

Draft Environmental Assessment

Restoration of Ike's Creek in Bloomington, Minnesota
2025-0002202-NEPA-001

October 2024

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Prepared by Minnesota Valley National Wildlife Refuge



U.S. Department of the Interior
U.S. Fish and Wildlife Service
Region 3 (Midwest Region)
Minnesota Valley National Wildlife Refuge
Bloomington, Minnesota

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Executive Summary

This environmental assessment evaluates one action alternative and a no action alternative. The proposed action would restore the geomorphology to enhance habitat for brook trout (*Salvelinus fontinalis*) and improve water quality on a stream locally known as Ike's Creek in Bloomington, Minnesota. Ike's Creek is a small groundwater-fed stream that runs from City of Bloomington property near the Mall of America, through private property and onto Minnesota Valley National Wildlife Refuge (Figure 1, Appendix B). The proposed action would remove an old culvert and water control structure that currently limit fish passage, suitable brook trout habitat and the natural streamflow needed to flush sediment and debris from the stream. Ravines would also be stabilized to reduce sedimentation caused by erosion. The no action alternative would keep the stream in its present condition, allowing erosion and sedimentation to continue, causing stream overflow. This would continue to impact trails, infrastructure and fish movement. The proposed project would improve habitat, reduce sedimentation, keep water within the stream channel and allow the fish to utilize the entire length of the stream.

This environmental assessment examines the potential environmental impacts associated with the proposed action and complies with the National Environmental Policy Act, or NEPA, in accordance with the Council on Environmental Quality NEPA regulations (40 Code of Federal Regulations, or CFR, 1500-1508), the Department of the Interior NEPA regulations (43 CFR 46; 516 Department Manual, or DM 8), U.S. Fish and Wildlife Service policies (550 Service manual, or FW 3) and other relevant regulations and requirements. NEPA requires examination of the effects of proposed actions on the natural and human environment.

The following resources were analyzed in the environmental assessment: natural resources, cultural and historic resources, socioeconomics and refuge resources (see Chapter 4 for more information). The U.S. Fish and Wildlife Service initially considered several other resources, but they were ultimately dismissed from further analysis because neither the proposed action nor the no action alternative have the potential to result in measurable impacts to these resources.

The draft environmental assessment is available for public review and comment from **October 8 to November 6, 2024**. Public comments and agency responses will be summarized and available in Appendix C of this environmental assessment.

Chapter 1: Introduction

1.1 Background

National Wildlife Refuges are guided by the mission and goals of the National Wildlife Refuge System, the purposes of an individual refuge, Federal laws and executive orders, U.S. Fish and Wildlife Service policy and international treaties. Relevant guidance includes but is not limited to the National Wildlife Refuge Administration Act of

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1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 United States Code [U.S.C.] 668dd et seq.), the Refuge Recreation act of 1962 and selected portions of the Code of Federal Regulations and the U.S. Fish and Wildlife Service manual. See Appendix A for Applicable Statues and Executive Orders.

The mission of the National Wildlife Refuge System, as outlined by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd), 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.”

The National Wildlife Refuge System Improvement Act of 1997 directs the Secretary of the Department of the Interior to ensure that refuges are fulfilling the intended mission of the refuge system and the purposes of individual refuges (16 U.S.C. 668dd(5)(a)(3)(A-M)).

Minnesota Valley National Wildlife Refuge was established pursuant to the Minnesota Valley National Wildlife Refuge Act of 1976 (16 U.S.C. 668kk). The primary purposes of the refuge “are to (1) provide habitat for a large number of migratory waterfowl, fish and other wildlife species; (2) provide environmental education, wildlife recreational opportunities and interpretive programs for hundreds of thousands of Twin City residents; (3) protect important natural resource areas from degradation; and (4) protect the valley’s unique social, educational and environmental assets.”

The Secretary shall develop and administer...the refuge, in accordance with the National wildlife Refuge System Act...The Secretary may also exercise any other authority available for the conservation and management of wildlife and natural resources, the development of wildlife recreational opportunities wildlife interpretation, and environmental education, to the extent deemed to be appropriate...The Secretary shall construct, administer, and maintain, ...a wildlife interpretation and education center. ...to promote environmental education and to provide an opportunity for the study and enjoyment of wildlife in its natural habitat. (Minnesota Valley National Wildlife Refuge [Public Law No. 94-466, 94th Congress 1976 and 1986 Amendment expansion for refuge]).

The refuge will place “... particular value in carrying out the national migratory bird management program (16 U.S.C. 667b (An Act Authorizing the Transfer of Certain Real Property for Wildlife, or other purposes)).

The refuge will be used “...for the development, advancement, management, conservation and protection of fish and wildlife resources...” (16 U.S.C 742f(a)(4)).

The refuge will be managed “...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to

the terms of any restrictive or affirmative covenant, or condition of servitude..." (16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)).

This project would meet the goals and objectives mentioned in the refuge's habitat management plan for creeks and small rivers. With the help of partners, these goals would reduce sedimentation, protect water quality, reduce the effects of stream flows from watersheds and improve hydrologic connection between streams and the floodplain. Specifically, the habitat management plan mentions maintaining low temperatures and high oxygenated water to support a brook trout population in Ike's Creek (U.S. Fish and Wildlife Service, 2018a).

The Lower Minnesota River Watershed District identified the stream and surrounding environment as a High Value Resource Area in their Watershed Management Plan (Lower Minnesota River Watershed District, 2022). It has also been ranked as an area of moderate biodiversity significance by the Minnesota Biological Survey (Minnesota Biological Survey, 2014). Additionally, the City of Bloomington has committed to enforcing current regulations to minimize impacts from development on the stream and bluff habitat in their 2022 Alternative Urban Areawide Review, as the portion of Ike's Creek on City of Bloomington property is part of Forest Glen Park (City of Bloomington, 2022).

1.2 Proposed Action

The U.S. Fish and Wildlife Service proposes restoring the geomorphology of a stream locally known as Ike's Creek in Bloomington, Minnesota that has been altered by impacts from development and the addition of infrastructure to manage water (Figure 1, Appendix B). A water control structure was previously constructed 0.2 miles upstream of Long Meadow Lake to provide a water source for fish rearing, serving as a barrier to fish movement (Figure 3, Appendix B). A culvert was also put in place underneath a trail crossing, which often clogs with sediment, creating backwater conditions upstream. This culvert restricts water flow and impedes the upstream migration of brook trout and other aquatic life (Figure 4, Appendix B). A large ravine upstream of the culvert and water control structure is eroding and loading sediments into the stream (Figure 5, Appendix B). The proposed action would encompass all restoration activities including removal of the water control structure and existing culvert, erosion control and any other activities recommended to improve stream habitat.

This environmental assessment evaluates the restoration of Ike's Creek as it relates to the ability to fulfill the missions of the refuge and the U.S. Fish and Wildlife Service. The proposed project will be evaluated relative to the refuge's purposes; biological integrity, diversity and environmental health; and implications of future maintenance costs.

A proposed action is an initial proposal and may evolve during the development of alternatives, the impact analysis and public involvement. This environmental assessment may determine that there are other, better or less impactful ways to address the purpose and need and may become the preferred alternative. The

proposed action and alternatives may change 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 differ from the originally identified preferred alternative and will be finalized at the conclusion of the public comment period after incorporating substantive comments. A decision to implement a proposed action will not be made until the environmental review process is complete.

1.3 Purpose and Need for Action

The proposed action aims to improve brook trout habitat by restoring the geomorphology of Ike's Creek in Bloomington, Minnesota. This proposal would fulfill the refuge's establishing purpose by providing fish habitat, protecting unique environmental assets and natural resources from degradation and providing wildlife recreational opportunities to residents of the Twin City area (Minnesota Valley National Wildlife Refuge Act of 1976 (16 U.S.C. 668kk)). Improving brook trout habitat in Ike's Creek would meet objective 4.2.2. Creeks and Small Rivers in the refuge's habitat management plan to, with the help of partners, protect, enhance and maintain at least 4 miles of streams and waterways on the refuge and adjacent lands over the next 15 years (U.S. Fish and Wildlife Service, 2018a). The refuge would conduct habitat management to maintain Ike's Creek classification as a coldwater stream and provide suitable oxygen levels to support the presence of brook trout species (U.S. Fish and Wildlife Service, 2018a).

Ike's Creek, partially located in the Long Meadow Lake management unit, is one of the refuge's coldwater streams and provides a unique resource in an intensely developed landscape (Figure 1, Appendix B). It is the only stream containing trout in Hennepin County and one of a few that supports brook trout in the Twin Cities metropolitan area (Berg et al., 2019). The Lower Minnesota River Watershed District has identified the stream and surrounding environment as a high value resource area in their Watershed Management Plan giving it protection standards and management goals related to the understanding, preservation, protection and restoration of this unique resource (Lower Minnesota River Watershed District, 2022). Additionally, the City of Bloomington has zoned the land immediately adjacent to Ike's Creek for conservation and has committed to minimizing impacts from development on the stream and bluff habitat (City of Bloomington, 2022).

Records indicate that Ike's Creek historically supported native brook trout (Niskanen, 2007). However, population studies conducted in 2006 found no brook trout present in the stream. In 2007, in partnership with the Minnesota Department of Natural Resources and Trout Unlimited, Minnesota wild strain brook trout were reintroduced into Ike's Creek (U.S. Fish and Wildlife Service, 2018a). The stream currently has favorable conditions, including a stable supply of cold water, high oxygen concentrations, shade and substrate type needed for spawning to occur (Berg et al., 2019; U.S. Fish and Wildlife Service, 2018a). A 2022 study identified that Ike's Creek also met the criteria for

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summer and overwintering habitat for brook trout, primarily based on water temperature and dissolved oxygen concentrations (Young Environmental Consulting Group, LLC, 2022). Based on current abundance estimates from the Minnesota Department of Natural Resources, the 2007 stocked brook trout are maintaining a naturally reproducing population (M. Nemeth, personal communication, December 13, 2023). Although sampling data show the brook trout population is doing well, evidence suggests that additional management actions may be needed to prevent future population declines (Young Environmental Consulting Group, LLC, 2022; U.S. Fish and Wildlife Service, 2018a). The refuge's habitat management plan classified brook trout as a priority resource of concern (U.S. Fish and Wildlife Service, 2018a).

Brook trout can be particularly susceptible to habitat changes because they require high quality habitat for all life history stages. Based on a 2019 survey conducted by the Lower Minnesota River Watershed District, Ike's Creek exhibited signs of instability, degradation, bank erosion and channelization throughout its length. Several in-stream stressors were also observed, including fallen logs and other debris deflecting flow, steep banks with non-cohesive soil and vertical valley walls (Berg et al., 2019). In addition, the existing water control structure and culvert on the stream constrict water flow, collect debris, create barriers to fish passage, force the stream to overflow and limit its natural ability to flush out sediment and debris. All of these characteristics contribute to increased erosion and decreased water quality, and negatively impact suitable brook trout habitat downstream and impede fish movement between spawning and foraging areas (Roni et al., 2002; U.S. Fish and Wildlife Service, 2018a).

As Ike's Creek flows downstream from its headwaters near Old Shakopee Road, infrastructure within the watershed and channel impacts the hydrology of the stream both directly and indirectly. Such infrastructure includes ponds, berms, the water control structure, culverts, drainage ditches, silt fencing, coir logs, a bridge, a stormwater sewer, parking lots and a network of trails. Pressures from urban development such as encroachment, increased stormwater rate, runoff volume and nonpoint pollution transport further exacerbate the declining condition of Ike's Creek and negatively impact brook trout habitat (Berg et al., 2019). The high density of impermeable surfaces and commercial developments increase the amount of runoff entering the stream after a storm event resulting in more erosion and bank instability (Berg et al., 2019). If habitat degradation continues at its current rate, there is increasing concern that Ike's Creek may not support a viable brook trout population in the future (Berg et al., 2019).

In 2012, the existing water control structure was modified, adjacent riparian areas were planted with native vegetation and channel habitat was improved. The improved channel utilized coir logs used as grade control and bank stabilization structures. Since installation, the structures have required regular maintenance. Part of the proposed project would include replacing these structures with a low maintenance solution.

Chapter 2: Involvement, Coordination and Consultation

2.1 Public Involvement

This draft environmental assessment will be made available for public review and comment for 30 days from **October 8 to November 6, 2024**. Members of the public will be notified of the availability of the draft document through the refuge website and Facebook page, letters to potentially interested people such as adjacent landowners and other media outlets. The draft document will be made available at the Minnesota Valley National Wildlife Refuge Bloomington Education and Visitor Center (3815 American Blvd E, Bloomington, MN 55425) and can be downloaded from the refuge website ([click here for website link](#)). For access to the document in an alternative format reviewers should contact the refuge. Submit comments in writing via email or by mail to the refuge by the end of the public comment period. Any comments, concerns, suggestions or other feedback will be incorporated into the final environmental assessment if a substantive response is required.

