for threatened and endangered species under this alternative because invasive species and other undesirable vegetation would not be allowed to alter those conditions. Following the National Bald Eagle Management Guidelines (USFWS 2007), aerial herbicide applications in the area surrounding bald eagle nests would only be made during the fall to not disrupt or otherwise disturb nesting eagles.

Alternative B

Under Alternative B, impacts for the Northern long-eared bat, Gray Wolf, and Monarch Butterfly would be comparable to the Alternative A above. When utilizing ground-based

application equipment, potential for unintentional damage exists for non-target plant species, such as milkweed species, which may be impacted either by herbicides, incidental take via equipment, or trampling of plants during application. This may further impact monarch butterflies. The minimal impacts to non-target species are likely to be mediated by increased plant diversity and overall habitat quality improvements. As noted above, both alternatives would result in the direct short-term effects of wildlife disturbance (including listed species).

Water Quality

Affected Environment

Description of Affected Environment for the Affected Resource

The glacial lake sediments and drift deposits of sand and gravel contain ground water in quantities sufficient for domestic and stock use. Local ground water is of good quality but is relatively hard and high in iron. Over much of the Refuge the depth to the water table is only 1 to 4 feet. This proximity to the surface has been favorable for pothole development, but conversely, makes building construction difficult and subsurface waste disposal impractical. The relative impermeability of Agassiz NWR's surface soils impedes recharge of even its more permeable aquifers.

The Red Lake River watershed in which Agassiz NWR sits drains into the northward-flowing Red River of the North. Approximately 624 square miles of drainage basin are upstream of Agassiz NWR's outlet. The largest contributing watershed is the Thief River basin, which drains about 256 square miles above the northern boundary of the Refuge. The Thief River drains Thief Lake, a large waterfowl marsh located four miles north of Agassiz NWR; this lake, in turn, is fed by the Moose River. The Mud River Judicial Ditch 11 system (299 square miles) drains from the east into the Refuge.

Flooding is one of the main issues affecting the Refuge – both its habitat and its facilities – as well as the neighboring region. Flooding also impacts relations between the Refuge and local property-owners and officials. Floods occur most often during March, April and May, when spring rains may combine with snowmelt to exceed channel capacity.

The Refuge includes 26 impoundments (known variously as lakes, or pools) and three small natural lakes. Whiskey and Kuriko Lakes are located in a designated Wilderness Area, and Webster Lake is in the northeast corner of the Refuge. The artificial impoundments vary from 30 acres to 9,000 acres in size. Water is maintained within the impoundments by an extensive network of dikes, and water levels can be raised or lowered in any given impoundment by adjusting water control structures at pool outlets. Agassiz NWR's impoundments with their marshes, mudflats, and open water are the dominant geographic features of the Refuge.

Impacts on Affected Resource

Alternative A

Under the Alternative A, the aerial application of herbicides will allow for the treatment of more habitat and will help mitigate the degradation that the invasive and undesirable plant species are causing. The reduction and prevention of further establishment of these species will result in an increase of habitat available for priority resources.

Negative impacts to water quality from herbicides are a concern. However, aerial herbicide applications would allow for areas to be treated more efficiently, which would result in less chemical used over time. Only herbicides approved for aquatic use and registered with the Environmental Protection Agency (EPA) and state will be prescribed and used for aerial application in aquatic environments.

Alternative B

Under the Alternative B, the treatment of hybrid cattails, undesirable woody species, and other invasive plant species would be limited, allowing populations to further expand along wetland edges and in the instance of cattail, form large dense mats. Large cattail invasions contain a significant amount of vegetative mass which alters the habitat and lowers the amount of water the wetlands can hold due to displacement. This reduces the capacity of the wetlands within the refuge, affecting not only the ability to capture water during spring snow melt and significant rain events, but also the amount of water available for aquatic plants and wildlife.

As mentioned in Alternative A, only herbicides approved for aquatic use and registered with the EPA and state will be prescribed.

