

**APPENDIX A. GRINDSTONE RIVER DAM REMOVAL DRAFT ENVIRONMENTAL
IMPACT STATEMENT**

Grindstone Draft Environmental Impact Statement - Fully Engineered Alternative
Screening Analysis

Grindstone River Dam Removal Draft Environmental Impact Statement - Fully Engineered Restoration Alternative Screening Analysis

May 10, 2023

Executive Summary

The fully engineered restoration alternative was conceptualized during the scoping process as part of environmental review for the Grindstone River Dam Removal Project and was described in the Final Scoping Decision Document for the project. This screening analysis evaluates the fully engineered restoration alternative as an option to meet the needs of the proposed project and evaluates whether the fully engineered restoration alternative would provide any significant environmental benefits in comparison to the proposed project or another alternative being considered.

1.0 Introduction

The Department of Natural Resources (DNR) Section of Fisheries is proposing to remove the dam on the Grindstone River within the city of Hinckley, in Pine County, Minnesota. The dam is owned and maintained by the DNR and impounds the Grindstone Reservoir, a 26-acre public water basin within the state-owned Hinckley Aquatic Management Area (AMA).

There has been a history of dams at this location for various uses since the late 1800s; however, the current dam was built in 1931 to provide a water supply for fish-rearing ponds that are located on an adjacent unit of the AMA. Due to the age and the design of the structure, the dam has increasingly been in need of repairs and is currently in poor condition with several deficiencies needing to be addressed. In addition, due to the hydraulic roller at the dam, at least two drownings have occurred at the site. Due to the poor condition of the dam and the safety hazard the hydraulic roller and the aging dam imposes, the DNR Section of Fisheries proposes to remove the Grindstone River Dam (Grindstone Dam) and allow the North and South Branches of the Grindstone River to restore naturally, providing a free-flowing river channel in this area within the AMA.

The purpose of the proposed project is to address public safety concerns from the dam due to the identified instability issues and inability to pass floods, as well as to allow for passage of fish and other aquatic wildlife, and to restore natural stream features, natural sediment transport, and habitat diversity within this section of the Grindstone River.

The Minnesota Department of Natural Resources (DNR) will prepare an Environmental Impact Statement (EIS) for the Grindstone River Dam Removal Project (project), pursuant to Minnesota Rules (Minn. R.) 4410.2000, subp. 2 (2019) and 4410. 4400, subpart 20, which identifies that projects that will eliminate a public water or public waters wetland requires preparation on an EIS.

There are several key steps in the process of developing an EIS. These steps include developing the scope of the EIS, preparing the draft EIS, preparing the final EIS, and determining EIS adequacy. Scoping for the Grindstone River Dam Removal Project EIS was completed in December 2020. During scoping, it was determined that the following alternatives would be analyzed in the EIS: the proposed project, the no action alternative, the partially engineered restoration alternative, and the fully engineered restoration alternative. These alternatives were conceptualized during the scoping process. During development of the draft EIS, the DNR River Ecology Unit surveyed the Grindstone Reservoir, and two

upstream reference reaches on the North and South Branches of the Grindstone River; data collected from these surveys was used to further describe and design these alternatives, which are described below.

- The proposed project includes the removal of the Grindstone Dam along with floodplain grading and construction of a series of riffles with associated erosion control, such as toewood-sodmat, for bank protection. Both the North Branch and South Branch of the Grindstone Rivers would be allowed to reform naturally, without manipulation.
- The no action alternative involves leaving the Grindstone Dam in place. This alternative would retain existing liability, dam maintenance costs, dam failure potential, as well as biodiversity impacts due to blocked fish migrations and habitat alteration.
- The partially engineered restoration alternative includes the removal of the Grindstone Dam along with floodplain grading and construction of a series of riffles with associated erosion control, such as toewood-sodmat for bank protection. Both the North Branch and South Branch of the Grindstone Rivers would be allowed to reform naturally, without manipulation, with the exception of excavating a meander on the North Branch of the Grindstone River near station 19+00 to 21+00, shown in Figure 1.
- The fully engineered restoration alternative includes the removal of the Grindstone Dam and natural channel design of both the North and South Branches within much of their distance within the AMA. Natural channel design would include channel excavation and assuring appropriate pool and riffle dimensions throughout the two river channels.

Minnesota Rules requires that specific content be included in the EIS, including types of reasonable alternatives to be analyzed for comparison of potentially significant impacts (Minn. R. 4410.2300, item G (2019)). Minnesota Rules 4410.2300 item G directs that, “An alternative may be excluded from analysis in the EIS if it would not meet the underlying need for or purpose of the project, it would likely not have any significant environmental benefit compared to the project as proposed, or another alternative, of any type, that will be analyzed in the EIS would likely have similar environmental benefits but substantially less adverse economic, employment, or sociological impacts.” It further states that, “Alternatives included in the scope of the EIS as established under part 4410.2100 that were considered but eliminated based on information developed through the EIS analysis shall be discussed briefly and the reasons for their elimination shall be stated.” Data collected from the River Ecology Unit led to questions on whether the fully engineered restoration alternative would provide any significant environmental benefit compared to the proposed project, or the partially engineered restoration alternative, which will be analyzed in the EIS. This screening analysis identifies potential environmental impacts as compared to the proposed project and discusses if there would be significant environmental benefits provided by the fully engineered restoration alternative.