Entire comments, including personal identifying information (e.g., address, phone number, email or other information) could be made publicly available. Requests to remove this information will be accommodated to the extent practicable, but their withholding cannot be guaranteed.

2.2 State Coordination

The refuge has been coordinating all activities related to Ike's Creek with the Minnesota Department of Natural Resources since 2006. This includes collaborating on biennial fish population assessments and minor stream habitat improvements and repairs. They are also an active partner in the development of the restoration design.

2.3 Tribal Consultation

A draft of the environmental assessment and maps of the proposed work area will be shared with federally recognized Native American Tribes in advance of the public comment period. Initial consultation occurred with the Shakopee Mdewakanton Sioux Community, local to the proposed project area and a site visit was set up to begin identifying cultural resource concerns. An invitation was also extended to Tribal Historic Preservation Officers from other Tribal Communities. Additional communication, meetings and formal consultation will occur as necessary to ensure adequate involvement.

Chapter 3: Alternatives

3.1 Decision Framework

The Assistant Regional Director, National Wildlife Refuge System, Midwest Region of the U.S Fish and Wildlife Service, will make two decisions based on this environmental assessment once the review process is complete. They will: (1) select an alternative for

the refuge, and (2) determine if the selected alternative is a major Federal action that would significantly affect the quality of the human and/or natural environment, and therefore, require the preparation of an environmental impact statement. Minnesota Valley National Wildlife Refuge recommends Alternative B: restoration of Ike's Creek to the Assistant Regional Director, National Refuge System.

3.2 Alternatives

Alternative A – Continuation of Current Management - No Action Alternative

Under the no action alternative restoration of Ike's Creek would not occur. No direct actions would be taken to alter the stream's geomorphology to reduce erosion, improve bank stability, limit channelization or remove constriction points from the entire length of stream, including refuge, City of Bloomington and private property. The City of Bloomington has identified Ike's Creek as a priority for resource management and would continue to remove invasive species on their property (City of Bloomington, 2018).

Habitat management including invasive species control, water level management of adjacent wetlands and where appropriate, restoration of wetland and floodplain forest would continue at existing levels as outlined in the refuge's habitat management plan (U.S. Fish and Wildlife Service, 2018a). The existing water control structure, culvert, ravine and trail crossing would remain in their current condition. No changes would occur to current operations and maintenance. Routine maintenance of removing hazard trees, fixing trails after flood events and minor stream repairs by refuge staff would continue.

Alternative B – Restoration of Ike's Creek - Preferred Alternative

The preferred alternative would be to restore the geomorphology of Ike's Creek and improve habitat for brook trout and other aquatic organisms within a 38-acre area (Figure 1, Appendix B). This would be accomplished by removing the water control structure and culvert, which are fish passage barriers, controlling ravine erosion and improving stream channel geomorphology and habitat.

Since the lower portion of Ike's Creek has been heavily manipulated, restoration would be needed to reconstruct the channel and remove the infrastructure impeding fish movement. The water control structure (Figure 3, Appendix B), culvert (Figure 4, Appendix B), walls and pipes would be removed. A trail crossing would be maintained for visitors and staff, while providing fish passage and hydrologic and ecological connectivity.

To improve stream channel geomorphology and wildlife habitat, the lower valley bottom would be regraded and rebuilt. The stream would be diverted temporarily to protect brook trout during construction. The newly constructed stream channel would incorporate natural material to create steps and pool habitat for brook trout while optimizing sediment movement through the system. Adding pools and riffle areas would

increase fish habitat and oxygen levels on the stream's lower reaches. Channel bed material would include a mixture of imported gravel, cobble and salvaged fill from onsite.

Ravine stabilization would occur as ravines surrounding Ike's Creek are loading sediment into the stream (Figure 5, Appendix B). The initial phase of the proposed project would be to install check dams on refuge property to reduce sediment inputs from the large ravine into the stream. Future plans would include bringing eroded material from deposition areas back into the ravine to raise the channel bed. The ravine would then be lined with stone and gravel to stabilize the channel, and eventually revegetated.

To accomplish restoration, techniques to replicate natural in-stream structures and provide suitable brook trout habitat would include fabric encapsulated soil lifts, large wood installations, habitat boulders and gravel riffle augmentation using construction equipment such as bulldozers, haul trucks and excavators.

Under this alternative, phase 1 of construction would begin in 2025 and include erosion control measures, habitat improvements and removal of the culvert and water control structure. Total construction time during this phase would be expected to last up to 8 weeks. Additional phases would be completed as funding and resources become available. This environmental assessment includes all phases.

Chapter 4: Affected Environment and Environmental Consequences

This section is organized by affected resource categories. Each affected resource discusses both (1) the existing environmental and socioeconomic baseline in the action area and (2) the effects and impacts of the alternatives on each resource. Effects and impacts from the proposed action or alternatives are changes to the human environment, whether adverse or beneficial, that are reasonably foreseeable (40 CFR 1508.1(g)). The impact analysis directly follows the affected environment description for a resource and is organized by alternative.

The impact analysis will evaluate a variety of criteria, as defined below, to describe the context and intensity of impacts on affected resources. The Council on Environmental Quality does not require the use of these terms; however, they are commonly used in NEPA documents and will be referenced in the subsequent sections.

Impact analysis criteria and terminology:

- Adverse effects: negative or detrimental effect to the resource (40 CFR 1501.3)
- Beneficial effects: positive effect to the resource (40 CFR 1501.3)
- Cumulative effects: effects on the environment resulting from the incremental effects of the action when added to other past, present and reasonably foreseeable actions regardless of what agency (e.g., federal or non-federal) or person undertakes the action (40 CFR 1508.1(g))

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- Direct effects: caused by the action and occur at the same time and place (40 CFR 1508.1(g))
- Indirect effects: incidentally caused by the action and are often later in time or farther in distance but are still reasonably foreseeable (40 CFR 1508.1(g))
- Irreversible: unable to be undone or altered
- Irrecoverable: unable to regain, recover or repair
- Less than significant: effects are detectable but localized, minor and short-term
- Major: effects are significant, readily detectable and would cause a substantive decline or increase in the resource
- Minor: effects are detectable but insignificant and would not affect the population or resource on a large-scale
- Moderate: effects are negligible, readily detectable and may have some temporary effects to the population or resources on a large-scale but would not cause a substantive decline or increase in the resource
- Negligible: resource is slightly affected but the impact is so minimal that effects are not detectable or may not be observable
- No effect: resource would not be affected and there are no impacts
- Short-term effects: occurring in or relating to a relatively short period of time (40 CFR 1501.3)
- Significant: effects are readily detectable and obvious, localized or regional, major and long-term
- Long-term effects: occurring in or relating to a relatively long period of time (40 CFR 1501.3)
- Unavoidable: unable to be prevented or ignored; inevitable

Impacts that are speculative (i.e., there is a remote possibility that the impact would occur, but no meaningful information exists on which to base a prediction) or indefinite were not included (43 CFR 46.30). If a resource is not expected to be affected, a brief justification is provided as to why it was dismissed.

Impacts to air quality, soundscapes and land use would be negligible and have been excluded from further analysis. Although use of heavy equipment, gas-powered tools and vehicle exhaust during stream restoration activities under Alternative B could cause a temporary increase in emissions and noise, these impacts would be negligible considering the highly developed landscape surrounding Ike's Creek. Due to its location in a large metropolitan area, vehicle and airplane traffic and road and building construction contribute to local atmospheric emissions and are part of the daily soundscape surrounding Ike's Creek. Equipment use during construction would not add significant or cumulative impacts compared to what is already occurring in adjacent areas.

The land use in the immediate area is recreational, surrounded by urban development and is not expected to change under either alternative. For example, the Minneapolis –

St. Paul International airport, Mall of America, highways and interstates and commercial and residential buildings occur within 2 miles or less of Ike's Creek.

The refuge does not have any designated wilderness areas per the Wilderness Act, 16 U.S.C. 1131 et seq. nor does the refuge have any waterways that fall under the Wild and Scenic Rivers Act, 16 U.S.C. 1271 et seq. Given this, these have been excluded from further analysis.

4.1 General Description of Affected Environment Applicable to All Resources.

Ike's Creek spans more than 3,500 feet from its headwaters on City of Bloomington property near the Mall of America, briefly through private property and onto Minnesota Valley National Wildlife Refuge, where it outlets in Long Meadow Lake, a connected backwater of the Minnesota River (Figure 1, Appendix B). Streamflow in Ike's Creek is fed by groundwater springs located throughout the stream length. Steep valley side slopes (with grades of 12% or greater) connect the upland and lowland watershed areas.

The refuge is part of a corridor of land and water stretching nearly 70 miles along the Minnesota River, from Bloomington to Henderson, Minnesota. The authorized boundary of the refuge encompasses approximately 26,018 acres (calculated using geographic information system mapping), with approximately 13,159 acres currently owned by the refuge in fee title or by the Minnesota Valley Trust, or trust. The trust is a non-profit organization that supports the refuge in their mission for habitat restoration, land acquisition and improving opportunities for the public to connect with wildlife and nature. The trust assists the refuge with grant administration and oversight of restoration projects.

The refuge consists of 13 management units in seven counties (Carver, Dakota, Hennepin, Le Sueur, Ramsey, Scott and Sibley), offering a variety of free outdoor recreational experiences for individuals and families (U.S. Fish and Wildlife Service, 2018a). The refuge ranges from urban to rural, providing a unique opportunity to enjoy wildlife-related recreation in the shadows of skyscrapers and grain elevators. The refuge is part of the Mississippi Headwaters/Tallgrass Prairie Ecosystem as currently defined by the U.S. Fish and Wildlife Service in the refuge's habitat management plan (U.S. Fish and Wildlife Service, 2018a). The refuge provides valuable habitat for a diversity of waterfowl and other migratory birds, fish and resident wildlife.

The refuge's Long Meadow Lake Unit is 2,411 acres in size and consists of floodplain forest, a large emergent marsh, spring-fed streams, deep water fishing ponds and oak savanna (Figure 2, Appendix B). This unit stretches from the refuge visitor center to the Russell A. Sorensen Landing on the southernmost stretch of Lyndale Avenue in Bloomington, Minnesota. This unit is one of the most visited units of the refuge by birders, anglers and hikers (U.S. Fish and Wildlife Service, 2018a).

Ravine erosion and water management structures have affected the hydrology and water quality of Ike's Creek. The upper portion of the stream is relatively unaltered by

infrastructure; however, sediments from erosion have had a partial impact. The lower portion of the stream is a more manipulated segment, including a large ravine, water control infrastructure and berms. The upper portion of the streambed contains sand and gravel suitable for spawning, however the streambed in the lower portion is primarily sand with gravel occasionally present in pools resulting in reduced habitat for brook trout. Despite these conditions, Ike's Creek supports a naturally reproducing brook trout population.

4.2 Natural Resources

Habitat and Vegetation: Affected Environment

The area adjacent to Ike's Creek is a riparian corridor consisting of a range of habitats and vegetation types including upland and floodplain forest, wet meadow and permanent and semi-permanent wetlands (U.S. Fish and Wildlife Service, 2018a). The lower portion of the stream is forested along the valley walls, but grasses, forbs and shrubs dominate the riparian area. The upper portion of Ike's Creek from the headwaters to the water control structure is largely forested. Floodplain forests on this area of the refuge flood seasonally and are dominated by tree species silver maple (*Acer saccharinum*), cottonwood (*Populus deltoides var. occidentalis*), American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*) and boxelder (*Acer negundo*). The understory of these forests is generally open, and, in some places, the groundcover consists of wood nettle (*Laportea canadensis*) (U.S. Fish and Wildlife Service, 2018a).

The Minnesota Department of Natural Resources has designated certain native plant communities that intersect with Ike's Creek, such as "Red Oak – White Oak – (Sugar Maple) Forest" and "Bulrush Marsh (Northern)", as ecologically significant (Minnesota Department of Natural Resources, 2020). The Minnesota Biological Survey has also ranked the area surrounding Ike's Creek as an area of moderate biodiversity significance (Minnesota Biological Survey, 2014).

In-stream vegetation of Ike's Creek includes watercress (*Nasturtium officinale*), water forget-me-not (*Myosotis scorpioides*) and other aquatic plants that provide cover for young brook trout (Boussu, 1954). Riparian areas along the stream are home to spring ephemerals and forest plants, such as marsh marigold (*Caltha palustris*), bloodroot (*Sanguinaria canadensis*), trilliums (*Trillium sp.*), jewelweed (*Impatiens capensis*) and jack-in-the-pulpit (*Arisaema triphyllum*). These plants provide early pollen resources for pollinators, such as bees and butterflies (U.S. Fish and Wildlife Service, 2018a).