Wilderness

Affected Environment

Description of Affected Environment for the Affected Resource

Public Law 94-557 designated 4,000 acres as the Agassiz Wilderness, to be managed as part of the National Wilderness Preservation System. "The Wilderness Act of 1964 (Public Law 88- 577) created additional purposes for Agassiz National Wildlife Refuge. Section 2(a) of the Wilderness Act states in part that '*... it is hereby declared to be the intent of Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness ...*' and designated wilderness areas are to be managed "*... for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness.*"

The wilderness is in the north-central portion of the refuge and is one of the most westerly extensions of black spruce-tamarack bog in Minnesota.

Impacts on Affected Resource

No impacts are expected under either alternative. The proposed action of herbicide application to manage invasive species will not take place in the Wilderness area of the refuge.

Visitor Use and Experience

Affected Environment

Description of Affected Environment for the Affected Resource

Agassiz NWR is open to wildlife observation, photography, hunting, and environmental education and interpretation. Currently, wildlife observation and photography occurs within designated areas of the refuge. Opportunities are also available along perimeter and interior public roads. Special Use Permits are required for any use off the gravel roads. Both uses are conducted along the 4-mile auto tour route (Wildlife Drive) which is open May through mid-October. No forms of boating (motorized or non-motorized), snowmobiles, or all-terrain vehicles are allowed within the refuge for this use. The refuge has three foot-trails (Headquarters 0.5-mile, Rodahl 1.5-mile and Maakstad 0.25-mile) open to the public. These trails are open year-round from sunrise to sunset, except for management purposes such as maintenance or unusual or critical conditions affecting land, water, vegetation, wildlife populations or public safety.

Environmental education and interpretation are carried out within the headquarters, visitor center and outdoors throughout the refuge on designated roads, trails, overlooks and visitor contact facilities. Deer hunting and upland game bird hunting occur on the entire refuge excluding closed areas around the headquarters and maintenance facilities. The youth waterfowl hunt is confined to the Farmes Pool Unit, which is south of Marshall County Road 7 and encompasses approximately 4,220 acres. The refuge estimates public use via the Refuge Annual Performance Plan report. Based on those data, Agassiz NWR typically has around 15,000 annual public use visits.

Impacts on Affected Resource

Alternative A and Alternative B

The majority of the refuge is closed to the public during the time frame most herbicide applications would take place. Some areas that may be treated either by ground or aerial application are open to public use including hunting, wildlife observation and photography, and environmental education and interpretation. Public contact with herbicides would most likely occur from direct contact with the spray or drift or contact with treated plants. Public areas would be closed 24 hours prior to treatment and remained closed after treatment to eliminate exposure to the herbicide. Re-entry times indicated on the chemical label would be posted on temporary signage. The application of herbicides typically occurs during a weekday and outside

of peak public use periods, thereby further limiting the potential exposure to the public. Herbicide application closures have not impacted visitation in the past and are not expected to change visitation rates in the future.

Wildlife viewing areas open to the public, such as along the auto tour route or public roadways have become obstructed in areas with dense cattails and undesirable woody vegetation. Cattails have reduced open water areas obstructing spots to few wetland dependent birds and other wildlife species. Woody vegetation in grasslands and other open areas has also become very dense in areas eliminating wildlife viewing opportunities. Aerial herbicide treatment will allow for more areas to be treated creating more opportunities for the public to view wildlife.

Monitoring

Agassiz NWR will monitor the effects and success of aerial application of herbicides on the target plant species and the habitats that are being targeted for restoration or enhancement. The USFWS, Midwest Region, requires all herbicide applications are recorded via the R3 Management Actions Chemical Plant Map. The recorded information includes the treatment area and amount of applied herbicide. The refuge monitors vegetation response to herbicides with visual observations. Aerial imagery analysis will be conducted for consecutive years after aerially spraying has occurred to observe changes in treated species densities and occurrence. Other monitoring may include but is not limited to photo point surveys, vegetation plots, and visual anecdotal evidence of changes in habitat conditions and wildlife use patterns. Adaptive management strategies will continue to be used, which require monitoring effects of actions taken and their outcomes to move forward with the best possible habitat management approaches.

