July 2013 version

Environmental Assessment Worksheet

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at: http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addresses collectively under EAW Item 19.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. **Project Title:**
   Grindstone Dam Removal Project

2. **Proposer:**
   Contact Person: Leslie George
   Title: Area Fisheries Supervisor
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3. **RGU:**
   Contact Person: Becky Horton
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4. **Reason for EAW Preparation:**

Required	Discretionary
✓ EIS Scoping	Citizen petition
Mandatory EAW	RGU discretion
	Proposer Initiated

If EAW is mandatory, give EQB rule category subpart number(s) and name(s): Minnesota Rules, 4410.4400, subpart 20. Wetlands and public Waters- elimination of a public water.

5. Project Location:

County: Pine
City/Township: Hinckley
PLS Location (¼, ¼, Section, Township, Range): N/N

¼, ¼	Section	Township	Range
NW1/4, NW1/4	24	41	21

Watershed (81 major watershed scale): Kettle River (35)
GPS Coordinates: 46.02272, -92.94771 (Decimal Degrees) (Center point of reservoir)
Tax Parcel Number(s):
400108000
400108000
400109000
400110000
400112000
150248000
150249000

Attachments: At a minimum, attach each of the following to the EAW:

- County map showing the general location of the project;
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); and
- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.

Figure 1: County map showing general project location
Figure 2: USGS 7.5 minute, 1:24,000 scale map indicating project boundaries
Figure 3: Map of project area with municipal boundaries and areas of interest
Figure 4: Wetlands map
Figure 5: Photo of Grindstone Dam
Figure 6: Concept site plans

6. Project Description:

a. Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).

The Department of Natural Resources (DNR) proposes to remove the dam on the Grindstone River at Hinckley, and restore connectivity to the river channel. This would result in the permanent removal of the 26.6 acre Grindstone Reservoir, a public water basin. The removal is proposed because the dam is in poor condition, a safety hazard, and a barrier to passage of fish and other aquatic wildlife on the river. In addition, the dam does not allow for natural sediment transport and natural stream features or habitat diversity.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

The Minnesota Department of Natural Resources (DNR) proposes to remove the dam on the Grindstone River in Hinckley and restore the river channel. There has been a history of dams at this location for various uses (logging, hydropower, water storage) since the late 1800s. The former Minnesota Department of Game and Fish constructed the current dam in 1931 to provide a water supply for fish rearing ponds. The current dam has failed twice, in 1944 and 1954, due to high water events. Major repairs were necessary in 1976, 1985, and 2014. The DNR Dam Safety Unit, in an inspection report dated February 2017, determined the dam to be in stable but poor condition. The proposed project is located largely within the Hinckley Aquatic Management Area (AMA), which is owned by the State of Minnesota and managed by the DNR. Aquatic Management Areas provide angler and non-boat public access to water resources, protect critical shoreland habitat and provide areas for education and research. The AMA is located almost entirely within the city limits of Hinckley in Pine County (Figures 1, 2, and 3). The AMA contains the 26.6-acre Grindstone Reservoir, which is impounded by the dam and contains the confluence of the North and South Forks of the Grindstone River; as well as three fish rearing ponds located approximately 0.2 miles downstream of the dam along the Grindstone River. The area of impact of the proposed project includes the 26.6-acre Grindstone Reservoir, which would be permanently eliminated, the area immediately surrounding the dam, access routes for construction equipment, and downstream areas that may receive sediment.

The existing dam consists of an uncontrolled concrete spillway with a sluicegate. The dam has a height of 23 feet and length of 58 feet from abutment to abutment and a 6-foot vertical drop from the spillway. Metal pipe railings are located on top of the reinforced concrete abutments and wing walls (Figure 5).

Implementation of the proposed project would include the drawdown of the reservoir, removal of the dam and restoration of the river channel. Specifically, the proposed project includes demolition and removal of the main spillway structure and its abutments, the sluicegate, sheet piling and concrete reinforcements on the embankments. All waste materials resulting from the demolition and removal of the dam would be disposed of at an approved offsite facility. Staging areas for heavy equipment would be located in the current parking area near the dam. Once the reservoir is dewatered and soils become dry, additional staging areas may be located within the newly created floodplain, if additional work is needed to shape the river channel.

Demolition of the dam would be done preferably during low flow conditions (which typically occur late summer through fall), but could begin in normal mid-summer flows. Flow monitoring may be conducted before the proposed project begins to determine the exact timing and dewatering strategy. Equipment used in the demolition of the dam would likely be a hydraulic jackhammer or grinder attached to a tracked backhoe, which would be parked on the south embankment of the dam. Typically, a dam removal begins with a series of notches created in the spillway to initiate a slight increase in the rate of water release. Demolition would proceed in a slow, precise manner to allow for a gradual, controlled release of water, which would minimize excess flow and deposition of sediment downstream. Removal of the spillway and drawdown would be expected to take up to

four weeks, depending on river flow and precipitation, and to allow for stabilization of sediments to form the floodplain in the emerging reservoir bed.

Once the drawdown is complete and the spillway removed, the remaining components of the dam would be demolished and removed from the site. Water would continue to run through the site and work would occur during low flow conditions. The earthen embankments would be excavated and graded using heavy equipment to allow for passage of flood flows and to maintain continuity with the floodplain. As the reservoir nears the end of drawdown and the floodplain establishes from exposed sediment, the river channel would reconfigure with pattern, dimension, and profile based on the underlying substrate and historic meander patterns. Typically, the thalweg (deepest portion of the channel) would end up in the deepest part of the reservoir, most likely the historic channel itself. The new channel may laterally migrate small distances during this time as the channel stabilizes and vegetation establishes.

Immediately after dam removal, it is expected that a form of grade control would need to be installed in the channel in the area of the removed dam to slow flows and prevent excess incision of the channel. This would likely take the form of a series of in-stream riffles. After the dam is removed, the project proposes to allow the river channel to reform naturally for a period of months to one year, as determined by reservoir sediment, rainfall frequency and intensity and channel-forming flows (flows that occur when the river reaches the top of its banks). Once the main channel would be considered to be established (expected to be within one-year post-dam removal), the need for any further intervention would be assessed (example: head cutting of tributaries and/or loss of floodplain connectivity).

There are two alternatives related to the stream channel restoration that would include varying levels of engineering design and intervention:

1) As soon as is practical after dam removal (likely the following summer), encourage and steer channel formation in a specific pattern and path within a certain location of the river channel while balancing engineering capabilities, ecological benefits and legal requirements. This may also include some bank stabilization efforts.
2) As soon as practical after dam removal, (likely the following summer), manipulate the resultant channel along much of its distance within the AMA to design specifications to ensure channel stability, river access to the floodplain, and ensure any legal requirements that may be determined for the river's course are met.

Alternatives 1 and 2 described above would be informed by topographic surveys to assess the slope of the reservoir bed, historic pattern, and size of bed materials. The floodplain width and slope would be determined by upstream and downstream constraints and conditions, as well as scaling to reference sites located on the Grindstone River. If deemed necessary, the additional channel work involved in alternatives 1 or 2 would be designed and implemented within a single bid and constructed as weather conditions allow, likely being completed over the one to two growing seasons following dam removal.