Invasive vegetation has impacted some of the areas along Ike's Creek including, but not limited to, reed canary grass (*Phalaris arundinacea*), garlic mustard (*Alliaria petiolata*), Siberian elm (*Ulmus pumila*) and buckthorn species (*Rhamnaceae* family). If left uncontrolled, invasive plant species can be detrimental and cause a reduction in native biodiversity, changes in the composition of native species and adversely affect wildlife habitat (Kerns and Guo, 2012). Regardless of which alternative is selected, informal monitoring of invasive species would be performed regularly.

Habitat and Vegetation: Environmental Consequences

Alternative A - Continuation of Current Management – No Action Alternative

Under this alternative, the refuge and City of Bloomington would continue minimal invasive species management but would not stabilize ravines to address erosion. The portion of Ike's Creek that falls within City of Bloomington's Forest Glen Park would "remain a passive, natural park, with potential addition of a natural-surfaced trail" (City of Bloomington, 2022, p. 25). The goals of the refuge's habitat management plan to "restore, protect, and maintain natural species diversity while emphasizing priority wildlife and plants characteristic of the Minnesota River" would still apply under this alternative (U.S. Fish and Wildlife Service, 2018a, p. 4-3).

Spring ephemerals and forest plants would continue to grow in the riparian area of Ike's Creek. However, under this alternative, these forest plants could be reduced due to erosion, trampling from social trail creation and overcrowding from invasive species such as buckthorn, garlic mustard and reed canary grass. If the erodible conditions continue to worsen, there would be a decline in soil available to support root systems of trees and shrubs. This would cause trees to fall and create gaps in the tree canopy, limiting the shading needed to keep stream temperatures cool.

There are small risks of invasive species introduction with current maintenance and public use around Ike's Creek. Under this alternative access to Ike's Creek would not be improved and the presence of user made trails may continue to increase and negatively impact terrestrial habitat and vegetation through trampling and soil compaction. This disturbance could lead to invasive species replacing native plants. Refuge and City of Bloomington staff and volunteers would continue to remove small patches of invasive species where feasible (City of Bloomington, 2018).

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Under this alternative, restoration would help improve Ike's Creek and surrounding habitat, however, there may be temporary disruptions to in-stream and riparian vegetative communities during construction. Physical disturbance to vegetation may include compaction and trampling from construction activities. Disruptions to in-stream vegetation would be minimized to protect habitat and cover for brook trout. Heavy equipment use would be minimized in reaches with in-stream vegetation. If crossing the stream or other wet areas is necessary, mats would be used to minimize disturbance to in-stream and riparian vegetation. Riparian vegetation may be removed and replaced with rock and other substrates to aid in ravine stabilization. Any disturbed areas would be stabilized and seeded with appropriate native vegetation immediately following construction. It is anticipated that the vegetation would recover within one growing season.

Some trees near the project area would require removal as part of the restoration process. Trees that would improve habitat quality or impede access to the stream by equipment may require removal. Many trees include invasive species or shrubs less than 3 inches in diameter. Downed trees would be repurposed to create in-stream

habitat. This approach would take logs and use them for bank stabilization. All other trees would remain undisturbed to provide shade and low water temperatures needed to support brook trout.

Studies have found that forest cover influences stream water temperature through stream shading (Fink, 2008; Brosofske et al., 1997). Tree removal areas would be replanted with native trees to restore stream shading. Before tree removal, the potential project area would be surveyed to determine if endangered bats utilize the area. Please refer to the Candidate, Threatened and Endangered Species and Critical Habitat: Environmental Consequences, Alternative B section for further explanation.

Invasive species such as garlic mustard, dame's rocket (*Hesperis matronalis*), Japanese hedge parsley (*Torilis japonica*) and reed canary grass are currently inundating the potential project area's terrestrial habitat. Invasive vegetation would be hand-pulled, or cut and treated, and would be replaced with native vegetation to stabilize ravines and protect against erosion. An appropriate seed mix verified by the refuge would be hand seeded and shrubs would be planted during the growing season. The refuge would engage with the contractor and volunteers to assist with these efforts. This would enhance the riparian area of the stream, which would be beneficial to the habitat as a whole (Roni, 2014).

Restoration activities may increase the risk of colonization by invasive species due to disturbance and seed source introduction from equipment to other areas. To minimize the potential spread of invasive species, the refuge would require contractors to clean all equipment prior to entering the refuge and again before leaving the construction site. Other construction best management practices would include locating and using staging areas that are free of invasive plant species and monitoring revegetation once construction is complete. Any areas disturbed during construction would be restored using native species.

Floodplains: Affected Environment

Ike's Creek serves as a tributary flowing into Long Meadow Lake, an important floodplain area of the Minnesota River. Its ability to handle flooding and provide habitat make it invaluable to the watershed. Under current conditions, due to ravine erosion, the stream introduces sediment into the floodplain.

A portion of the project area lies within the 100-year floodplain of the Minnesota River, which is subject to specific Lower Minnesota River Watershed District policies and management goals. Applicable management goals include improving and protecting the floodplain in the Lower Minnesota River Watershed and minimizing the adverse effects of floods and droughts on the Minnesota River including all water bodies in the watershed (Lower Minnesota River Watershed District, 2020). Bluffs surrounding the floodplain have slopes of 12-25% and at their crest average 100 feet elevation above the river valley (U.S. Fish and Wildlife Service, 2018a). A natural levee along the Minnesota River channel in several portions of the river has created many natural

wetlands and shallow lakes in the floodplain by impounding waters that top the levees during flood or high-water events. Small feeder creeks and streams are also common in the floodplain, including Ike's Creek.

Historically, the area surrounding Ike's Creek was part of a large floodplain marsh which likely provided floodplain ecosystem services including water quality improvement, sediment storage, biodiversity and flood attenuation (Opperman, 2010). The Izaak Walton League developed and used the area for fish rearing in the 1920s through the 1950s (Meersman, 2012). Once it became part of the refuge, it was used for water management of the Bass Ponds area. The development of the Bass Ponds likely reduced the overall floodplain area, and the construction of pipes and use of water control structures to divert water to the ponds likely changed the hydrology of Ike's Creek.

Floodplains: Environmental Consequences

Alternative A – Continuation of Current Management – No Action Alternative

Under this alternative, the geomorphology of Ike's Creek would remain in its current condition. As a result, no direct changes to the floodplain would occur and floodplain connectivity would not be affected. Natural processes and effects from the urbanized landscape would continue to influence long-term changes to the floodplain.

Ravines surrounding the potential project areas would continue to erode and contribute additional sediment into Ike's Creek and Long Meadow Lake. It is expected that this influx of sediment would affect the floodplain and change wetland vegetation types due to a decrease in water depth.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Under this alternative, the proposed project would be analyzed for a no-rise certification by a professional engineer to determine if the project would increase flood heights. Due to the small footprint of Ike's Creek within the larger floodplain, the proposed project would not be expected to cause a rise in the 100-year floodplain and no major detrimental impacts to the floodplain would be expected.

Excessive sediment has the potential to alter aquatic food webs as well as reduce a wetland's ability to improve water quality (Gleason and Euliss, 1998). The restoration of Ike's Creek would reduce the amount of sedimentation into the floodplain of the lower Minnesota River and could increase the water quality and habitat of the existing floodplain.

There is a possibility that flooding that would affect the lower portion of the proposed project area. If the Minnesota River were to flood during construction, all equipment and materials would be removed from the site. Disturbed soils and extra construction materials would be secured.

Wetlands: Affected Environment

On the refuge, Ike's Creek flows between manmade basins Little and Big Bass ponds, and eventually empties into Long Meadow Lake, a 1,500-acre large emergent marsh within the Minnesota River watershed. The refuge uses a water control structure to manage water levels on Long Meadow Lake to meet habitat and wildlife management objectives (U.S. Fish and Wildlife Service, 2018a).

Wetlands within the Minnesota River floodplain provide nesting, brood rearing, feeding and migration habitats for over 30 species of migratory and resident waterfowl and waterbirds. They also provide spawning and nursery habitat for fish that inhabit the Minnesota River (U.S. Fish and Wildlife Service, 2018a). Wetlands provide numerous benefits for people and wildlife by protecting and improving water quality, storing floodwaters and maintaining surface water flow during dry periods (McInnes, 2011).

Wetlands: Environmental Consequences

Alternative A – Continuation of Current Management – No Action Alternative

Under this alternative, sediments from the eroding ravines would continue to deposit into Ike's Creek and ultimately into Long Meadow Lake. This continued sedimentation would alter the flow of water, reduce water depth, impair water quality and damage native habitat.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Prior to construction, an on-site wetland delineation report would be prepared by a professional wetland scientist using the 2015 "Guidance for submittal of delineation reports to the St. Paul District Corps of Engineers and Wetland Conservation Act Local Governmental Units in Minnesota, Version 2.0 (St. Paul District Regulatory Branch, 2015). Wetlands identified in this report would be assessed to see if construction would cause a permanent disturbance. A permitting process would be used under the Clean Water Act Section 404 and the Minnesota Wetland Conservation Act after the delineation occurs. The permitting process would address mitigation strategies if needed for any impacts found following the wetland delineation. Specific mitigation strategies would be determined through coordination with appropriate federal and state agencies. These mitigation strategies could include wildlife-friendly erosion prevention, sediment control measures and revegetation with appropriate native seed mix.

During restoration, the floodplain area would expand into both Big and Little Bass ponds, resulting in wetlands reconnecting to the historic floodplain (Figure 1, Appendix B). The stream and wetlands would be planted with a forested wetland plant community native to the area.

Fish and Wildlife Species: Affected Environment

Brook trout require cold, clear, highly oxygenated water with silt-free bottoms and adequate vegetative cover (Conservation Strategy Working Group, 2005). They are indicators of good water quality as brook trout are sensitive to changes in water

temperature, presence of pollutants (Clean Wisconsin, 2013) and sedimentation when young (Argent and Flebbe, 1999). Brook trout were also identified as a priority resource of concern in the refuge's habitat management plan (U.S. Fish and Wildlife Service, 2018a). In addition, brook trout (SE Minnesota wild strain) are listed as a Species of Greatest Conservation Need in the State of Minnesota's Wildlife Action Plan 2015-2025 because their distribution is highly localized. The Minnesota brook trout population represents a "significant portion of their North American breeding or wintering population" (Minnesota Department of Natural Resources, 2016).

Past records indicate that Ike's Creek has historically supported brook trout and has suitable water temperatures and substrate type needed for spawning to occur (Berg et al., 2019; U.S. Fish and Wildlife Service, 2018a). Minnesota Department of Natural Resources' minimum criteria for trout streams requires water temperatures less than 72 degrees Fahrenheit in July and August, dissolved oxygen concentrations greater than 5 mg/L and definable beds and banks throughout the stream (Young Environmental Consulting Group, 2022). Ike's Creek provides constant temperatures for brook trout despite fluctuating air temperatures, which is indicative of a groundwater-fed stream (Minnesota Department of Natural Resources, personal communication, May 2007).

In 2007, in partnership with the Minnesota Department of Natural Resources and Trout Unlimited, 1,450 fingerling Minnesota wild strain brook trout were stocked in Ike's Creek (U.S. Fish and Wildlife Service, 2018a). Based on current abundance estimates, brook trout have been sustaining their population through natural reproduction (M. Nemeth, personal communication, December 13, 2023). Brook trout in Ike's Creek have been found both above and below the water control structure, with more fish observed upstream. Additional fish species encountered in Minnesota Department of Natural Resources surveys include bluntnose minnow (*Pimephales notatus*), brook stickleback (*Culaea inconstans*), central mudminnow (*Umbra limi*), creek chub (*Semotilus* species), fathead minnow (*Pimephales promelas*), green sunfish (*Lepomis cyanellus*) and Johnny darter (*Etheostoma nigrum*; Harris, 2017).

Brook trout habitat in Ike's Creek is somewhat limited but does include important habitat features including small plunge pools, large wood complexes, watercress beds and exposed gravels. The stream also provides quality in-stream habitat for aquatic invertebrates, which are the primary food source for brook trout. Currently, the aquatic invertebrate population is at a healthy level with an abundance of freshwater amphipods and other invertebrates present in the stream. The University of Minnesota conducted a study that looked at the larval skins of midges. The study indicated there were healthy midge populations that were likely to be sufficient to sustain fish stocking efforts (Nyquist et al., 2020).