Summary of Analysis

Alternative A – Continued use of Aerial Application Equipment

Under Alternative A, aerial herbicide application would continue to be used as another tool to control and prevent the spread of invasive, non-native, and undesirable vegetation. This alternative provides flexibility in selecting the appropriate application method and timing for the safest and most effective herbicide treatment. Timing of herbicide applications would typically take place when target plants are most susceptible to herbicide control. In addition to ground and aerial herbicide application, the refuge would continue with an integrated management approach using other mechanical methods, prescribed fire, and water level management, when feasible. Given the challenges in managing a heavily altered landscape, herbicide application is needed to effectively reduce populations of invasive species.

One of the main concerns for environmental impact under both alternatives is the application of herbicides and their associated risks. Several measures are in place to mitigate the negative

impacts of herbicides. The Federal Insecticide, Fungicide, and Rodenticide Act requires all herbicides to have specimen labels. The Environmental Protection Agency's label registration process includes NEPA review and Endangered Species Act consultation. All herbicides applied are certified and have an approved product label by the EPA. Herbicides are regulated both by the federal government and individual states to ensure that unreasonable risks to human health or the environment are not present. Pesticide use on Service lands requires an individual Pesticide Use Proposal (PUP) for each chemical, which specifies the target pest(s), the method of application and the timing and location of application. These PUPs can be approved (or disapproved) at the Refuge, Regional, or National level, depending on the pesticide being proposed, method of application, and site conditions. Additionally, Best Management Practices are followed during the chemical application and the application is part of an overarching pest management framework, where multiple management actions are used together to reduce and eliminate populations of invasive species.

Impacts to habitat and wildlife species would have a net positive impact with increased habitat diversity, quality, and resilience. Threatened and endangered species may see short-term direct disturbance but would overall be benefited from increased habitat quality. Water quality impacts from herbicide application are always a concern, but only approved aquatic pesticides will be used according to product labels mitigating significant negative impacts. The designated wilderness area will not be impacted because no aerial herbicide application will take place within the wilderness. Visitor use and experience would be minimally impacted because most herbicide applications would occur out of public use areas. When herbicide application must occur within the public use area of the refuge, applications can be mostly achieved when those areas are closed for public use. Refuge visitor exposure to herbicides would be avoided by following restricted entry interval detailed on the product labels.

Aerial herbicide application on select lands within the refuge is more efficient in both effectiveness and associated costs than ground applications. This would ultimately facilitate the treatment of larger areas on an annual basis, resulting in accelerated invasive species control across the refuge. This alternative fulfills the Service's mandate under the NWRSA, BIDEH policy and the Integrated Pest Management policy. This alternative also fulfills Agassiz NWR's purpose and mission and the mission of the NWRS and the purpose and need of this environmental assessment.

Alternative B – No Aerial Spraying

Under Alternative B, only ground application of herbicide would be allowed on the refuge for the control of invasive, non-native, and undesirable vegetation. The total habitat treated under this alternative would remain small given the difficult terrain, remote locations, size, and other limiting factors. Costs per acre are also significantly more when compared to the efficiency of aerial application methods. Invasive cattails, undesirable woody vegetation, and other invasive species populations will continue to expand and will likely move to other areas of the refuge. As

a result, more open wetland and grassland habitat will be lost, resulting in the displacement of both wildlife and native plant communities and the purpose and need for action would not be met. The refuge would not be able to meet its management goals and objectives.

List of Sources, Agencies and Persons Consulted

List of Preparers

James Graham, Refuge Manager

Cody Okeson, Assistant Refuge Manager

State Coordination

This Environmental Assessment will be provided to the MN Department of Natural Resources, Thief River Falls area office, for comment. Any comments, concerns, suggestions, or other feedback will be included if substantive response is required.

Tribal Consultation

Tribes and tribal members are welcome to provide comment during the public comment period. This Environmental Assessment will be provided to the Red Lake Band of Chippewa. Any comments, concerns, suggestions, or other feedback will be included if substantive response is required.

Public Outreach

This draft Environmental Assessment will be available for public review and comment for 20 days from June 30, 2023 to July 20, 2023. The document will be available at the refuge office 22996 290th Street, Middle River, MN 56737, and available from the refuge website <https://www.fws.gov/refuge/agassiz>. Copies can also be requested via phone at 218-449-4115. Comments can be submitted in person or via mail to 22996 290th Street, Middle River, MN 56737. Any comments, concerns, suggestions, or other feedback will be included if substantive response is required.