The stream channel restoration would include hydraulic analyses to ensure that there are no impacts to crossings and infrastructure downstream. Floodplain grading may occur post-dam removal if determined to be necessary for connectivity. Grading, any necessary stream channel modification/excavation, and installation of grade control would require the use of heavy equipment. Natural excavated materials (soil and rock) from the dam's removal and any bank shaping/grading necessary would be used on-site to ensure design elevations are

met. Continuous intervention to the channel is not expected after the restoration (natural or engineered) is completed.

Soil stabilization would begin immediately and completed within seven days (weather dependent) of temporarily ceasing soil disturbance in any location of the proposed project, as required by permits. During restoration, the exposed soils of the floodplain would be seeded with a native plant mixture; trees may be selectively planted in the following year. Newly-exposed reservoir sediments typically experience significant vegetation the first growing season; however, it would take two to three growing seasons for the native planting to fully establish. The site would be monitored for invasive species and vegetation best management practices would be used to control invasive species.

The Grindstone Reservoir currently provides a water source for three drainable fish rearing ponds located 0.2 miles downstream from the dam along the Grindstone River (Figure 3). The ponds are separated from the river by an earthen dike. The southernmost pond was built in the late 1930s; two additional ponds were added in the 1940s. The three ponds currently provide approximately 20 percent of the DNR's annual muskellunge fingerling production. Currently, the DNR draws water from the Grindstone Reservoir to fill the ponds under a long-term DNR water appropriation permit (2018-0240). Beginning in April each year the ponds are filled via a gravity-fed pipeline running from the water intake structure in the reservoir to a pump house adjacent to the ponds. Approximately 15 million gallons of water is required to fill all three ponds. Once filled and dependent upon summer rainfall amounts, the ponds generally only require occasional additional inputs of water during the summer unless there is significant loss from evaporation.

In June, muskellunge that have been reared in a hatchery are placed in the ponds and allowed to grow. After about four months of growth, the muskellunge are collected and the ponds are drained with the water allowed to flow back into the river. This fill/drain process has been used annually since 2009 when improvements were made to the drainage of the second and third ponds, but the annual cycle of filling, muskellunge rearing, and draining has taken place for over 40 years.

The permanent water level change resulting from the removal of the dam and the elimination of the reservoir would render the current water intake at the reservoir unusable and would require an alternate water source to fill the ponds. Funding for engineering to design an alternate water source for the fish rearing ponds has been secured and DNR engineering staff are currently designing a system that would use the Grindstone River as the water source. Current discussions involve the installation of a filter bed in the streambed near the southernmost pond to facilitate its filling, and using existing infrastructure as much as possible to fill the other two ponds. Execution of the project would likely involve burying electrical lines and water pipes in more than one location in the dikes surrounding the ponds. A short-term, in-channel stream diversion would likely be needed to dewater the immediate area of construction of any included filter bed. It is also possible that the water line currently in use, which runs from the reservoir to the pond pumphouse, may need to be removed and/or filled, depending on the specific location. Due to the importance of these rearing ponds to the DNR muskellunge stocking program, the water supply project has been given a high priority by the DNR Section of Fisheries. Once engineering staff determine a final design and cost estimate, the availability of funds would determine when the water intake system would be constructed. Ideally, in an attempt to minimize disruption to fish production, construction would take place in concert with the removal of the dam. Other than changes to the water supply,

no other changes to rearing pond operations are anticipated. A DNR Public Waters Work Permit and a DNR Water Appropriation Permit would be required for the above described work.

c. Project magnitude:

Type	Amount
Total Project Acreage	50.05
Linear project length	6,750 feet
Number and type of residential units	not applicable
Commercial building area (in square feet)	not applicable
Industrial building area (in square feet)	not applicable
Institutional building area (in square feet)	not applicable
Other uses – specify (in square feet)	not applicable
Structure height(s)	not applicable

The current impoundment has an area of 26.6 acres, which includes 0.15 acres of embankments and temporary access road, as well as 23.3 acres of Types 1, 3, 4, 6, and 7 wetlands adjacent to, or near, the impoundment.

d. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

Project Need

The Grindstone River dam, built in 1931, has reached the end of its expected life cycle, already having required multiple expensive repairs to keep it in service. The dam is a safety hazard, with at least two documented drownings at the site. The dam is a barrier to fish passage, and fewer species occur upstream from the dam than downstream. The proposed Project is needed to address public safety concerns from the dam due to the identified instability issues and inability to pass floods. The proposed Project is also needed to allow for passage of fish and other aquatic wildlife and restore natural stream features, natural sediment transport and habitat diversity within this section of the Grindstone River.

Project Purpose

The purpose of the proposed project is to:

1. Address the threat of dam failure, address safety concerns, and minimize impacts from flooding by providing a larger floodplain;
2. Restore fish and aquatic life connectivity to the Grindstone River system;
3. Increase pool and riffle habitat;

4. Improve hydrologic function of the Grindstone River (by restoring normal sediment and nutrient transport).

Beneficiaries

The public would benefit from the removal of the drowning hazard just downstream of the dam, as well as elimination of the threat of dam failure and the resulting flooding due to dam failure. Currently, there is little fishing or boating use on the reservoir. A 2017 electrofishing survey found very few game fish in the reservoir, while the fish population downstream from the dam was more diverse. Creating fish passage and restoring the river channel would likely improve the fish population and create better shore fishing opportunities for the public, as well as providing opportunities for canoeing, kayaking, tubing and wildlife viewing.

e. Are future stages of this development including development on any other property planned or likely to happen, Yes or No? Yes
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

The DNR was granted $150,000 by the Minnesota Legislature during the 2019 session to 'maintain the history of the Grindstone River Dam at Hinckley'. These funds will be distributed to the DNR via a Minnesota Historical Society grant in 2020. Funds are expected to be used to conduct an interpretive planning effort to develop and design an educational kiosk. This kiosk would be installed within a previously disturbed area near the parking lot and current dam location.

f. Is this project a subsequent stage of an earlier project, Yes or No? If yes, briefly describe the past development, timeline and any past environmental review.

The proposed Project is not a subsequent stage of an earlier future project.

7. Cover Types:

Estimate the acreage of the site with each of the following cover types before and after development:

Blank	Before	After
Wetlands	23.3	23.3
Deep water/streams	26.6	7.75
Wooded/forest	0	0
Brush/Grassland	0	19
Cropland	0	0
Lawn/landscaping	.15	0
Impervious Surface	0	0
Stormwater Pond	0	0
Other (describe)	0	0
Total	50.05	50.05

The wetlands acreage listed above includes Circular 39 Types 1, 3, 4, 6, and 7 wetlands that would potentially be impacted by the proposed project. These numbers are from the 2019 update to the National Wetlands Inventory; a wetland delineation would be conducted to determine exact acreages. The removal of the dam would change the cover type of the current reservoir from a 26.6 acre deep water/stream to a restored river channel with connected floodplain.