Besides fish, the area surrounding Ike's Creek provides habitat for a variety of wildlife along the Mississippi flyway migration corridor, including prothonotary warblers, wood ducks (*Aix sponsa*), bald eagles (*Haliaeetus leucocephalus*), hooded mergansers (*Lophodytes cucullatus*), mallards (*Anas platyrhynchos*) and shorebirds. It also provides

habitat for turtles, river otters (*Lontra canadensis*), mink (*Neovison vison*) and other wildlife (U.S. Fish and Wildlife Service, 2018a).

Regardless of which alternative is selected, the Minnesota Department of Natural Resources will continue to conduct biennial brook trout population surveys in partnership with the refuge.

Fish and Wildlife Species: Environmental Consequences

Alternative A – Continuation of Current Management – No Action Alternative

Under this alternative, the original trail crossing, culvert and water control structure would stay in place and remain barriers to fish movement. Fish habitat below these barriers would continue to lack in-stream vegetation, proper shading and consistent cool temperatures. It would remain inadequate to support brook trout and would limit fish from reaching additional spawning areas.

It has been observed that culverts can serve as an impediment to how brook trout move within their habitat (Poplar-Jeffers et al., 2009). As the water control structure is currently non-functional and the culvert is prone to clogging with sediment, the brook trout population would continue to face these obstacles. Erosion and sedimentation would continue, and potentially increase, and could impact future population levels of brook trout by blanketing and suffocating eggs (M. Nemeth, personal communication, December 13, 2023). Sediments settling to the bottom of the stream would cover habitat and negatively impact many aquatic invertebrates, which are crucial to the ecosystem and food chain in a healthy trout stream (Hartman, 2021). Suspended sediments could cause turbidity and increase in-stream temperatures as suspended particles absorb sunlight, resulting in the reduction of available dissolved oxygen (U.S. Environmental Protection Agency, 2012). This would negatively affect brook trout as they are sensitive to changes in temperature and oxygen levels.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Construction activities could cause some sediment movement and turbidity in Ike's Creek and there may be temporary impacts to fish, invertebrates, amphibians, turtles, mammals and other wildlife that depend on the stream. Direct impacts to wildlife could come in the form of behavioral modifications, as they would avoid areas of the stream under construction. Indirect impacts could include a temporary loss of living space during construction (Cline et al., 2007). However, there would be suitable habitat available upstream for wildlife to utilize.

To minimize impacts to brook trout, in-stream construction would occur between April 1 and October 15 to protect spawning and hatch-year fish. The stream would be temporarily diverted to protect the brook trout during construction. However, there is minimal suitable habitat and few brook trout present in the area of Ike's Creek where most of the construction would take place. Eliminating barriers would allow brook trout to access additional habitat upstream. Following the project, to determine if brook trout

use increased in restored areas, the Minnesota Department of Natural Resources would continue to conduct population monitoring.

The floodplain on the lower portion of Ike's Creek would be regraded and the channel would be reconstructed and stabilized using wood from the site to preserve the natural appearance of the area. Large wood would be used to help define channel boundaries, stabilize banks and create in-stream habitat for wildlife. Ravine stabilization would reduce sediment in the stream and Long Meadow Lake, improving and benefitting water quality and habitat for aquatic life. Decreased sedimentation along with the creation of steps, riffles and pools would increase oxygen levels and areas available for fish on the lower portions of the stream.

The restoration of Ike's Creek would improve and increase the habitat available for brook trout and other wildlife along the entire length of the stream. It would also increase habitat for aquatic insects and other macroinvertebrates, which are a primary food source for brook trout (Minnesota Department of Natural Resources, 2018). Any minor construction disturbance should not have sustained negative impacts on the aquatic system and the amount of habitat for wildlife would be increased and improved following the restoration of Ike's Creek. As mentioned in the habitat and vegetation section, any vegetation disturbed during construction would be replanted with native plants used by wildlife for cover and foraging.

Candidate, Threatened and Endangered Species and Critical Habitat: Affected Environment

A list of federally listed threatened, endangered and candidate species that may occur within the proposed project area was developed by consulting the U.S. Fish and Wildlife Service's Information for Planning and Consultation, or IPaC, system. The proposed project area was then evaluated for the potential occurrences of federally listed threatened and endangered species. The following are federally listed species whose ranges could overlap with the proposed project area:

Northern long-eared bat (*Myotis septentrionalis*), federal status: endangered

The proposed project area contains roosting and foraging habitat suitable for northern long-eared bats. The bats forage at night in understory habitat, feeding on insects and utilizing wetlands as water sources. During the summer and portions of the fall and spring, northern long-eared bats may be found roosting singly or in colonies underneath bark and in cavities or crevices of both live trees and snags, or dead trees. They may also roost in cooler places, like caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. The species has also been found, although less commonly, roosting in structures, such as barns and sheds (U.S. Fish and Wildlife Service, n.d.-a). Northern long-eared bats are known to use the Minnesota River valley for roosting and wintering cave habitat. However, there are no known maternity colonies, roost trees or hibernacula in the proposed project area. On November 29, 2022, the U.S. Fish and

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Wildlife Service published a final rule in the Federal Register and uplisted the northern long-eared bat from threatened to endangered and in spring 2023 the rule was finalized.

Tricolored bat (*Perimyotis subflavus*), federal status: proposed

Tricolored bats are one of the smallest bats native to North America. Their range consists of eastern and central United States and portions of southern Canada, Mexico and Central America. They are distinguished by unique tricolored fur that appears dark at the base, lighter in the middle and dark at the tip. Tricolored bats roost in forested habitats, primarily in leaves on trees (U.S. Fish and Wildlife Service, n.d.-b). The proposed project area contains roosting and foraging habitat suitable for the tricolored bat, however there are no known tricolored bat maternity roost populations, summer roost trees or hibernacula. On September 13, 2022, the U.S. Fish and Wildlife Service announced a proposal to list the tricolored bat as endangered.

Rusty patched bumble bee (*Bombus affinis*), federal status: endangered

Historically, the range of rusty patched bumble bees was across the eastern United States and upper midwest, as well as in southern Quebec and Ontario, in Canada. This historical range continued south to the northeast corner of Georgia and reached west to the eastern edges of North and South Dakota. Colonies are started by the overwintering queen in the spring. Workers then begin to emerge throughout the summer to collect pollen resources. In the late summer and fall, males and new queens emerge and the cycle restarts. Reasons for decline are unknown, but evidence suggest that pesticide use, habitat loss and climate change could be contributing factors. The proposed project occurs within the high potential zone for rusty patched bumble bees (Minnesota-Wisconsin Ecological Services Field Office, 2023). However, most of the habitat is not suitable for rusty batched bumble bees because it consists of highly degraded ravines and floodplain with minimal floral food resources. Most floral resources available include spring ephemerals and early blooming forest plants.

Higgins eye (pearlymussel) (*Lampsilis higginsii*), federal status: endangered

Higgins eye (pearlymussel) was historically in the Minnesota River adjacent to the proposed project area, however, there have been no live specimens detected in over 30 years and it has been extirpated in the Minnesota River (Minnesota Department of Natural Resources, 2023). Due to this, Higgins eye (pearlymussel) has been excluded from further analysis.

Whooping crane (*Grus americana*), federal status: experimental population

There are under 600 whooping cranes in the United States and are a rare sighting in Minnesota (Petersen, 2021). According to the Minnesota Department of Natural Resources' Natural Heritage Information System database, there have been no records of whooping cranes in Minnesota. However, there have been anecdotal reports of whooping cranes briefly stopping in the Twin Cities metro area. There have not been any documented cases of whooping cranes near the proposed project area. Since the

presence of whooping cranes is unlikely in the proposed project area, they have been excluded from further analysis.

Monarch butterfly (*Danaus plexippus*), federal status: candidate

Monarch butterflies fly from as far as Canada and across the United States to congregate at a few forested overwintering sites in the mountains of central Mexico and coastal California. There is recent evidence to suggest that their populations have been declining due to habitat destruction (U.S. Fish and Wildlife Service, 2020). Monarch butterflies are present in Minnesota from May to September and occur in the Minnesota River valley. Suitable habitat include nectar producing flowering plants and milkweed. The proposed project area contains limited suitable habitat for monarchs, as there is a lack of adequate milkweed and seasonal-round floral resources (National Park Service, 2023).

***Candidate, Threatened and Endangered Species and Critical Habitat:
Environmental Consequences***

Alternative A – Continuation of Current Management – No Action Alternative

Under this alternative, trail maintenance and hazard tree removal would continue. Limited invasive species control would also occur.

Northern long-eared bat and tricolored bat

Ongoing management around Ike's Creek would continue to include trail maintenance, hazard tree removal to ensure visitor safety and control of undesirable woody species. Although most tree removal would be planned to occur outside of the summer occupancy season for endangered bats, minimal tree removal may need to occur during this period due to public safety concerns. If hazard tree removal of suitable roost trees during the active season cannot be avoided, the refuge would coordinate with the Minnesota/Wisconsin Ecological Services Field Office using the Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines (U.S. Fish and Wildlife Service, 2023).

Rusty patched bumble bee and monarch butterfly

Rusty patched bumble bees have not been identified in the area surrounding Ike's Creek. Monarch butterflies have been found in limited areas surrounding Ike's Creek as there is scarce appropriate habitat available. User made trail continuance would cause trampling of floral resources including spring ephemerals and early blooming forest plants. This would decrease pollen and nectar resources available for pollinators, if bees and monarchs were to utilize this area.

Current management that would affect rusty patched bumble bees and monarch butterflies involves invasive species control. This would cause a temporary reduction of invasive floral resources for these species. However, according to the Conservation Management Guidelines for the Rusty Patched Bumble Bee (*Bombus affinis*), best management practices for habitat include the removal and control of invasive plants in

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areas used for foraging, nesting or overwintering (U.S. Fish and Wildlife Service, 2018b). To minimize any effects on these pollinators, the conservation management recommendations in the guidelines would be followed, including applying herbicides as locally and directly as possible (U.S. Fish and Wildlife Service, 2018b).

Alternative B – Restoration of Ike's Creek – Preferred Alternative

To avoid impacts to federally listed species, construction activities would be completed within appropriate timeframes and use techniques consistent with permits, approvals and applicable avoidance plans in coordination with the U.S. Fish and Wildlife Service's Minnesota-Wisconsin Ecological Services Field Office. Federally listed species that may occur within the proposed project area, impacts and potential mitigation measures are listed below:

Northern long-eared bat and tricolored bat

Removal of trees with suitable roosting characteristics (e.g., peeling bark, crevices and cavities; U.S. Fish and Wildlife Service, 2022) could diminish available suitable tree roosts used by maternity colonies and foraging habitat, especially if these trees are removed outside of the inactive bat season (i.e., when bats are hibernating).

Minimization and avoidance measures would be implemented to ensure that "take" under the Endangered Species Act is not reasonably certain to occur for these species.

One of these measures would be to remove trees outside of the pup season for bats. Although it is recommended and planned for tree removal to occur during the inactive season, minimal tree removal may need to occur outside of this period due to brook trout protection and grant timing. If removal of suitable roost trees during the summer occupancy season cannot be avoided, surveys to confirm presence or probable absence would be conducted in coordination with the Minnesota/Wisconsin Ecological Services Field Office using the Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines (U.S. Fish and Wildlife Service, 2023). If presence is confirmed in the project area where tree removal would occur, refuge staff would coordinate further with the Minnesota-Wisconsin Ecological Services Field Office to implement measures that would avoid take of the species (e.g., delaying or limiting suitable roost tree removal) and would re-initiate consultation if necessary.

Rusty patched bumble bee and monarch butterfly

Apart from spring ephemerals, there are limited floral resources available in this area for pollinators. However, to minimize any impact on early blooming floral resources, construction activities would occur between July and October. Though this would be during the active season for rusty patched bumble bees and monarch butterflies, it would be conducted after spring ephemerals have finished flowering and would be less likely to impact rusty patched bumble bees (U.S. Fish and Wildlife Service, 2018b).

If construction cannot begin before October, tree clearing may need to occur during the fall and winter months. Tree clearing is not expected to impact overwintering rusty patched bumble bee queens since there is lack of suitable habitat in the project area.

If any areas would be impacted by construction equipment or compaction of vegetation, this could cause displacement to pollinators. However, these impacts would be temporary, and the areas would be seeded to native vegetation with a high floral diversity important to pollinators at the conclusion of the project. This would ultimately increase the quality of habitat for pollinators.

Special Status Species: Affected Environment

Several bald eagles (*Haliaeetus leucocephalus*) nest on the Long Meadow Lake unit and use Long Meadow Lake and other smaller wetlands as feeding areas (U.S. Fish and Wildlife Service, 2018a). Bald eagles are protected under the Migratory Bird Treaty Act and The Bald and Golden Eagle Protection Act. However, there are no known nests in close proximity to the project area.