References

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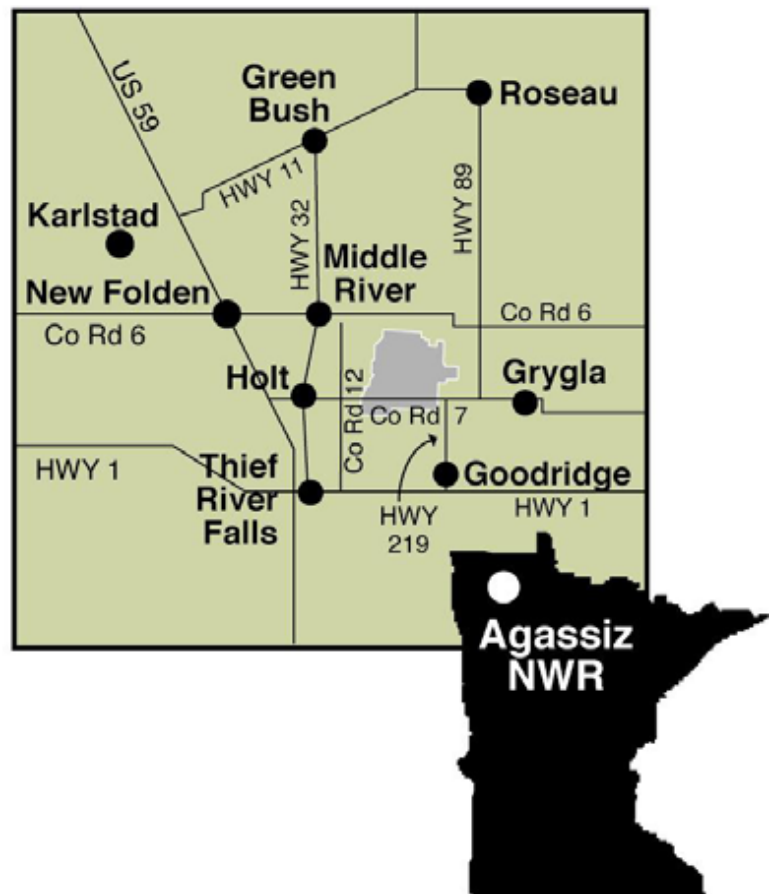
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U.S. Fish and Wildlife Service. 2007. Agassiz NWR Habitat Management Plan. <https://ecos.fws.gov/ServCat/DownloadFile/16001>

Figure 1. Location of Agassiz NWR

Agassiz NWR is located in Marshall County, in northwestern Minnesota, about 25 miles northeast of Thief River Falls along Marshall County Road 7 (22996 290th St. NE, Middle River, MN 56737).



Appendix A -

This Appendix lists all applicable statutes, regulations, and executive orders not otherwise addressed specifically within the “Affected Environment and Environmental Consequences” section of this environmental assessment, as well as how the proposed action and environmental assessment analysis comply with each and any additional compliance steps taken by FWS.

Fish and Wildlife

- Bald and Golden Eagle Protection Act, as amended, 16 U.S.C. 668-668c, 50 CFR 22
- Endangered Species Act of 1973, as amended, 16 U.S.C. 1531-1544; 36 CFR Part 13; 50 CFR Parts 10, 17, 23, 81, 217, 222, 225, 402, and 450
- Fish and Wildlife Act of 1956, 16 U.S.C. 742 a-m
- Migratory Bird Treaty Act, as amended, 16 U.S.C. 703-712; 50 CFR Parts 10, 12, 20, and 21
- Executive Order 13186-Responsibilities of Federal Agencies to Protect Migratory Birds, 66 Fed. Reg. 3853 (2001).

Impacts to threatened and endangered species that may occur on the refuge is described in detail on pages 16-18 of this environmental assessment. An ESA Section 7, Intra-Service Consultation analyzing the potential effects of herbicide applications, by either ground application equipment, or aerial application equipment has been submitted to the local Ecological Services Field Station for concurrence. The language of potential effects on threatened and endangered species in this Environmental Assessment are the same determination of effects in the herbicide application ESA Section 7 consultation. This analysis and Section 7 consultation meets requirements under the Endangered Species Act.