8. Permits and approvals required:

List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. *All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.*

Unit of Government	Type of Application	Status
US Army Corps of Engineers (USACE)	Section 10 Permit	To be obtained
USACE	Section 404 Permit	To be obtained
DNR	Public Waters Work Permit (depending on Permitting process and timing, multiple permits may be needed)	To be obtained
DNR	Water Appropriation Permit	To be amended
DNR	Wetland Conservation Act	To be obtained
DNR	Dam safety permit	To be obtained
DNR	Endangered Species Taking Permit	To be obtained
Minnesota Pollution Control Agency (MPCA)	National Pollution Discharge Elimination System (NPDES) Construction Stormwater (CSW) Permit	To be obtained
MPCA	401 Water Quality Certification Antidegradation assessment	To be obtained
MPCA	Notification to Manage Dredged Material Without a Permit	To be obtained if necessary
City of Hinckley and/or Pine County	Permit to move fill within shoreland management zone	To be obtained if necessary
Pine County	Wetland Conservation Act (WCA) review (wetland impacts outside of state owned land)	To be obtained if necessary

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

9. Land Use:

a. Describe:
   i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.

The proposed Project lies almost completely within Hinckley Aquatic Management Area (AMA) public access parcels, which is administered by the DNR Section of Fisheries (Figure 3). Currently, the proposed project area consists of the Grindstone Reservoir (Public Water Basin 58-0121-00), which is a shallow, open water impoundment classified as a Recreational Development lake, and surrounding riparian woodland. Other non-publicly accessible parcels of the AMA include three fish rearing ponds discussed in Item 6b.The impoundment of the Grindstone Reservoir has a public access and a fishing pier, which receives light fishing use. The Willard Munger State Trail, owned and administered by the DNR Division of Parks and Trails, runs adjacent to the east side of the reservoir and has its southernmost trailhead nearby. This paved, abandoned rail right-of-way runs from Hinckley to Duluth and is used for walking, biking, inline skating, and snowmobiling. During a 2019 study, the average daily trail traffic during the summer was around 250 passes (traffic use is not the same as people or visits, since someone going out and back would be counted twice). Compared to other state trails, trail traffic is moderate. Land uses in the vicinity include residential housing to the north, east, and south within the City of Hinckley; a gravel mining operation to the northwest; agricultural fields (not classified as prime or unique) to the north and south; and athletic fields and DNR fish rearing ponds to the east. Private residences range from about 200 to 500 feet from the reservoir; the corner of one private landowner's property abuts the shoreline of the reservoir. The Hinckley downtown area is approximately a quarter mile to the southeast.

   ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The 2017 Hinckley AMA Management Guidance Document (MGD) informs management and use of the AMA. Aquatic Management Areas are established "to protect, develop, and manage lakes, rivers, streams, and adjacent wetlands and lands that are critical for fish and other aquatic life, for water quality, and for their intrinsic biological value, public fishing, or other compatible outdoor recreational uses."

The City of Hinckley Comprehensive Plan includes a section that discusses the natural environment, which includes a goal statement, objectives and policies regarding natural environment features within the city. The goal statement of this section reads, "A fundamental goal of the City is to preserve and protect the environmental features of the community including sensitive habitats or ecosystems of the natural environment. To the extent possible, natural features should be enhanced and treated as an amenity." One objective listed under this goal states: "Maintain and improve the natural and aesthetic quality of the City's water resources." Policies informing natural environment goals include two items relevant to the proposed project:

1. The City's unique natural, scenic, and historic areas should be identified, protected, and developed for public use and enjoyment with the primary purpose being preservation of these resources.
2. The importance of the river, forests, streams, ponds, open spaces, and other significant natural features to the quality of life shall be recognized and appropriately managed and preserved for future generations.

The City of Hinckley Wellhead Protection Plan (WHP) (June 2013 - June 2023) addresses groundwater management in the city Drinking Water Supply Management Area (DWSMA), which includes portions of the reservoir and river. Goals identified in the WHP are to maintain a safe and adequate drinking water supply for community residents and prevent contaminants from reaching levels that present a risk to people's health.

The Kettle River Watershed Restoration and Protection Strategies (WRAPS) document currently in development sets goals for reductions of nutrient loading and stressors in the watershed. The Pine County Water Plan (2015-2020) and the Kettle River Watershed Landscape Stewardship Plan (2014) identify goals to protect and improve water quality, and protect and increase forested riparian zones.

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

DNR policies concerning AMA use and management apply to this area. Shoreland areas of the proposed project are subject to the Hinckley and Pine County Shoreland Management Ordinances and lie within Federal Emergency Management Agency (FEMA) flood zones. Within the city of Hinckley, areas surrounding the current Grindstone Reservoir are zoned Public/Semi Public and Single Family Residential. The City of Hinckley Drinking Water Supply Management Area (DWSMA) extends to the upper reaches of the reservoir and the Grindstone River (Figure 3).

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

The Grindstone Reservoir currently provides a water supply for the fish rearing ponds mentioned in Item 6b. As proposed, the Project would require DNR to find an alternate water supply for the ponds, such as pumping directly from the Grindstone River.

This proposed project is consistent with the Hinckley AMA MGD directives for desired future facility development; the plan states, "Structural removal or modification of the dam is a high priority due to the structure's poor condition and a desire to allow for fish passage".

The Hinckley Shoreland Management Ordinance considers the Grindstone Reservoir as a Recreational Development lake. Extent of the shoreline management zone around the reservoir would change from 1,000 feet from the current shoreline to 300 feet from the new riverbank. Permits as discussed in EAW Item 8 would be required for movement of fill in excess of 10 cubic yards within the shoreland impact zone. A preliminary hydraulic study determined that removal of the dam would not increase the FEMA base flood elevation upstream or downstream of the dam.

The proposed project appears compatible with the "restoration and enhanced habitat in the Grindstone River" goals of the Pine County Water Plan (2015-2020), the Kettle River Watershed Landscape Stewardship Plan (2014), and the City of Hinckley Comprehensive Plan.

Preliminary findings from the Kettle River Watershed Stressor ID, Total Maximum Daily Load (TMDL) and WRAPS study indicate that the Grindstone River dam may be considered a stressor due to its effects on the hydrology and sediment/nutrient transport in the system and the barrier to fish passage. The proposed project appears consistent with the WRAPS goal of reducing stressors to the watershed.

The proposed project appears to be compatible with the City of Hinckley Comprehensive Plan, in that removal of the dam would enhance the habitat and ecosystem of the Grindstone River, while providing the amenity of public access to the river. The City has stated that the dam and reservoir are an integral part of the City's history and currently provides recreation opportunities to city residents and visitors.

The City of Hinckley Wellhead Protection Plan describes effects related to anticipated land and water use changes in 2013-2023, and delineates the DWSMA and Wellhead Protection Area (WHPA). The plan did not anticipate any changes to surface waters. With the elimination of the reservoir, the proposed project would create changes in surface waters. Although the proposed project is expected to have negligible impact on production capacity of Hinckley's municipal water supply wells, the flow field would be altered locally near the Grindstone Reservoir, which could impact how the City's DWSMA and WHPA are delineated. The Minnesota Department of Health (MDH) has indicated that the DWSMA is scheduled to be reviewed within the next few years; any delineation changes would be conducted at that time.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

As discussed in Item 6b, the DNR is studying potential designs for a water supply for the fishponds; it is anticipated that water supply would come from the Grindstone River.