There is also habitat for forest migratory birds, protected under the Migratory Bird Treaty Act, in the riparian area along Ike's Creek. Multiple species of birds take advantage of available habitats in the valley for breeding and year-round use. The refuge is located within the Mississippi Flyway and attracts over 260 species of birds to its diverse habitats. Forests and wetlands serve as critical stop-over habitat for birds as they make their way through the flyway during migration (Stuart, 2016).

The proposed project area is also within the Lower Minnesota River Valley Important Bird Area. Important bird areas, identified by Audubon Minnesota in partnership with the Minnesota Department of Natural Resources, are part of an international conservation effort aimed at conserving critical bird habitats (Audubon Minnesota, n.d.). This important bird area incorporates the riparian corridor, adjacent river valley and upland communities along the Minnesota River, and it supports an exceptional diversity of birds. The woodland and grassland areas within the important bird area are critical habitat for more than 260 bird species, at least 100 of which nest in the area (National Audubon Society, n.d.).

Special Status Species: Environmental Consequences

Alternative A – Continuation of Current Management – No Action Alternative

Currently there are no bald eagle nests around Ike's Creek, however migratory birds use this area for migration stopover and nesting. Under this alternative current management activities such as invasive species removal and trail maintenance would continue. Prior to hazard tree or invasive woody removal, surveys would be conducted for bald eagle and migratory bird nests. If active nests are found within the vicinity of the stream, removal during nesting season would be avoided to the extent possible as to not disturb nesting birds. Woody invasive species control would be conducted during the fall and winter when migratory birds are not actively nesting.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

There are currently no known nests within the vicinity of the proposed project area, however potential exists for bald eagles to nest in proximity of Ike's Creek. Nest surveys

would be conducted prior to construction, and if any bald eagle nests are identified, measures to avoid disturbance at nest sites would be identified and implemented according to the National Bald Eagle Management Guidelines (U.S. Fish and Wildlife Service, 2007). If a new nest (or suspected new bald eagle nest) is discovered within 660 feet of the worksite, coordination with an eagle specialist with the U.S. Fish and Wildlife Service's Midwest Migratory Bird Program would occur before work could continue.

There is habitat for migratory birds in the riparian areas of the stream, however, most construction activities would be scheduled to occur outside of the nesting season. If nesting season cannot be avoided, forested buffer zones would be established between the activity and the nesting trees (U.S. Fish and Wildlife Service, 2007). If active nests are found within the vicinity of the stream, removal would be avoided to the extent possible as to not disturb nesting birds.

Geology and Soils: Affected Environment

Soil types in the project area include, L2B-Malardi-Hawick complex, consisting of somewhat excessively to excessively drained soils; L12A-Muskego, Blue Earth and Houghton soils, consisting of very poorly drained soils; L32F-Hawick loamy sand, consisting of well drained to excessively drained soils; and L39A-Minneiska fine sandy loam, consisting of moderately well drained to poorly drained soils (Natural Resources Conservation Service, 2022a and b). Areas upstream include steep slopes that consist of highly erodible soils, which has resulted in sediment deposits throughout the stream and riparian area. These deposits have caused the culvert and other infrastructure to fill with sediment, resulting in water overflowing onto surrounding trails.

Substrate in Ike's Creek consists, on average, of 37% gravel and 63% sand (Berg et al., 2019). Gravel is important for brook trout egg protection and development as it allows stream flow to provide well-oxygenated water to eggs that fish have buried in a nest-like pit in the gravel (Dieterman and Mitro, 2019). The stream is also unique in that it contains marl, a compacted mixture of predominantly clay and calcium carbonate, that forms steps throughout the stream (Karrow, 2010). Marl forms from alkaline waters that are supersaturated with calcite. As the spring water emerges, carbon dioxide is degassed, resulting in an increase in pH and precipitation of calcium carbonate. This unique geochemistry has a direct impact on channel geomorphology as channel bed material and particularly logs, rocks or debris become encased in a concrete-like substance, with marl layers of several inches common throughout the channel (Inter-Fluve, personal communication, February 2, 2024). These marlstone formations result in pools that oxygenate the water, which is important for brook trout.

Geology and Soils: Environmental Consequences

Alternative A – Continuation of Current Management – No Action Alternative

Under this alternative, erosion and sedimentation from ravines would continue to deposit into the stream and Long Meadow Lake. It is expected that structures would

continue to congest, and regular maintenance would be required to keep structures free of sediment to allow for stream flow.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Under this alternative, stabilization of ravines with rock and native vegetation would help keep soils intact and from depositing into Ike's Creek and Long Meadow Lake. Although this would reduce sedimentation and ultimately protect habitat for brook trout, there would be alterations to geology and soils. Impacts on soils would be short-term and limited to the period of construction and would include compaction and erosion. Construction would take place during late summer and early fall, when conditions are driest to reduce soil compaction, rutting and erosion. Best management practices would be utilized to reduce potential impacts of compaction and erosion including using low-impact equipment, only clearing standing and downed vegetation that would be absolutely necessary (see Habitat and Vegetation Section), placing silt fencing in highly erodible locations and revegetating disturbed areas immediately following construction so plants could become established prior to the end of the growing season (Missouri Department of Conservation, 2022).

Project construction may fall within the City of Bloomington's Bluff Protection Overlay District, which lies between the 722-foot elevation and the 800-foot elevation (City of Bloomington, n.d.). Work would ensure impacts to bluffs are minimized through stabilizing bare slopes, using caution when removing invasive species by providing biodegradable erosion control and planting bare areas with seedlings or seeds immediately after construction (City of Bloomington, n.d.). Construction would be expected to ultimately stabilize and improve ravines addressed in this ordinance.

Stabilizing ravines would reduce erosion and ultimately the amount of fine sediment input into Ike's Creek. Removing constriction points would help maintain the velocity of stream flow. Reducing the induction of fine sediment inputs combined with removing constriction points would allow for a more natural sediment transport process (Roni and Beechie, 2013). This would allow sediments that contribute to reduced water quality to be transported throughout the stream system.

The restoration plan would consider the dynamics of marl accumulation, which would be informed by hydraulic modeling results. As the marl deposits on hard surfaces in layers, this accumulating material may affect the flow of the stream. Thus, step formations and designs would take into consideration those accumulations.

Water Resources: Affected Environment

Ike's Creek, located in the Lower Minnesota River Basin Watershed, surfaces near the Mall of America, and flows into Long Meadow Lake. The hydrology of this system is influenced by both agricultural and urban development in the area surrounding the stream (U.S. Fish and Wildlife Service, 2018a). The historic watershed was likely larger than present but is now drained by storm sewers to other locations.

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Impervious surfaces and impacts from urbanization surrounding the stream have contributed to higher rates of erosion, turbidity, pollution and elevated chloride levels. Water chemistry testing of Ike's Creek conducted by Metropolitan Council Environmental Services between 2021-2023 found chloride levels to range from 349 mg/L to 634 mg/L, which is above the chronic standard for chloride (230mg/L) to protect aquatic life (Minnesota Pollution Control Agency, 2022). Although the source of the elevated chloride levels is unknown, the refuge and adjacent landowners continue to work together to minimize additional chloride inputs into the stream to protect the health of aquatic life in Ike's Creek.

The lower portion of Ike's Creek has been heavily influenced due to its use for fish rearing and water management in the past. This area includes a degraded culvert and water control structure and berms around man-made ponds. Ike's Creek has been channelized, dammed and culverted, and the lower surficial geologic features have been graded to form berms for adjacent fish ponds in the Minnesota River valley bottom. The valley has relatively steep slopes exceeding 30%.

The channel bed is composed of sand and small gravel with more marl present in the lower portion. Sand inputs, marl, leaf litter and watercress influence stream flow. Significant sand volumes are input from one large ravine and several smaller drainages within the watershed. Throughout the channel, large wood and debris have created a series of impoundments and small log drops. Below many of these drops are pools of water 1.5-2.0 feet in depth (Inter-Fluve, personal communication, February 2, 2024).

Ike's Creek is a coldwater stream fed almost entirely from groundwater springs that provide cold, clear and well oxygenated water. Coldwater streams are defined as having a maximum daily temperature of less than 69 degrees Fahrenheit and can support brook trout year-round (Lyons et al., 2009). Brook trout are sensitive to water temperature and oxygen levels, thus are indicators of good water quality (Maryland Department of Natural Resources, n.d.).

Water Resources: Environmental Consequences

Alternative A – Continuation of Current Management – No Action Alternative

Under this alternative, the stream would remain as is and would be subject to current or worsening conditions. There would be no ravine stabilization, which would result in continued erosion and sedimentation. This could increase turbidity and contribute more sediment to the stream, thus degrading water quality. The water control structure and culvert would remain in place and continue to impede stream flow, hindering natural flushing of fine sediments. Sediment and debris would continue to plug the culvert causing the stream to flow out of the stream channel and flood nearby trails. Although chloride impacts would likely still occur, the refuge and adjacent landowners would continue to work together to minimize additional chloride inputs into the stream.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Under this alternative, the ravine would be stabilized, which would help alleviate erosion and sedimentation, improving turbidity and the overall water quality of the stream. The water control structure and culvert would be removed, restoring the hydrology of Ike's Creek and allowing for natural flushing of fine sediments. Sediment and debris would move freely and not impede stream flow. Although elevated chloride levels would likely still occur, the refuge and adjacent landowners would continue to work together to minimize additional chloride inputs into the stream. The proposed project would also help preserve cool water temperatures by maintaining adequate native vegetation to help shade the stream. Pools and riffle areas would be added to increase fish habitat and oxygen levels on the lower reaches of the stream. As water from the stream flows into Long Meadow Lake, and eventually reaches the Minnesota River, water quality is important to the overall health of the ecosystem. Restoration of the stream would help minimize any negative impacts on water quality from the surrounding urban area.

To protect the water quality of Ike's Creek, the contractor would be required to submit and adhere to a Stormwater Pollution Prevention Plan to minimize the risk of erosion caused by construction. Rock and native vegetation would be used to stabilize the ravine and limit erosion causing sedimentation in Ike's Creek. Best management practices during construction would include using biodegradable erosion control and planting bare areas with seedlings or seeds immediately after construction (City of Bloomington, n.d.). Stream channel water would be temporarily diverted from the construction zone and brook trout would be relocated and kept from the immediate area. The fish would be allowed access to the lower portion of the stream following the construction period.

Climate Change: Affected Environment

Changes in climate in the midwest are expected to affect wildlife populations in many ways. Extreme heat, abnormal drought conditions, followed by abnormal precipitation events and flooding would disrupt natural cycles and could impact wildlife. Predicted climate changes for the midwest include more frequent rain events, causing more frequent flooding, runoff and erosion (U.S. Environmental Protection Agency, 2016). Steep slopes are present at Ike's Creek and considerable erosion occurs. According to the Minnesota Department of Natural Resources, water quality and temperature are the biggest threats to the survival of brook trout populations. Brook trout are highly susceptible to stream degradation and climate change, including low oxygen levels due to sediments from run off and warm waters (Minnesota Department of Natural Resources, n.d.-b).

Climate Change: Environmental Consequences

Alternative A – Continuation of Current Management – No Action Alternative

Environmental effects from climate change may have negative impacts on the future temperature and water quality of Ike's Creek. Climate change is expected to intensify

the hydrological cycle, which would likely increase the intensity of extreme precipitation events and the risk of flooding (Tabari, 2020). As a result of climate change, we expect an increase in extreme precipitation events to exacerbate runoff and erosion. Under this alternative, ravine stabilization would not occur, and erosion would continue and likely worsen during extreme precipitation events, increasing sediment into Ike's Creek and Long Meadow Lake. Increased sediment loads into the stream could cause turbidity, increasing in-stream temperatures as suspended particles absorb sunlight resulting in the reduction of available dissolved oxygen (U.S. Environmental Protection Agency, 2012). In addition, the water control structure and culvert would remain in place and plug more frequently from the increase of sediment.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Under this alternative, banks and ravines would be stabilized, and water quality would improve as a result of decreased sediments entering the stream during runoff events (Johnson, 2017). Decreased sediment loads would also improve water clarity and visibility in the stream. In addition, root structures would help stabilize the soil, helping to decrease erosion and sedimentation. This would provide better habitat conditions for brook trout and other aquatic life.

Between 1895 and 2020, Minnesota warmed by 3 degrees Fahrenheit and although climate conditions are expected to vary each year, increases in temperature are expected to continue into the 21st century (Minnesota Department of Natural Resources, n.d.-c). An important climactic factor that has an effect on water temperature is air temperature, however it has been found that groundwater will keep streams cool in the summer and will help maintain seasonably warm temperatures in the winter (Dauwaulter and Mitro, 2019). Due to this, it has been projected that streams with groundwater dominant flows will be resilient to changes in climate (Dauwaulter and Mitro, 2019). Restoring the riparian habitat by revegetating with native species along the banks of the stream would increase shading and also help maintain cool temperatures vital to brook trout survival.