Impacts to wildlife and aquatic species under the Preferred Alternative is described in detail on pages 13-16 of this environmental assessment. As indicated in the Preferred Alternative section of this document (pages 7-8), Federal law requires all herbicide applications follow product label restrictions to minimize the potential contamination of air, soil, and water and effects on non-target organisms. Service policy also requires review and approval of a Pesticide Use Proposal (PUP) prior to the application of any herbicide. These PUP’s must consider potential impacts to protected resources and environmental quality and implement mitigation measures such as restricting timing of application to assure no take of migratory birds or eagles and ensure compliance with the Gold and Bald Eagle Protection Act and the Migratory Bird Treaty Act. The approval of PUP’s ensures compliance with the laws and Executive orders listed above not specifically mentioned in this more detailed description.

Cultural Resources

- Archaeological Resources Protection Act of 1979, 16 U.S.C. 470aa-470mm; 18 CFR Part 1312; 32 CFR Part 229; 36 CFR Part 296; 43 CFR Part 7
- National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470-470x-6; 36 CFR Parts 60, 63, 78, 79, 800, 801, and 810

The only physical disturbance to the ground would occur using specialty tracked equipment when conducting ground applications or traveling through areas with hydric soil, are frequently wet, or are seasonally flooded. If a known or suspected cultural site is in the application area and ground disturbance could occur, the Regional Historic Preservation Office will be contacted for a determination for specific application projects. This will ensure compliance with the Archaeological Resources Protection Act and National Historic Preservation Act. No ground applications with tracked equipment will occur in areas with known cultural resources to avoid any adverse effects. It is determined there would be no adverse effects to cultural resources given the site-specific compliance that will take place if cultural resources are present in the application area.

Natural Resources

- Clean Water Act, as amended, 33 U.S.C. §1251 et seq.
- Clean Air Act, as amended, 42 U.S.C. 7401-7671q; 40 CFR Parts 23, 50, 51, 52, 58, 60, 61, 82, and 93; 48 CFR Part 23
- Wetlands Protection Executive Order 11990
- Floodplain Management Executive Order 11988

The Clean Air Act does not apply to this action as emissions of hazardous air pollutants will not occur. Air quality will not be affected by this action.

Clean Water Act compliance will be adhered to when applicable. Point source discharges of biological pesticides and chemical pesticides that leave a residue in waters of the U.S. are required to comply with National Pollutant Discharge Elimination System (NPDES) requirements. EPA and the states issue Pesticide General Permits (PGPs) under the NPDES program to offer coverage for pesticide operators. Thresholds provided by the MN Pollution Control Agency to determine NPDES permit requirements will be referred to as required. As indicated in the Preferred Alternative section of this document (pages 7-8), Federal law requires all herbicide applications follow product label restrictions to minimize the potential contamination of air, soil, and water and effects on non-target organisms. Service policy also requires review and approval of a Pesticide Use Proposal (PUP) prior to the application of any herbicide. These PUP's must consider potential impacts to protected resources and environmental quality. The approval of PUP's ensures compliance with the laws and Executive orders listed above.

The executive orders for wetland and floodplain management do not apply to this action as there will not be adverse effects to floodplains or wetlands and no loss or degradation of wetlands.

Socioeconomics and Environmental Justice

- Environmental Justice Executive Order 12898

Executive Order 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” was signed by President Clinton on February 11, 1994. Its purpose was to focus the attention of federal agencies on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income community’s access to public information and participation in matters relating to human health or the environment. The preferred alternative described above is not expected to impact minority and low-income populations.

Given the refuge lies in a rural area of the state, the primary economic mainstay is agriculture. No socioeconomic impacts are expected. As indicated in the Preferred Alternative section of this document (pages 7-8), Federal law requires all herbicide applications follow product label restrictions to minimize the potential contamination of air, soil, and water and effects on non-target organisms. Service policy also requires review and approval of a Pesticide Use Proposal (PUP) prior to the application of any herbicide. These PUP’s must consider potential impacts to protected resources and environmental quality. The approval of PUP’s ensures compliance with the laws and Executive orders listed above. Also, as discussed on pages 7-8. The USFWS’s Integrated Pest Management (IPM) Policy (569 FW 1) is in effect to minimize any potential health, environmental, and economic risks.