The DNR intends to continue to work with the City of Hinckley to ensure compatibility of the proposed project with the City Comprehensive Plan.

The Minnesota Department of Health (MDH) has indicated that the DWSMA is scheduled to be reviewed within the next few years; any delineation changes would be conducted at that time.

10. Geology, soils, and topography/land forms:

a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

According to the Pine County Geologic Atlas, bedrock in the area of the proposed project is composed of Hinckley sandstone, which lies approximately 20 feet below the surface. The Hinckley sandstone is overlain by a limited extent of buried sand and gravel aquifers and unconsolidated glacial sediment composed of sandy glacial till.

Karst conditions are described as areas underlain by karst-prone bedrock (carbonate bedrock, Hinckley and St. Peter sandstones) with less than 50 feet of overlying glacial sediment. These types of conditions are known to

occur in Pine County; the proposed project area and its immediate surroundings meet the criteria for karst since the Hinckley Sandstone lies approximately 20 feet below glacial sediment. Sinkholes, seeps, or springs have not been documented in the area of the dam; however, it is not known if formal searches for these features have been conducted within the proposed project area and its immediate surroundings. Approximately 10 to 20 miles northeast of Hinckley, hundreds of sinkholes have been mapped near the cities of Sandstone and Askov, and active karst terrain has been documented in the Askov area. In Askov, lagoons for the wastewater treatment facility were unknowingly constructed over karst conditions, which caused land sinking and concerns for waste water drainage into groundwater and surface water, due to the presence of conduits and sinkholes related to the karst conditions present.

Since the geology of the proposed project area meets the definition of a karst prone area, draining of the Grindstone Reservoir could result in land slumping or sinking due to collapse of conduits becoming unsaturated. To better understand potential impacts from the proposed project due to the geology of the area, more specific site information regarding the geology would be collected and is discussed in the DSDD. The study would also help inform mitigation recommendations, if necessary.

b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.

The Hinckley AMA has a forested soil with a mean temperature cooler than 47 degrees Fahrenheit. The soils range from a fine-loamy/sandy, red stony outwash plain with 5 to 15 foot relief. The upland soils surrounding the reservoir are of the Cloquet-Seelyeville-Oesterly (MN249) soil type.

The earthen berm of the reservoir is stable enough to support construction equipment that would be used in the demolition of the dam. The removal of the dam would expose sediment in the reservoir basin. Observations suggest that there is not a deep accumulation of sediment behind the dam as is often seen in reservoirs. Sediments are thought to be predominantly sand, gravel, and cobble.

Immediate environmental effects from dam removal may include excess sediment transport downstream, and erosion as the exposed river channel seeks stability. Demolition and construction sequence would influence sediment transport. Drawdown of the reservoir and dam removal would be completed in a slow, controlled manner to prevent excessive sediment release. In water, Best Management Practices (BMPs) would be utilized as needed; during early stages of demolition, the dam may control sediment release. Some grading and shaping of the embankments would-be necessary immediately following dam removal to prevent erosion in the short term and protect from future flood events. Erosion control BMPs would be used on the embankments and other areas of exposed soil. These may include the use of wildlife-friendly natural fiber, erosion control blankets, silt fencing, synthetic fiber-free hydro-mulch, straw, quick sprouting cover crops and rock checks. Soil stabilization would begin immediately and completed within seven days of temporarily ceasing soil disturbance (weather dependent) in any location of the proposed project. To ensure water quality standards are met, all conditions of

the MPCA's Construction Stormwater Permit and 401 Water Quality Certification would be met. Areas of exposed sediment would be reseeded with a native plant mixture during restoration.

NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 11 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 10.

11. Water resources:

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory (PWI) number(s), if any.

Grindstone Reservoir (PWI 58-0121-00) is a 26.6-acre impoundment at the confluence of the North and South Forks of the Grindstone River (PWI M-50-46-010 and M-50-46-010-003, respectively). The reservoir has existed at various levels and served various purposes since the late 1800s. The North Fork Grindstone River is a designated trout stream in its upper reaches, with the designated portion beginning where it exits Grindstone Lake (PWI 58-0123-00) and ending five miles upstream of Grindstone Reservoir. Downstream of the Grindstone Reservoir, the Grindstone River flows 6.6 miles to its confluence with the Kettle River. The total watershed size is 55,558 acres.

Three drainable fish rearing ponds, Hinckley Ponds 1, 2 and 3 (PWI 58-0122-01, 58-0122-02 and 58-0122-03, respectively) are present downstream of the dam and on the north side of the Grindstone River.

The most recent MPCA 303d Impaired Waters list was approved by the Environmental Protection Agency (EPA) on January 28, 2019 and lists the main stem of the Grindstone River, the South Fork, and the North Fork as impaired stream reaches. The main stem of the Grindstone River (the receiving water) and the South Fork Grindstone River are listed as impaired for Aquatic Life and Aquatic Recreation (fecal coliform), while the North Fork Grindstone River is listed as impaired for Aquatic Recreation (fecal coliform). The Grindstone Reservoir was not evaluated as a basin for impairments due to short water residence time.

ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

The water level in nearby wells ranges from 1,020.4 to 1,028 feet, which is near the surface water level of the reservoir. It is estimated that removal of the dam would result in a maximum 10.5-foot drop in groundwater level. There are no wells onsite. A DNR monitoring well (804703) is located to the south of the reservoir on

Dunn Avenue. Several residential wells are present to the north of the reservoir along Seventh Street (520533, 598022, 720817, 582345), with depths ranging from 47-66 feet. The DNR Groundwater Technical Analysis Workgroup has determined that two of these wells (520533 and 720817) could be at high risk, and two wells (582345 and 598022) could be at moderate risk, of being impacted by the proposed dam removal and the resulting lower groundwater level. Additionally, 23 unverified wells have been identified within 0.5 miles of the dam. Further evaluation would be required to determine whether any of these unverified wells could be impacted by the removal of the dam. More information is needed to better understand how the proposed project may impact groundwater levels and local groundwater use. The accompanying DSDD describes additional information that would be gathered to better understand potential impacts to private wells and their ability to draw water.

The proposed Project is within 0.2 miles of the Hinckley Wellhead Protection Area (WHPA). The City of Hinckley's municipal water supply comes from two deep bedrock wells (425 and 452 feet). Although removal of the dam would likely have a negligible impact on the wells' water levels and production capacity, the pattern of groundwater flow would be significantly altered locally near the reservoir. The change in flow field could impact how the WHPA and DWSMA are delineated. According to the Minnesota Department of Health, the City's DWSMA is scheduled for review within the next few years and changes to how it is delineated would be assessed at that time.