4.3 Cultural and Historic Resources

Cultural and Historic Resources: Affected Environment

According to the refuge's comprehensive conservation plan, several hundred archaeological and cultural sites exist in the Lower Minnesota River Valley, and many are located on refuge lands (U.S. Fish and Wildlife Service, 2004). These sites include prehistoric burial mounds and village sites, early 19th century trading posts and ferry crossings and early 20th century bridges and farmsteads.

Recorded history at Ike's Creek began with the Minnesota Valley Chapter of the Izaak Walton League, who leased the property starting in 1926. An impoundment, a culvert and water control infrastructure were constructed to provide water for fish rearing. Much of this infrastructure has degraded over time and is no longer functional.

Cultural and Historic Resources: Environmental Consequences

Alternative A – Continuation of Current Management – No Action Alternative

Under this alternative, all infrastructure would remain in place and would likely continue to degrade. No action would eliminate a National Historic Preservation Act Section 106 review of the project. There would be no additional impacts to cultural and historic resources.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Prior to construction, the contractor will conduct a preliminary desk top cultural resources review within the Area of Potential Effects with State Historic Preservation Office consultation. Any recommended fieldwork would be conducted. The State Historic Preservation Office and the agency's Regional Historic Preservation Officer would review the results of the fieldwork before allowing construction. After resolving any cultural and historic resource concerns, the water control structure and culvert would be removed in their entirety to allow for geomorphic connectivity.

All construction would stop immediately if unknown or unanticipated cultural resources were discovered during the project. The Regional Historic Preservation Officer would be contacted to ensure compliance with the National Historic Preservation Act. Construction would be suspended until an adequate evaluation was completed to determine cultural significance. Areas or materials identified as culturally significant would be protected using necessary preservation and avoidance measures in consultation with the refuge's Regional Historic Preservation Officer.

4.4 Socioeconomics

Local and Regional Economies: Affected Environment

"Banking on Nature 2017: The Economic Contributions of National Wildlife Refuge Recreational Visitation to Local Communities" identified average daily expenditures for different recreational visits to refuges nationwide. Expenditures included food, drinks, lodging, transportation, equipment and other expenses. Based on the findings of this report, 7.5 million recreational visits to refuges in the Midwest Region generated almost 457 million dollars to regional economies (Caudill and Carver, 2019).

Minnesota Valley National Wildlife Refuge is an important area for recreational opportunities. Based on numbers from The Refuge Annual Performance Plan the refuge had 405,600 recreational visits in 2023 (U.S. Fish and Wildlife Service, personal communication, November 7, 2023). In the 2017-2021 Minnesota Compass profile for the City of Bloomington, the city population was 89,987 and the median household income in 2021 was \$80,582 (Minnesota Compass, 2023). The total number of workers employed in Bloomington was 35,874, including residents as well as those who commute from other areas.

Local and Regional Economies: Environmental Consequences

Alternative A – Continuation of Current Management – No Action Alternative and B – Restoration of Ike's Creek – Preferred Alternative

The refuge does not anticipate any variation in visitation and expenditures under both alternatives. Any changes to socioeconomics in the project area would likely result from the development of the City of Bloomington's South Loop District, which is already increasing the number of people in the area.

Environmental Justice: Affected Environment

According to the Minnesota Compass profile for the City of Bloomington (2017-2021), the majority of Bloomington residents identified their race as white (67.8%; 60,639). Approximately 29.4% (26,250) of residents identified as a person of color. Other race and ethnicities of people living in the city identified include Black or African American (10.2%; 9,081), American Indian and Alaskan Native (0.3%; 307), Asian or Pacific Islander (5.9%; 5,254), other race (1.5%; 1,335), two or more races (5.1%; 4,532) and people who identified as Hispanic or Latino (9.3%; 8,287). With approximately 29.4% of the city's population identifying as a person of color, the city had a slightly higher population of people of color than the average Minnesota population of 22%. (Minnesota Compass, 2023).

The average household income for the City of Bloomington (2017-2021) was \$80,582, with a majority (39.5%) of households falling into the \$100,000 or more income range. About 17.9% of households earned less than \$35,000 per year, with 8.1% of city residents with income below poverty. In terms of education level, 93.0% of city residents were high school graduates or higher. Additionally, 43.4% of residents had a bachelor's degree or higher and 13.7% had a graduate or professional degree (Minnesota Compass, 2023).

Environmental Justice: Environmental Consequences

Alternative A Continuation of Current Management – No Action Alternative and B – Restoration of Ike's Creek – Preferred Alternative

The alternatives would not disproportionately place any adverse environmental, economic, social or health affects onto historically under-represented communities or low-income populations. Contractors would be selected using a competitive bid process, which would provide equal opportunities across all demographics.

Public Health and Safety: Affected Environment

Currently, there are natural surface trails, consisting of packed dirt, loose sand and aggregate. The trail across Ike's Creek, and adjacent foot trails, are impacted by overflow of stream banks due to erosion and subsequent sedimentation. Sedimentation fills in the stream channel and culvert, which causes trail flooding and makes visitor access challenging. Storm events frequently cause trees to fall and block access to trails, which may be hazardous to visitor safety.

Public Health and Safety: Environmental Consequences

Alternative A - Continuation of Current Management – No Action Alternative

Under this alternative, the water control structure and culvert would remain in place and upstream erosion would continue to allow sediments to build up, flooding trails. This overflow of water can create unstable walking conditions as a result of wet, slippery or sediment covered trail surfaces. Standing water can also be hazardous as visitors would not be able to see the trail surface or any debris or obstacles covered by water. During flooding visitors have also been observed to walk off-trail where they would encounter uneven or unstable surfaces, vegetation, tree branches and other debris common in wooded areas. These conditions could increase the potential of visitors to trip, fall or slip when using these areas and potentially result in injuries. To ensure visitor safety, temporary closures would be used when repairing trails from flooding, washouts and downed trees.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Under this alternative, the culvert and water control structure would be removed to allow for unrestricted stream flow. The current stream crossing would be replaced by a bridge and the current gravel trails would be re-graded. The bridge would provide a safer stream crossing and allow users to stay on the trail and avoid areas where they could encounter unstable and slippery surfaces or tree branches and other debris. Due to stream improvements, the trails would be less impacted from streambank overflow and erosion, improving visitor safety.

No long-term impacts to public health and safety are anticipated and conditions would likely improve as a result of the project. To alleviate any safety concerns during construction, areas would be temporarily closed until stream banks are stabilized and construction is complete. Appropriate signage would notify users of closed areas and construction activity and would redirect them to alternative trails. Construction equipment would be staged away from public access areas and secured when not in use.

4.5 Refuge Resources

Visitor Use and Experience: Affected Environment

Over 400,000 people typically visit Minnesota Valley National Wildlife Refuge annually. Activities allowed on the refuge include wildlife observation, photography, hunting, fishing, environmental education, interpretation, hiking and biking. Two natural surface trails cross the stream, giving viewing opportunities for visitors. User-made walking and biking trails also exist in the area.

The refuge currently hosts programs with several partners on the Long Meadow Lake Unit. These include hikes and bird watching programs. Current operations include roving time on the trails by staff and volunteers. Fishing opportunities through the

Fishing in the Neighborhood program at the Bass Ponds would continue to take place under either alternative.

Visitor Use and Experience: Environmental Consequences

Alternative A - Continuation of Current Management – No Action Alternative

Under this alternative, visitors would continue to have access to the stream and surrounding trails. Overflow from Ike's Creek during flooding events would continue to impact visitor use. Standing water on trails would temporarily impede or close public access, disrupt visitor experience and pose a safety risk (see Public Health and Safety Section). Flooding would also cause user-made trails to become more prevalent, which would negatively impact spring ephemerals and other riparian vegetation by trampling. Under these conditions, trail maintenance needs, temporary trail closures and visitor impacts on vegetation would likely increase.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

During restoration, only the small loop around the Big and Little Bass ponds would be posted as closed. All other trails within the Bass Ponds area would remain open for visitors. Equipment would be staged in a contained area in the lower event parking lot, which is not normally open to visitors. These could all lessen the visitor experience, but anticipated impacts would be short-term and temporary.

It is also anticipated that the restoration of the stream would enhance trail access and viewing opportunities. With the removal of the culvert and water control structure, water would be able to flow more freely, resulting in less trail flooding. Any newly constructed trails would comply with the Americans with Disabilities Act according to standards issued under the Architectural Barriers Act creating safe and equal access to all visitors.

Aesthetics, Viewsheds and Visual Resources: Affected Environment

Across the street from the Mall of America, and nestled in a highly urbanized landscape, Ike's Creek offers a rare aquatic vista. The stream hosts spring ephemerals and riparian flowering plants within a forested area. The stream also remains green with vegetation in the winter months as the water temperature remains above freezing. The soundscapes provided by the stream offer a relaxing environment to visitors. The combined aesthetic and relaxing environment can provide visitors with beneficial green space time that can be a supplement to health and wellbeing (Bratman et al., 2019).

A degrading water control structure and collapsing culvert currently detract from the overall beauty of the area. Due to ravine erosion silt fences have been installed, but are inundated by sediment, detracting from the natural aesthetics. Invasive plants dominate in some places, displacing native plant species and depreciating the biological diversity.

Aesthetics, Viewsheds and Visual Resources: Environmental Consequences

Alternative A - Continuation of Current Management – No Action Alternative

Under this alternative the aesthetics of Ike's Creek would remain unchanged except for alterations from natural processes. Infrastructure and silt fences would remain and continue to degrade and be buried under additional sediment. Although minimal invasive species treatment would continue, widespread removal would not occur in the immediate area. Invasive species would continue to outcompete native vegetation, reducing plant diversity and the natural beauty.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Removing the culvert, water control structure and buried silt fences would improve the scenery of the area. Materials such as rock and wood would be used in the restoration of Ike's Creek habitat, resulting in a more natural appearance. Invasive species would be removed from the riparian area of the lower portion of the stream and replaced with native trees and other vegetation. It would be expected that the aesthetic value would increase with restoration of Ike's Creek and the riparian plant community, heightening the visitor experience.

During construction, additional vehicles and equipment would be present along the stream and in temporary staging areas, which could disrupt viewsheds. However, this would temporarily impact about 10% of the greater Long Meadow Lake Unit. Plenty of other scenic vistas and observation areas would remain available for visitors.

Management and Operations: Affected Environment

In the area surrounding Ike's Creek, regular maintenance operations include trail mowing, maintaining parking lots, removing hazardous trees and repairing trail crossings. Any trees that are safety hazards along, or fall over, trails are removed. Refuge staff and volunteers regularly visit trails to pick up litter and perform light trail maintenance.

Management and Operations: Environmental Consequences

Alternative A - Continuation of Current Management – No Action Alternative

Under this alternative, the culvert and water control structure would not be removed, the ravine would not be stabilized, and more frequent trail maintenance and repair would be required as a result of continued flooding. Maintenance staff often need to clear out culverts or install temporary erosion control to help keep the stream within its banks. Trails would be repaired after streambank overflow and erosion events. Current trail mowing, parking lot maintenance and hazard tree removal would continue.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Under this alternative, removal of the culvert and water control structure, and stabilization of the ravine, would result in less maintenance to stream banks and trails as a result of decreased sedimentation and streambank overflow. A decrease in maintenance needs at Ike's Creek would allow refuge staff to address needs in other

parts of the refuge. Trail mowing, parking lot maintenance and hazard tree removal would continue.

Administration: Affected Environment

The refuge currently has approximately 18 permanent employees, including administrative, biological, fire, maintenance, management, visitor services and wildlife officers. Additional seasonal staff, interns and Minnesota Valley Trust employees work at the refuge at times throughout the year.

Wildlife officers currently conduct patrols on the refuge. The primary issues that occur in the project area are illegal camping, off-trail mountain biking, unauthorized trail construction, dogs off leash, aquatic plant harvesting and illegal hunting and fishing. In addition, wildlife officers assist in posting trail closures during flooding or construction and administer special deer hunts. They also coordinate with other local law enforcement authorities when necessary.

Administration: Environmental Consequences

Alternative A - Continuation of Current Management – No Action Alternative

Under this alternative, administration would be limited to coordinating and budgeting for infrastructure repairs and wildlife officer patrols.

Alternative B – Restoration of Ike's Creek – Preferred Alternative

Under this alternative, refuge and trust staff would support and administer this proposed project. The trust has funds that would help cover the cost of the proposed restoration and associated plans, therefore, there should be minimal cost to the refuge.