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.
2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.
3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

No wastewater would be produced or treated within the proposed project area. No wastewater discharge to surface waters is proposed or anticipated.

ii. Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

The proposed project area is currently an impoundment, so there is no stormwater runoff under existing conditions. Removal of the dam could cause a short-term introduction of sediment-laden runoff into the Grindstone River downstream of the proposed project site prior to stabilization of the stream channel and establishment of native vegetation. This would be minimized by a slow, controlled drawdown of the reservoir and controlled demolition of the dam planned to occur during normal to low flow conditions to prevent overflow from the dam. Installation of an in-stream filter bed related to the replacement of the fish rearing ponds' water supply would also result in the short-term disruption of stream sediment, but its introduction downstream should be minimized by temporary dewatering of the area and the work taking place under low flow conditions. The proposed project (removal of the dam) and the fish rearing ponds water supply work would require development of separate Stormwater Pollution Prevention Plans, which would be developed in accordance with the National Pollution Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater permit requirements. To prevent runoff, BMPs would be used (e.g., the use of wildlife friendly, natural fiber, erosion control blankets; silt fencing; hydro-mulch; straw; quick growing crops and rock checks). Soil stabilization would begin immediately and completed within seven days of temporarily ceasing soil disturbance (weather dependent) in accordance with permitting requirements.

iii. Water appropriation: Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

The DNR Section of Fisheries currently has a long term permit (2018-0240) for the appropriation of up to 26.5 million gallons of water from the Grindstone Reservoir to seasonally operate three drainable fish rearing ponds (See Item 6b for details). The proposed project would change the source of the water from the Grindstone Reservoir (58-0121-00) to the Grindstone River (M-50-46-010). The amount and timing of water appropriated for use in the fish rearing ponds would not change.

The proposed project would not appropriate surface or groundwater for the removal of the dam. There would be no well abandonment or connection to an existing municipal water supply.

iv. Surface Waters:

1) Wetlands: Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

The Grindstone Reservoir (discussed in detail in EAW Item 11.i.b) has associated peripheral wetlands (Figure 4). These exist in their current locations due to the surface water level maintained by the dam, and would change in nature due to dam removal. The 2019 update to the National Wetlands Inventory identifies the following Circular 39 wetland types adjacent to the reservoir: Type 1 (seasonally flooded): 13.4 acres; Type 3 (shallow marsh): 0.55 acres; Type 4 (deep marsh): 0.10 acres; Type 6 (shrub swamp): 8.21 acres; Type 7 (forested swamp): 1.19 acres.

Proposed dam removal could lower the water table and potentially change the water depth, vegetation, and associated wildlife use of these wetlands, or convert them to non-wetland areas. Two alternatives to dam removal were considered; each would retain the reservoir water level and avoid wetland impacts: 1) Reconstruction of the dam, and 2) construction of a series of high gradient rapids downstream of the dam to retain the current water level while allowing fish passage. For reasons discussed in the DSDD, these alternatives were deemed to be less feasible or practical than removal of the dam.

Some natural establishment of new wetland areas may occur as the river reconnects with the floodplain. A wetland delineation would be completed prior to the dam removal in areas adjacent to the current reservoir or potentially subject to impacts. A second delineation would take place once the river channel is restored and stabilized to document any wetland loss or change in wetland type. In accordance with state and federal wetland laws, mitigation for wetland loss would occur by purchasing wetland credits or by restoring wetlands within the AMA, if required. With the required mitigation, there would be no net loss of wetlands in and nearby the proposed project area.

2) Other surface waters: Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

The removal of the dam would result in the permanent elimination the Grindstone Reservoir, a human-created public water body; restored river channels of the North and South Forks of the Grindstone River, which are also public waters, would exist where the reservoir had been. Direct and indirect effects could include the following:

- Former lake bed sediments would be exposed, along with any debris that may be on the bottom of the lake.
- Former lake bed would undergo a natural vegetation succession from grass and brush to hardwood forest in the decades following initial seeding and planting.
- The water table in areas near the former lake would drop to the level of the restored river channel. This may change the nature of wetlands adjacent to the reservoir.
- The flood zone and shoreland management zone may be altered.
- The North and South forks of the Grindstone River would have connectivity restored with the lower Grindstone River system, allowing fish and other aquatic life access to more river habitat.

- The normal sediment and nutrient transport function of the Grindstone River would be restored.
- Currently there is a boat launch and fishing pier, which would not be suitable for use in the river and would be removed. Anglers would be able to fish from the restored riverbank and have opportunities to catch fish species that are currently not present in the reservoir. Currently there is little boating use on the reservoir, but the restored river channel and connection to downstream areas of the river may attract recreational use in the form of kayaking, canoeing, and tubing.
- There may be a temporary increase in flows downstream as the dam is removed, along with some sediment release. To minimize excessive flow and sediment release, work would be done during a period of normal to low flow. Drawdown of the reservoir and demolition of the dam would be done in a slow, controlled manner. Best management practices would be used on exposed sediments to reduce erosion; these may include silt fencing, mulch, geo fabric, and seeding. Although motorized use is generally prohibited on aquatic management areas, public access to the newly exposed lakebed would be temporarily barricaded to deter potential illegal off-road vehicle use.

12. Contamination/Hazardous Materials/Wastes:

a. Pre-project site conditions. Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

A search of the MPCA's "What's In My Neighborhood" database found no hazardous waste sites in the vicinity of the proposed project area. Currently, there has been no sediment testing at the site. Upstream land uses are forested with some agriculture consisting mainly of pasture/hayfields. There is no known history of industrial use upstream from or near the reservoir, but sediment in the reservoir would be tested for contaminants prior to dam removal and drawdown. A description of the sediment testing process is included in the DSDD; testing results would help inform mitigation, if necessary. Any hazardous materials found during dam removal and drawdown of the reservoir would be disposed of and handled in accordance with applicable local, state, and federal regulations.

b. Project related generation/storage of solid wastes. Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

The proposed project would generate solid waste from the dam structure removal including concrete, steel sheet piling, and other metal. All waste materials would be collected and disposed of off-site at an approved facility. Any debris that falls into the river bed as a result of dam removal would be immediately removed. Once dam removal would be complete, no further solid wastes are anticipated to be produced by the stream restoration phase of the proposed project.

c. Project related use/storage of hazardous materials: Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number,

location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

During the removal of the dam and river channel restoration, fuels, oils, lubricants and other materials typical for use by heavy equipment would be used on site. The contractor would be required to prepare a Spill Prevention and Response Plan to address accidental spills or the release of any hazardous material or petroleum products. The plan would be required to include the following measures to avoid and/or minimize spills during construction activities:

- Fueling and equipment maintenance would not be allowed within 100 feet of the water's edge without deploying spill capture methods.
- The contractor shall maintain fuel spill containment kits and trained spill response personnel on the site at all times.
- Any spill or release of a hazardous material or petroleum products would be reported to the project site supervisor who would take immediate action to minimize the potential for groundwater or surface water pollution.
- In the event of a significant spill or release of a hazardous material or a petroleum product, the project site supervisor would immediately deploy on-site supplies and equipment to contain the spill and contact the DNR, MPCA and the Minnesota Duty Officer, according to emergency procedures identified in Minnesota Rules, 7045.0574.
- Temporary, above ground, on-site fuel storage would not be allowed within the 100-year floodplain.
- Below ground storage tanks would not be allowed.

d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

The proposed project would not generate or store any hazardous wastes.

13. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

The Hinckley AMA falls within the Mille Lacs Upland Subsection of the Western Superior Uplands. The upland habitat on the Hinckley AMA is representative of a Northern Wet-Mesic Hardwood Forest (MHn46) native plant community. These communities occur as wet-mesic lowland hardwood forests on level sites with clayey subsoils or high local water tables. Quaking aspen and silver maple are most abundant, with oaks, elm, basswood, and red maple present. Most of the shoreline of the river is dominated by species often found in wetter conditions such as cottonwood, boxelder, willows, black ash, and specked alder. Common wildlife species present in the AMA include deer, furbearers, songbirds, reptiles, and amphibians.

A number of invasive upland plant species have been documented within the AMA as well as nearby. Species include Canada and sow thistle, buckthorn, common mullein, spotted knapweed, exotic honeysuckle, birdsfoot trefoil, Kentucky bluegrass, and reed canary grass.

The Grindstone Reservoir is a shallow impoundment with a maximum depth of 10 feet and median depth of 3.3 feet. The small size and shallow depth limit the capacity for game fish species. Submerged aquatic vegetation is abundant, including species such as coontail, northern watermilfoil, elodea, and various pondweeds. One invasive species, curlyleaf pondweed, has been observed. Floating leaf and emergent vegetation includes yellow waterlily, cattail, and arrowhead.

The fish assemblage of the Grindstone River consists of warm water and cool water species. Thirty-one fish species were sampled in a 2017 population assessment. These species included numerous gamefish species such as Black Crappie, Bluegill, Northern Pike, Smallmouth Bass, Walleye, Yellow Perch, Channel Catfish, hybrid sunfish, Green Sunfish, Pumpkinseed, and Rock Bass. The lowest diversity of fish species occurred within the reservoir and upstream in the North and South Forks of the Grindstone River. In contrast, the fish community near the mouth had more species, a greater number of species intolerant of pollution, and a higher percentage of species that require clean, coarse substrates to spawn, indicating high quality habitat. Species diversity near the mouth of the river is likely enhanced due to the proximity and connectivity to the Kettle River, which has a high number of fish species. When combined with other recent surveys by the DNR and MPCA, there have been 45 native fish species documented in the Grindstone River system; there have been 34 species documented in the river downstream of the dam, 15 species documented in the reservoir and 25 species documented in the north and/or south forks of the river upstream of the reservoir.

The Grindstone Reservoir was stocked with various fish species between 1965 and 2003. The goal was to create a "put-grow-and-take" fishery for local anglers. Primary species stocked were Northern Pike, Black Crappie, and Bluegill. Despite the stocking, surveys of the reservoir showed low numbers of fish present. Fish surveys in the river downstream of the dam suggested that significant numbers of stocked fish were leaving the reservoir by swimming over the dam. Limited available habitat and low dissolved oxygen levels in the reservoir in winter could have also affected fish numbers. Angling pressure was never formally surveyed, but observed use of the fishing pier was low. Stocking was discontinued due to the cost and low return of stocked fish to anglers.

Common Carp, an invasive species, has been sampled in the past in the Grindstone Reservoir, with the last occurrence in 2003. This species is very rare in the Kettle River watershed.

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (ERDB 20190379) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

A query of the Minnesota Natural Heritage Information System (NHIS) (ERDB 20190379) was completed (Attachment 1: Natural Heritage review letter), and found several rare animal species near the proposed project area.

The state-listed threatened mussel species mucket (*Actinonaias ligamentina*), elktoe (*Alasmidonta marginata*), and fluted-shell (*Lasmigona costata*) have been documented in the Grindstone River just downstream of the dam. Current conditions are unknown, since the last survey was conducted over three years ago. In order to

determine the potential for a take of state-protected mussels, a survey would be needed in areas that would be impacted by dam removal. A mussel survey would be conducted and is discussed in the DSDD.

Blanding's turtles (*Emydoidea blandingii*), a state-listed threatened species, have been reported in the vicinity of the proposed project, but outside of a one mile radius.

The mudpuppy (*Necturus maculosus*), a state-listed species of special concern, has been found in the Grindstone River just downstream of the dam.

In addition to the species identified in the NHIS query, the creek heelsplitter (Lasmigona compressa), a mussel species of special concern, has been documented in the river downstream of the dam. Lake Sturgeon, a fish species of special concern, are present in the Kettle River system. A 1956 fish survey found sturgeon in the section of the Grindstone River downstream of the dam, however sturgeon have not been found in any recent surveys.

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

Impacts to the Grindstone River fish community

The removal of the Grindstone River dam would restore approximately 6750 linear feet of river habitat that is currently part of the shallow reservoir. The dam presents a barrier to fish passage, and removal would restore connectivity between the main stem of the Grindstone River and 24 miles of the north and south forks.

Studies of the impact of barriers on fish have shown that species richness is generally lower upstream of barriers than downstream, especially for intolerant, stream dependent, and imperiled species. Removal of barriers has resulted in recolonization of fish species in river reaches where they were absent, as well as an increase in catch per unit effort for many species (Aadland, Luther. 2015. Barrier Effects on Native Fishes of Minnesota. MN DNR Division of Ecological and Water Resources, St. Paul, MN).

Many fish species use rocky areas with swift moving waters for spawning. Removing this dam would expose an important section of stream that has steeper slopes and would provide important spawning habitat for many riffle spawning fish species.

The dam unnaturally increases the water surface area thereby increasing uptake of solar energy and increasing water temperature. Removing the dam would allow the system to return to a more natural temperature regime, which would benefit fish species with preferences for cooler temperatures.

Removal of the dam would restore natural sediment transport throughout the river system both upstream and downstream of the dam. The dam creates an unnatural impediment to sediment transport resulting in unnatural accumulation of sediment in the upstream reaches of the reservoir. As a result of the dam's impoundment of water, sediment is deposited in the upstream reservoir. Consequently, the water downstream of the dam is sediment-hungry (has capacity to carry sediment) and the dam causes erosion of stream banks and bed downstream. Restoring sediment transport would benefit the stream stability, decrease erosion caused by the dam, improve water quality (turbidity and temperature) and improve habitat for riparian and aquatic species.

The removal of the Grindstone River dam is expected to have a positive impact on fish species in the system in the long term, and contribute to the resiliency of the ecosystem. These effects would work in concert with watershed restoration projects implemented under the Kettle River Watershed Restoration and Protection Strategies (WRAPS) plan.

Effects on rare species

According to the DNR Rare Species Guide, dams are acknowledged as a threat to rare mussel species. Mussels are dependent on host fish species in the early stages of life; fish movement helps to disperse mussels throughout available habitat. The three threatened mussel species listed above would benefit from the restored connectivity and habitat in the river system. Two of the three species, mucket and elktoe, are not currently known to inhabit river reaches upstream of the dam.