Administrative tasks would include grant administration, preparing NEPA documentation, overseeing contractors and providing routine interval inspections. It is anticipated that additional time, staff and resources would be needed to oversee the project but is within the refuge capacity to do so. No additional wildlife officer patrols would be anticipated.

Land Use and Planning: Affected Environment

The Bass Ponds area of the Long Meadow Lake Unit is managed for wildlife habitat, recreational use and environmental education. Through the Fishing in the Neighborhood program, administered by the Minnesota Department of Natural Resources, these fishing ponds are stocked regularly with game fish and provides pond fishing opportunities to people from inner city neighborhoods. Habitat improvements through undesirable woody species removal occurs as part of routine management in the Bass Ponds area.

Land Use and Planning: Environmental Consequences

Alternative A Continuation of Current Management – No Action Alternative and B – Restoration of Ike’s Creek – Preferred Alternative

Under both alternatives, routine management actions in the area of Ike’s Creek would continue as outlined in the refuge’s habitat management plan (U.S. Fish and Wildlife Service, 2018a). However, no additional construction or restoration projects are expected in the vicinity, therefore no cumulative effects are anticipated.

4.7 Summary of Analysis

Table 1: Effects of Alternative A – Continuation of Current Management – No Action Alternative

Affected Resources	Direct Effects	Indirect Effects
Habitat and vegetation	Continued habitat management at existing levels	Continued erosion and potential decrease in habitat quality
Floodplains	None	Continued sedimentation
Wetlands	None	Continued sedimentation
Fish and wildlife species	None	Continued degradation of in-stream habitat
Candidate, threatened and endangered species and critical habitat	Minor, short-term disturbance from habitat management activities	Continued habitat management at existing levels
Special status species	Minor, short-term disturbance from habitat management activities	Continued habitat management at existing levels
Geology and soils	None	Continued erosion
Air quality	None	None
Water resources	None	Continued sedimentation, stream flooding and decreasing water quality
Soundscape	None	None
Climate change	None	Potential increase in sedimentation, erosion, flooding and declining instream habitat/water quality
Cultural and historic resources	None	None
Local and regional economies	None	None
Environmental justice	None	None

Affected Resources	Direct Effects	Indirect Effects
Public health and safety	None	Continued stream flooding and potentially hazardous trail conditions
Land use	None	None
Refuge visitor use and experience	None	Continued stream flooding and temporary trail closures
Refuge aesthetics, viewshed and visual resources	None	Continued stream degradation
Refuge management and operations	Continued maintenance at existing levels	Long-term increase in maintenance needs and refuge resources from continued stream flooding
Refuge administration	Continued administration at existing levels	None
Refuge land use planning	None	None

Table 2: Effects of Alternative B – Restoration of Ike's Creek – Preferred Alternative

Affected Resources	Direct Effects	Indirect Effects
Habitat and vegetation	Minor, short-term disturbance to riparian habitat	Long-term improved riparian habitat (e.g., intensive invasive species removal; reseeded with native vegetation)
Floodplains	No rise in the 100-year floodplain	Long-term decreased sedimentation and improved water quality
Wetlands	Minor (to be determined by wetland delineation)	Long-term net increase in wetland area, reduced sedimentation and improved water quality
Fish and wildlife species	Minor, short-term disturbance	Long-term improved riparian corridor, in-stream habitat and water quality
Candidate, threatened and endangered species and critical habitat	Minor, short-term disturbance	Long-term improved riparian habitat
Special status species	Minor, short-term disturbance	Long-term improved riparian habitat
Geology and soils	Minor, short-term compaction and erosion	Long-term stream stabilization and reduced erosion

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Affected Resources	Direct Effects	Indirect Effects
Air quality	None	None
Water resources	Minor, short-term decrease in water quality	Long-term decrease in sedimentation and stream flooding and increase in water quality
Soundscape	None	None
Climate change	None	Improved resilience to projected climate change impacts
Cultural and historic resources	None pending review by historic preservation officer(s)	None
Local and regional economies	None	None
Environmental justice	None	None
Public health and safety	Minimal, short-term hazards of construction	Reduced trail and safety hazards
Land use	None	None
Refuge visitor use and experience	Short-term trail/area closures and disturbance from equipment and construction	Reduced stream flooding and improved trail conditions and accessibility
Refuge aesthetics, viewshed and visual resources	Short-term disturbance from equipment and construction	Improved viewing from restoration of natural stream features and native vegetation
Refuge management and operations	Continued maintenance at existing levels	Long-term reduction in maintenance needs from decreased stream flooding
Refuge administration	Cost and monitoring within current capacity and budget	None
Refuge land use planning	None	None

Chapter 5: List of Preparers and Sources

5.1 List of Preparers

Theresa Garrison, Conservation Biology Apprentice

Sarah Inouye-Leas, Volunteer Coordinator

Vicki Sherry, Refuge Wildlife Biologist

5.2 List of Sources Consulted

City of Bloomington: Dave Hanson

Lower Minnesota River Watershed District: Linda Loomis

Minnesota Department of Natural Resources: Mark Nemeth

U.S. Fish and Wildlife Service Personnel: Hanna Daly, Faye Healy, Eric Mruz, James Myster

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Appendix A: Applicable Statutes and Executive Orders

Statutes Not Requiring Additional Consideration:

No anticipated impacts to resources associated with the laws and/or executive orders outlined below.

Administrative Procedures Act of 1946: The preferred alternative would not involve developing or issuing regulations (e.g., rulemaking).

Alaska National Interest Lands Conservation Act of 1980, as amended: The preferred alternative would not occur in Alaska.

Anadromous Fish Conservation Act of 1965: Brook trout in Ike's Creek are not considered anadromous fish.

Coastal Barriers Resources Act of 1982: The preferred alternative would not occur on a coast.

Coastal Zone Management Act of 1972, as amended: The preferred alternative would not occur on a coast.

Consultations for Essential Fish Habitat: This consultation requirement is only applicable to marine fish and shellfish. The preferred alternative would not occur in a marine environment.

Emergency Wetlands Resources Act of 1986: No wetlands would be purchased under the preferred alternative.

Executive Order 11644, Use of Off-Road Vehicles on Public Land: No off-road motor vehicle trails would be modified, designated or established under the preferred alternative.

Executive Order 12866, Regulatory Planning and Review: No changes to new or existing regulations would occur under the preferred alternative.

Executive Order 13563, Improving Regulation and Regulatory Review: No changes to new or existing regulations would occur under the preferred alternative.

Farmland Protection Policy Act of 1981, as amended: The preferred alternative would not convert farmland to nonagricultural uses.

Federal Cave Protection Act of 1988: No significant caves exist within the proposed action area.

Plant Protection Act of 2000: The preferred alternative would not include the interstate commerce of federally designated noxious weeds.

Fishery (Magnuson) Conservation and Management Act of 1976: The preferred alternative would not occur in a marine environment.

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Lacey Act of 1900: The preferred alternative would not involve the importation, exportation, transportation, sale, receipt, acquisition or purchase of any fish, wildlife or plants.

Marine Mammal Protection Act of 1972, as amended: The preferred alternative would not occur in a marine environment.

Migratory Bird Hunting and Conservation Stamp Act of 1934: The preferred alternative would not include any migratory bird hunting, and no project funding would come from the Migratory Bird Conservation Fund.

Paleontological Resources Protection Act of 2009: No paleontological resources exist within the proposed project area.

Rivers and Harbors Act of 1899: Ike's Creek is not a navigable waterway.

Resource Conservation and Recovery Act of 1976: The preferred alternative would not involve hazardous waste.

Safe Drinking Water Act of 1974: No potable water exists in or near the proposed action area.

Water Resources Planning Act of 1965: The preferred alternative would not require review by the Water Resources Council because no river basin plans or federal water projects would occur.

Wild and Scenic Rivers Act of 1968, as amended: No designated wild and scenic rivers occur within the proposed project area.

Wilderness Act of 1964, as amended: No designated wilderness areas occur within the proposed project area.

Statutes with a Nexus

American Indian Religious Freedom Act of 1978: The refuge consulted with federally recognized Native American Tribes with potential interest in the preferred alternative and determined there would be no infringement on traditional religious rights and cultural practices. The preferred alternative would not occur on a religious site and would not limit or change the ability of tribes to access Ike's Creek.

Americans with Disabilities Act of 1990: The preferred alternative could impact trails. Any modifications or improvements would be compliant with the Americans with Disabilities Act and accessible to people of all abilities.

Antiquities Act of 1906: The preferred alternative would not occur in an area of known historic or scientific interest. No examination of ruins, excavation of archaeological sites or gathering of objects would occur. The state and regional historic preservation officers would be contacted prior to the start of any construction and mitigation measures would be in place if unanticipated antiquities are found. See the Cultural and Historic Resources Section for additional information.

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Archaeological and Historic Preservation Act of 1974: The preferred alternative would not occur in an area of known historic or scientific interest and is not expected to result in the loss of destruction of significant scientific, historical or archeological data. The state and regional historic preservation officers would be contacted prior to the start of any construction and mitigation measures are in place if unanticipated objects of archaeological and historic significance are found. See the Cultural and Historic Resources Section for additional information.

Archaeological Resources Protection Act of 1979, as amended: The proposed action and alternatives would not involve the excavation of archaeological sites. The state and regional historic preservation officers would be contacted prior to the start of any construction and mitigation measures are in place if unanticipated objects of archaeological and historic significance are found. See the Cultural and Historic Resources Section for additional information.

Architectural Barriers Act: The preferred alternative could impact trails. Any modifications or improvements would be compliant with the Architectural Barriers Act and accessible to people of all abilities.

Bald and Golden Eagle Protection Act of 1940, as amended: Bald eagles nest in the Long Meadow Lake management unit of the refuge, however no nests are located in or near the proposed action area. No take of bald eagles, including their parts, nests or eggs would occur. National Bald Eagle Management Guidelines would be followed to minimize and mitigate disturbance that would injure an eagle, decrease its productivity or cause nest abandonment (U.S. Fish and Wildlife Service, 2007). See the Special Status Species section for additional information.

Clean Air Act of 1970: The use of construction equipment under the preferred alternative would have a negligible impact on air quality and comply with all federal, state, local and tribal clean air act requirements. See Section 4.1 General Description of Affected Environment Applicable to All Resources.

Clean Water Act of 1972, as amended: The preferred alternative would not discharge pollutants into surface waters. Contractors would be required to mitigate erosion, sedimentation and runoff during construction. Restoring the geomorphology of Ike's Creek would improve water quality long-term. See the Water Resources Section for more information.

Endangered Species Act of 1973, as amended: The U.S. Fish and Wildlife Service Ecological Services Field Office would be consulted prior to the start of any construction to ensure that the preferred alternative would not jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. See the Candidate, Threatened and Endangered Species and Critical Habitat Section for more information.

Fish and Wildlife Act of 1956: The preferred alternative would assist in the conservation of brook trout in Ike's Creek by improving stream habitat. Restoring Ike's Creek and

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ensuring the continued existence of a healthy brook trout population would contribute to the health, recreation and well-being of refuge visitors and local residents.

Fish and Wildlife Coordination Act of 1958: The preferred alternative would improve instream habitat in Ike's Creek, which would not only benefit brook trout but other wildlife species and resources as well. The restoration of Ike's Creek would not impound, divert or channelize the stream or be modified for any other purpose such as navigation or drainage.

Migratory Bird Conservation Act of 1929: The preferred alternative would not interfere with the protection of migratory birds. No land would be acquired with or maintained by dollars from the Migratory Bird Conservation Fund. See Special Status Species Section for more information.

Migratory Bird Treaty Act of 1918, as amended: The preferred alternative could temporarily disturb and displace migratory birds during construction, however sufficient refugia would be available in adjacent areas. See Special Status Species section for more information and specific mitigation measures.

National Environmental Policy Act of 1969: This environmental assessment is a public document prepared by the U.S. Fish and Wildlife Service to comply with the National Environmental Policy Act. Analyses included in this document will determine if the proposed federal actions would have the potential to cause significant impacts to the quality of the human environment.

National Historic Preservation Act of 1966, as amended: The preferred alternative would consider impacts to cultural and historic resources due to the age of the water control structure and ground disturbing activities. Prior to construction the Regional Historic Preservation Officer would be consulted, and the contractor would survey the proposed project area to ensure no significant impacts to protected resources would occur. See Cultural and Historic Resources Section for more information and specific mitigation measures.

National Wildlife Refuge System Improvement Act of 1997: The preferred alternative would conserve brook trout by improving and restoring habitat in Ike's Creek on Minnesota Valley National Wildlife Refuge.