The mussel species, as well as the mudpuppy, may experience direct mortality as a result of the proposed project. They may also experience short-term impacts due to increased sediment load during and immediately after dam removal and in water construction activities. Blanding's turtles could be impacted through direct mortality, or habitat disturbance.

Effects on spread of invasive species

The Grindstone River and impoundment are not listed as infested waters as of January 1, 2020. Common Carp is the only invasive fish species known in the Grindstone River and Kettle River watersheds. This species has been found in the Grindstone Reservoir upstream of the dam in the past but not in recent surveys. Removal of the dam would not provide an opportunity for carp to move into areas where they have not already been documented. Invasive carp species have been sampled infrequently in the lower St. Croix River; however, the dam at St. Croix Falls is a complete barrier to fish migration into the river and watersheds upstream, including the Kettle and Grindstone River watersheds.

Transportation of construction equipment and materials to a project site carries a risk of spreading invasive plant and animal species. The DNR maintains a strict policy to prevent the spread of invasive species on project sites. Measures to prevent spread of invasive species during proposed project activities are described in the next section.

d. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

Sediment release is the main potential adverse effect associated with the dam removal phase of the proposed project. To minimize effects, demolition of the dam would be done during a time of normal to low flow, preferably between July 1 and August 31. The reservoir would be drawn down gradually prior to and during demolition. Demolition would proceed at a rate that would limit excessive flow. Erosion control BMPs would be used on newly exposed soils. These may include the use of wildlife friendly natural fiber, erosion control blankets, silt fencing, synthetic fiber-free hydro-mulch, and rock checks; specifications for BMPs and allowed materials would be included in contracts. Exposed areas of sediment would be stabilized as soon as possible and seeded with an approved native plant mix to establish vegetative cover. Trees would be planted to aid in the succession of the native plant community. Invasive plant species would be monitored and managed according to

procedures outlined in the Hinckley AMA Management Guidance Document to ensure success of native species establishment.

Actions to avoid or minimize disturbance to Blanding's turtles may include, but are not limited to, the following:

- Timing of dewatering would take place during a period of normal to low flow between June 1 and August 31, preferably July 1 through August 31. Drawdowns would reach their lowest level by September 1 to prevent stranding of overwintering turtles.
- In-stream work would not take place between November 1 and April 15. Any areas where there would be in-stream work would be checked for turtles prior to disturbance.
- Areas where there would be bank and upland construction during turtle active season (April 15 through October 31, would be checked for turtles prior to the use of heavy equipment or ground disturbance.
- Use of erosion control netting would be limited to 'bio-netting' or 'natural netting' types that do not contain plastic mesh or other components. Hydro mulch, if used, would not be allowed to have synthetic additives.
- Contractors would be educated about the possibility of Blanding's turtles on site. If turtles are observed while working, they would be relocated to a safe place.

In order to determine the potential for a take of state-protected mussels, a DNR qualified surveyor would conduct a mussel survey and or/relocation in any potential mussel habitat prior to disturbance within these habitats. The proposed mussel survey is described in the accompanying DSDD. No dewatering or work in the riverbed would occur until potential impacts to mussels have been resolved. In addition, if mussels would be observed in the reservoir bed during dewatering, they would be relocated to an area of the river that is not impacted by dam removal activities.

Mitigation for disturbance to mudpuppies includes the erosion prevention and sediment control measures described in the first paragraph of this section.

Any equipment or materials brought into the site would be free of invasive species per the Public Waters Work conditions and contractor responsibility. Standard specification language would be incorporated requiring the prevention of contaminated equipment spreading terrestrial or aquatic invasive species. Vegetation management would be practiced on newly exposed soils to prevent establishment of invasive species. Approved native seed mixes would be used for planting.

14. Historic Properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

The DNR Division of Parks and Trails Cultural Resources Program conducted cultural resource investigations in the Grindstone River Dam area in July 2018. These investigations indicated that the completion of the proposed project should not adversely affect any known archaeological sites or data. The dam was evaluated and was recommended not eligible for listing in the National Register of Historic Places (NRHP). A review of the Minnesota State Archaeological Site Files found one site within one mile of the proposed project area. The

Brennan Sawmill site (21-PN-56) is an unevaluated site and location of the Brennan Sawmill, which burned during the 1894 Hinckley Fire. It is located on the northwest side of the terminus of Dunn Avenue North.

In January 2020, the DNR Division of Parks and Trails Cultural Resources Program submitted a request to SHPO for review of the 2018 report and assessment. The SHPO responded and agreed that the efforts to identify archeological resources was adequate and that no further archeological survey work is warranted for the project as it is currently proposed. SHPO also agreed with the determination that the Grindstone Dam is not eligible for listing in the NRHP and that no properties listed, or eligible for listing, in the NRHP would be affected by the proposed project (Attachment 2).

Dewatering of the reservoir may reveal previously unknown artifacts. If this occurs, the site would be secured until an investigation and documentation can be made.

15. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

This proposed Project would alter the view of the current Grindstone Reservoir from the access area/fishing pier, the Willard Munger State Trail, and several residences. The view would change from that of a small lake to that of a river. The view of the restored river channel would be temporarily affected before vegetation is established, and would change with the succession to a floodplain forest. Erosion control and revegetation plans outlined in Item 13b would minimize the duration of adverse visual effects.

16. Air:

a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

No stationary source emissions would be created by the proposed project.

b. Vehicle emissions. Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

Fuel exhaust emissions contain pollutants including carbon monoxide, nitrogen oxides, reactive organic gases, sulfur dioxide, and suspended particulate matter, all of which carry some associated health risks. Construction-related emissions would be exempt as de minimus and they would meet the conformity requirements under Section 176 (c) of the Clean Air Act, and 40 CFR 93.153. Emissions would be minor and temporary in nature, arising from the use of powered equipment during demolition of the dam; demolition would not be expect to exceed a period of 4 to 6 weeks. Equipment used would likely include excavators, loaders and trucks.

c. Dust and odors. Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 16a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

The proposed project may create some temporary dust during demolition activities. Fugitive dust could arise during hauling and grading of earthen materials and concrete debris. The exposed bed of the reservoir after dam removal may temporarily emit odors associated with organic soils, but this is expected to be of short duration; the length of time would depend on how quickly the soils dry. Effects associated with fugitive dust and offensive odors would be limited to the construction site and immediately adjacent areas. The reservoir and dam removal site are 200 to 1200 feet from the nearest sensitive receptors located in residential areas.

The contractor would be required to follow BMPs to reduce dust. BMPs may include:

- Covering loads during transport if wind-blown debris could be generated during hauling.
- Watering access routes and exposed soils when powdery conditions are evident.
- Placing mulch, temporary cover and erosion control mats on exposed areas and stockpiles.
- Requiring fill and stone materials to be clean and free of dirt and debris.

17. Noise:

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Existing noise levels in the project area are influenced by the waterfall created by the dam, along with traffic on nearby roads and occasional freight trains. Nearby sensitive receptors include four residences that are approximately 200 to 500 feet away from dam removal and river channel alignment areas, and the Willard Munger State Trail approximately 65 feet from the dam. During demolition of the dam and channel restoration, noise levels would temporarily increase due to construction equipment engines, pounding on concrete and rock and loading/hauling of concrete and metal debris. All activity associated with the proposed project would be limited to daytime hours and would be in conformance with state and local noise standards. Following construction, noise levels in the proposed project area would be anticipated to be less than or equal to pre-construction levels.

18. Transportation:

a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

There is currently no data on traffic use in the project area. Existing parking in the area consists of a cul- de-sac at the end of Dunn Avenue in the Hinckley AMA that can accommodate 10 vehicles; this would not change. New traffic generated by the proposed project would be temporary resulting from workers and construction

equipment. Availability of transit of alternative transportation modes is limited due to the small size of the community.

The Willard Munger State Trail is located near the project area, along with a parking lot for the southernmost trailhead. This 70 mile paved trail runs from Hinckley to Duluth and provides opportunities for walking, biking, inline skating and snowmobiling. The proposed project may require temporary rerouting of recreational user traffic for up to six weeks during demolition of the dam for safety reasons. The DNR Division of Parks and Trails has policies in place for notifying the public and trail users of trail closures and reroutes.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. *If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 *(available at: http://www.dot.state.mn.us/accessmanagement/resources.html)* or a similar local guidance,

The proposed project is not anticipated to generate additional traffic. Dunn Avenue, the access road to the Hinckley AMA and dam/reservoir, was improved in 2017 under a grant from the State Park Road Account, which is administered by the DNR and the Minnesota Department of Transportation's State Aid for Local Transportation Division. This program provides financial assistance for the improvement of county, township, and city roads that provide access to state parks, public lakes, rivers, state campgrounds, or other outdoor recreation units defined in Minnesota Statutes, section 86a.04. The previous gravel road was paved with asphalt.

c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

Access routes from public roads would be evaluated for safety, and operators of equipment turning onto and off public roadways would use caution. The DNR would work with the City of Hinckley to provide an alternative route for Willard Munger State Trail users. No other additional measures would be needed to mitigate project-related transportation impacts.

19. Cumulative potential effects:

a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

For the removal of the dam, the proposed project impact area includes the 26.6-acre Grindstone reservoir and the area immediately surrounding the dam and access routes for construction equipment. The proposed project timeframe includes two phases. First is the demolition of the dam and dewatering, which would be expected to take place over a period of up to 4 to 6 weeks during the summer months, ending by August 31. The second phase is the restoration of the river channel within the reservoir bed, which would begin as soon as dewatering is complete and would continue for a period of up to one to two years depending on natural processes and if engineering designs are needed. It is anticipated that construction of the water source for the fish rearing ponds would occur within the same timeframe as the dam removal; however, it is possible that the timeline for this work could occur during the winter.

Geographic scale and timeframes of project related environmental effects that could combine with other effects are described below.

Wetlands: The geographic scale for wetlands includes those surrounding the Grindstone Reservoir, as well as any present within access routes for construction. Elimination of the reservoir could result in wetland loss or change in wetland type. Any wetland loss, or change in wetland type in areas surrounding the reservoir would be expected to be permanent. Impacts to wetlands within access routes would be expected to be temporary in nature.

Surface water and water quality: It is estimated that the elimination of the reservoir would result in a loss of approximately 19 acres of deep water/streams. This loss of this portion of the reservoir would be permanent. Some area of the reservoir that is currently deep water/streams may become wetland; other areas may be converted to grass and brush. Excess sediment transport may occur following the removal of the dam, which may affect water quality downstream temporarily.

Rare species/features:

State-listed species have been identified as having the potential to be impacted by the proposed project. The geographic extent to where impacts to mussel species and the mudpuppy would be expected lie within the 26.6-acre reservoir and in areas downstream that would receive sediment. Downstream impacts due to increased sedimentation would be temporary in nature. Elimination of approximately 19 acres of the reservoir could result in permanent loss of this habitat type. The newly created stream channel would provide a new habitat type. The proposed removal of the dam would result in opportunities to expand population range of these species.

The geographic scale of impacts for the state-listed Blanding's turtle would include the area of the reservoir and proposed project access routes, and the new construction area for the water source. Impacts due to potential habitat loss from the elimination of the reservoir would be permanent; however new habitat may develop. Impacts from construction of the new water source would be temporary in nature. There is the potential for limited direct mortality of Blanding's turtles during project construction, since some of the proposed project would take place within upland habitat adjacent to wetlands.

Geology:

If karst conditions exist in the areas surrounding the reservoir, the removal of the dam may cause land subsistence, or slumping, to occur. Any land subsistence would be permanent in nature and would be expected to occur in the areas closet to the reservoir that have karst characteristics. It is not possible to predict a timeline for when subsistence might occur, though the possibility of any land subsistence would diminish over time.

Groundwater:

The proposed project may interfere with nearby private wells, and could result in a change in the groundwater flow field in the area immediately surrounding the reservoir, which could result in the need for the DWSMA to be redrawn. These impacts would be considered permanent.

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

Several agencies and units of government were contacted to inquire about current or planned projects in the area that might have impacts that could contribute to cumulative potential effects from the proposed project. These include: DNR Division of Forestry, DNR Division of Parks and Trails, Burlington Northern Santa Fe (BNSF) Railway, City of Hinckley and Pine County. Based on information obtained, reasonably foreseeable future projects do not exist within the geographic scope and timeframe in which project-related environmental effects are expected.

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

There are no reasonably foreseeable future projects that could combine with environmental effects of the proposed project to create cumulative potential effects greater than those from the proposed project.

20. Other potential environmental effects:

If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

There are no other potential environmental effects that have not been addressed.

Potential socioeconomic effects:

The proposed project would not be expected to have social and economic (e.g., socioeconomic) effects on the community. Social effects consider the ways in which the proposed project would have an effect on the community, such as how residents and visitors connect to the community historically and in the future. Economic effects considers ways in which the proposed project would have effects on the local economy. As stated previously, AMAs exist to provide non-boat public access to water resources, and provide areas for education and outreach. While the current boat launch would be removed from the Grindstone Reservoir, public carry-in access (for kayaks, canoes and tubes) to the river would exist following the proposed project; it is anticipated that new public carry-in access would be created at, or near, the location of the current boat launch. The current fishing pier would also be removed; however, anglers would still be able to fish from the restored riverbank, and additional fish passage as a result of dam removal is expected to provide a similar or improved angling experience. Areas for education and outreach would still exist following the dam removal. The DNR fish rearing ponds remain a priority facility for the production of muskellunge fingerlings for Minnesota anglers. While the Willard Munger State Trail may need to be rerouted during the six-week demolition period of the dam, this reroute would be temporary in nature and recreational use of the trail for the community and visitors would continue to exist over the long-term. Commercial boat traffic does not occur within or near the proposed project area and therefore would not be impacted. The proposed Project would not be expected to have economic effects on employment or the local economy.

RGU Certification

*(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature: /s/Rebecca Horton Date: 09/25/20

Title: EIS Project manager