Native American Graves Protection and Repatriation Act of 1990: The preferred alternative would not occur in an area with known Native American cultural items or involve the repatriation or transfer of such items. See the Tribal Consultation Section for more information on how tribes would be informed and consulted with regarding the proposed action. The state and regional historic preservation officers would be contacted prior to the start of any construction and mitigation measures are in place if unanticipated cultural items are found. See the Cultural and Historic Resources section for additional information and specific mitigation measures.

Noise Control Act of 1972: The preferred alternative would involve the use of construction equipment and would not significantly add to noise levels in the proposed

project area due to the high ambient volume of interstate traffic, building development, air traffic from the Minneapolis-St. Paul airport and other sound associated with a large metropolitan area.

Refuge Recreation Act of 1962, as amended: The preferred alternative would indirectly benefit wildlife-dependent recreation by reducing flooding on trails and replacing the water control structure with a bridge.

Executive Orders

Executive Order 11593, Protection and Enhancement of the Cultural Environment: The preferred alternative would consider impacts to cultural and historic resources due to the age of the water control structure and ground disturbing activities. Prior to construction the Regional Historic Preservation Officer would be consulted, and the contractor would survey the proposed project area to ensure no significant impacts to protected resources would occur. See Cultural and Historic Resources Section for more information and specific mitigation measures.

Executive Order 11988, Floodplain Management: The actions proposed under the preferred alternative would be analyzed by a professional engineer to ensure no negative impacts to floodplains would occur. Long-term the restoration of Ike's Creek would improve floodplain characteristics through reduced sedimentation. See the Floodplains Section for more information.

Executive Order 11990, Protection of Wetlands: The preferred alternative would improve wetlands by creating more wetland and riparian habitat. Mitigation strategies would be outlined in contracts if wetland delineation determined the potential for negative impacts to wetland resources. See the Wetlands Section for more information.

Executive Order 12898, Federal Actions to Address Environmental Justice for Minority Populations and Low-Income Populations: The preferred alternative would not have disproportionately high or adverse impacts on minority and low-income populations. The restoration of Ike's Creek would provide improved greenspace equitably to all refuge visitors. See Environmental Justice Section for more information.

Executive Order 12962, Recreational Fisheries: Although Ike's Creek is not currently open to fishing, if the preferred alternative is successful, it could be open in the future. The preferred alternative would restore habitat in Ike's Creek to support a viable, healthy and naturally reproducing population of brook trout. The proposed project would foster partnerships between the refuge, local municipal and state governments and federally recognized tribes and could assist private landowners with conserving and enhancing aquatic resources on their land.

Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System: The preferred alternative would continue to fulfill the biological integrity and environmental health requirements of the refuge system (e.g., conserve the refuge's brook trout population), ensure collaboration between the refuge, local

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municipal and state governments and federally recognized tribes and provide the public with the opportunity to provide input on the proposed project (e.g., public comment period for at least 30 days).

Executive Order 13007, Indian Sacred Sites: The preferred alternative would not occur in an area with known sacred sites. See the Tribal Consultation Section for more information on how tribes would be informed and consulted regarding the proposed action.

Executive Order 13112, Invasive Species: Under the preferred alternative, the refuge would require all construction equipment and materials be free and clear of plant material before entering or exiting the proposed project area to prevent the spread of invasive species. Any reseeding or planting post construction would use native species.

Executive Order 13175, Consultation and Coordination with Indian Tribal Governments: No statutory, regulatory or policy changes would occur under the preferred alternative. See the Tribal Consultation Section for more information on how tribes would be informed and consulted regarding the proposed action.

Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds: The preferred alternative would not have a measurable negative effect on migratory bird populations. See the Special Status Species Section for more information on potential impacts and mitigation measures.

Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis: Under the preferred alternative no regulations would be promulgated, or other actions taken that would conflict with the national objectives of this executive order.

Executive Order 14008, Tackling the Climate Crisis at Home and Abroad: The preferred alternative would not have disproportionately high and/or adverse impacts on human health, the environment or other climate-related impacts on disadvantaged communities. The restoration of Ike's Creek would provide improved greenspace equitably to all refuge visitors. See Environmental Justice Section for more information.

Appendix B: Figures

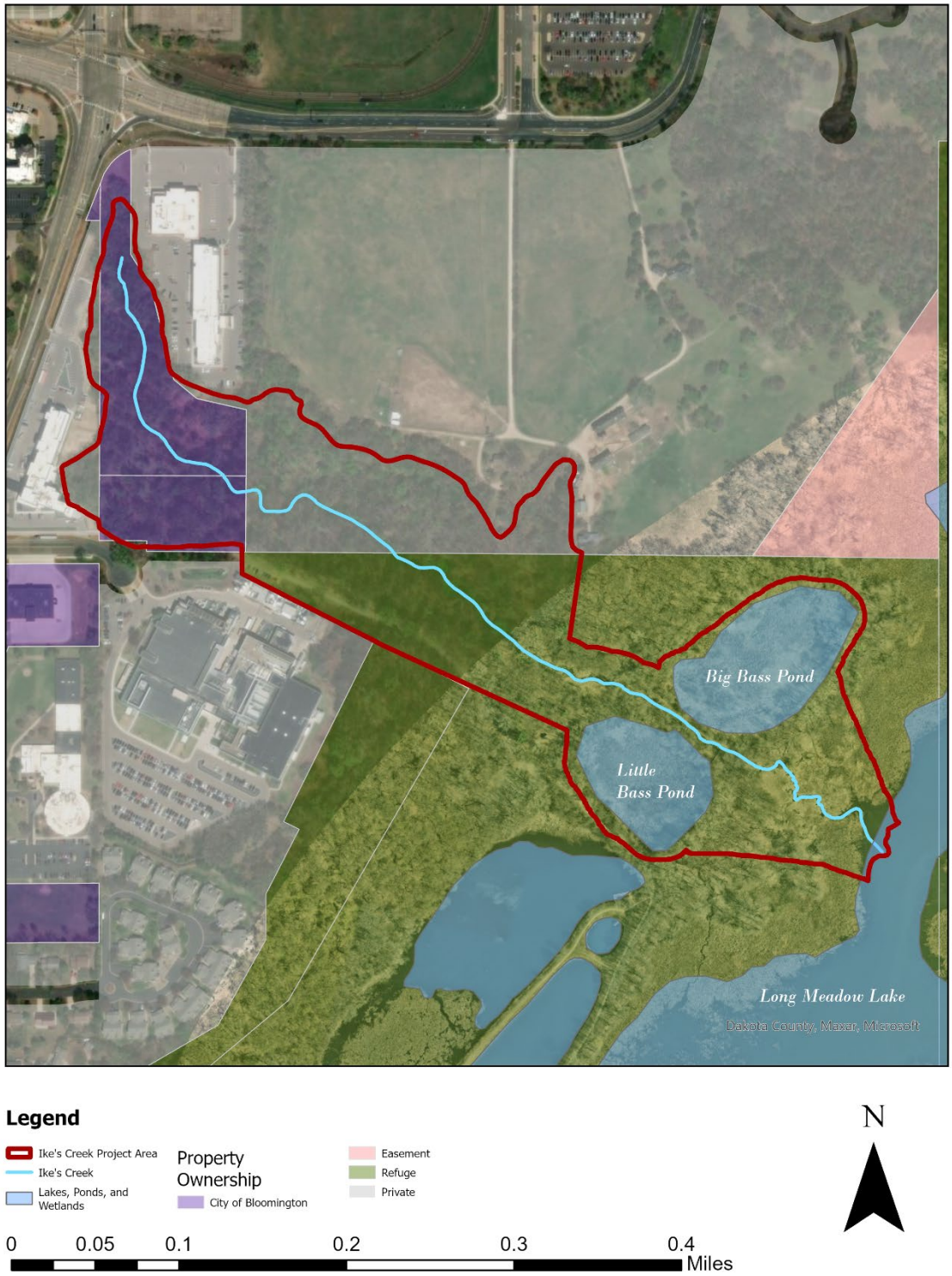


Figure 1: Ike's Creek proposed project area and property ownership map

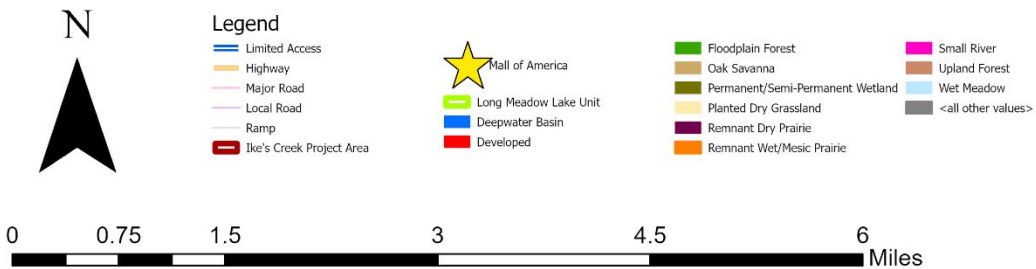
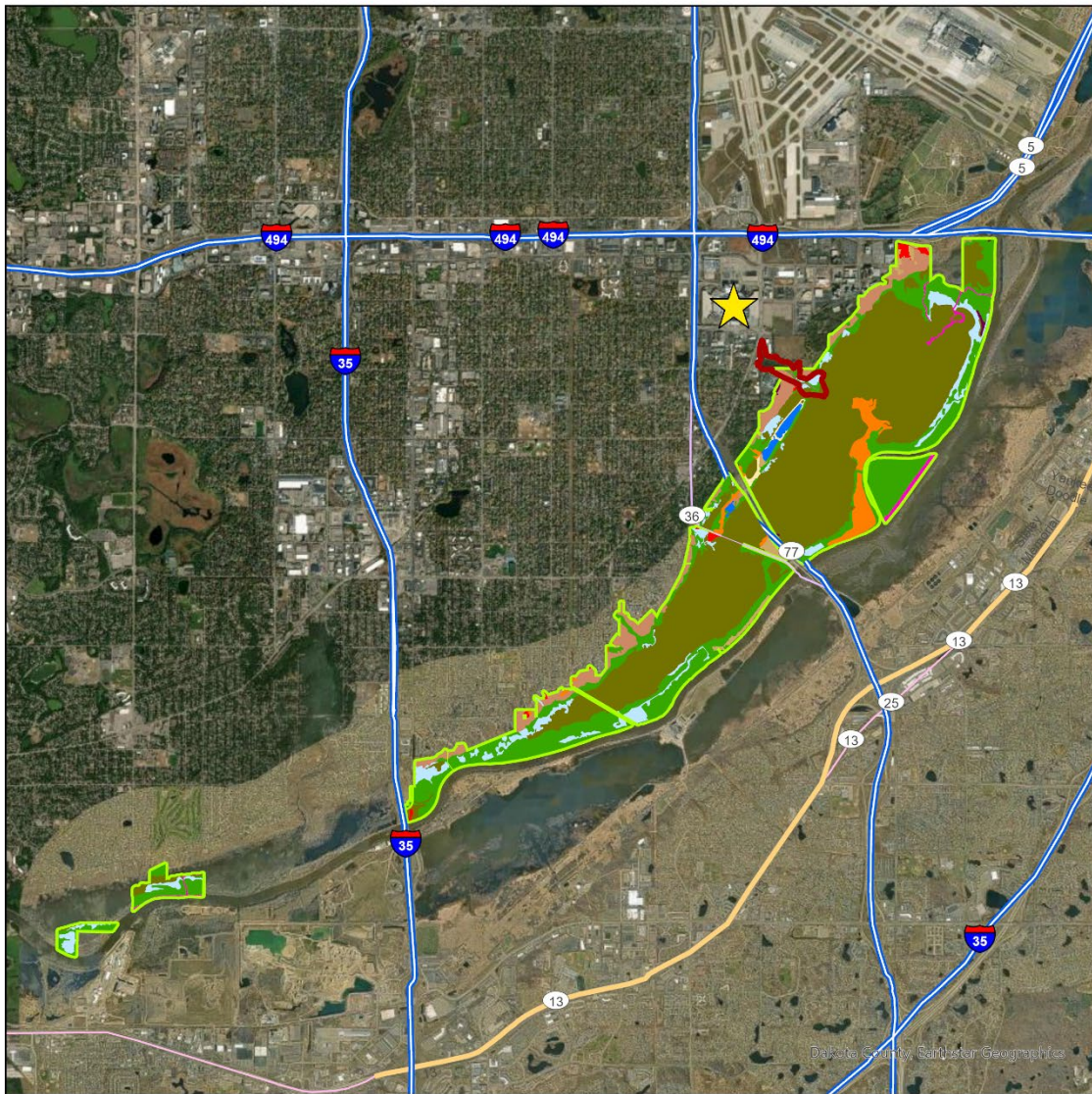


Figure 2: Long Meadow Lake Unit and habitat type map



Figure 3: Water control structure



Figure 4: Culvert



Figure 5: Ravine erosion