2.0 Description of the fully engineered restoration alternative

As described in the final scoping decision document, the fully engineered restoration alternative would include the same dam removal as the proposed project, but rather than letting the river channel naturally restore, this alternative would restore the resultant stream channel with full engineering. Implementation of the fully engineered restoration alternative would include: drawdown of the reservoir; consolidation of sediments; excavation of the river channels; and dam removal. In this alternative, the resultant stream would be manipulated along much of its distance within the AMA to design specifications that would

ensure channel stability. Based upon survey data collected by the River Ecology Unit on both the North and South Branch of the Grindstone River, this alternative would:

- Use natural channel design and excavate channels through the reservoir and both the North and South Branch of the Grindstone Rivers, assuring appropriate pool and riffle dimensions, channel pattern and profile throughout.
- Use erosion control measures along the outside banks of the meanders that would incorporate toewood-sodmats and other erosion control measures and provide initial aquatic habitat.
- Construct riffles at inflection points throughout the channels.

Drawdown and consolidation of sediments would occur in the same manner as for the proposed project, which will be described in the EIS. Excavation of the river channels is likely to occur prior to dam removal. Based on natural channel design, the fully engineered restoration alternative would involve excavating approximately 4,200 feet of the stream channel of the North and South Branch of the Grindstone River. For this alternative, the North Branch of the Grindstone River would be excavated from the dam (station 38+00) up to station 10+00 as shown in Figure 1; the South Branch of the Grindstone River would be excavated from SB 25+00 to station 11+00. An excavator (or other similar equipment as determined by the contractor) would excavate approximately 10,000 yards of sediment from the project area. This material would need to be properly disposed of and would either be hauled off site to an appropriate landfill, or placed in floodplain on site, post removal, depending on permitting and regulatory requirements and ability for re-use. If hauled off site, soil would likely need to dry for a period of time before being loaded into dump trucks for hauling. To excavate the channels, construction equipment would access the site along the banks. This would be done under frozen conditions to minimize impacts to wetlands within the construction area; this will also help minimize erosion. Much of the reservoir and historic channel contains exposed rock and boulders, which will also help provide grade control and limit channel incision.

3.0 Alternative Screening

As described above, an alternative may be excluded from analysis in the EIS if any of the conditions below are met:

- 1) If the alternative would not meet the underlying need for or purpose of the project.
- 2) If the alternative would not likely have any significant environmental benefit compared to the project as proposed.
- 3) If another alternative that will be analyzed in the EIS would likely have similar environmental benefits but substantially less adverse economic, employment, or sociological impacts.

If the fully engineered restoration alternative does not meet the criteria above, it may be excluded from analysis in the EIS. The EIS will describe the basis for this determination and the alternative will not be further analyzed.

3.1 Does the Fully Engineered Restoration Alternative Meet the Project Purpose and Need?

The purpose of the Grindstone dam removal project has been defined as:

1. Address public safety concerns around dam instability, inability to pass floods, and the threat of dam failure.
2. Address public safety concerns by eliminating the hydraulic roller and reducing the threat of drowning.

3. Minimize impacts from flooding by providing a larger floodplain (i.e., restore the reservoir to a naturally functioning stream with a connected floodplain).
4. Restore fish and aquatic life connectivity to the Grindstone River system.
5. Increase pool and riffle habitat.
6. Improve hydrologic function of the Grindstone River by restoring more natural sediment and nutrient transport.

It is generally understood that the fully engineered restoration alternative would meet all the project purposes listed above.

3.2 Does the fully engineered restoration alternative have significant environmental benefits?

This section will discuss if the fully engineered restoration alternative would offer significant environmental benefits in these areas as compared to the proposed project or the partially engineered restoration alternative. As described in the final scoping decision document, topics that will be analyzed in the Grindstone EIS will include wetlands; hydrological effects; sediment and contaminants; plant communities, wildlife, fish, and sensitive resources; geology (karst environment); groundwater (private well impacts); and public waters and riparian rights. For all topics, the draft EIS will discuss the affected environment and the environmental consequences of any of the alternatives that will be analyzed in the EIS.

In considering that the fully engineered restoration alternative would include more manipulation to surrounding environment compared to alternatives which will be analyzed in the EIS, it seems unlikely that this alternative would result in significant environmental benefits for any of the topics to be analyzed in the EIS. It is expected that impacts from the fully engineered restoration alternative would have similar environmental effects as compared to the proposed project, or the partially engineered restoration alternative which will be analyzed in the EIS.

Wetlands

The draft EIS will discuss wetland impacts within the affected environment for the proposed project and the partially engineered restoration alternative. Considering the fully engineered restoration alternative would involve excavating 4,200 feet of channel, it is possible that the fully engineered restoration alternative could result in increased temporary impacts to wetlands due to needing a greater number of routes for heavy equipment to access areas for excavation. It is likely that the fully engineered restoration alternative would result in similar permanent wetland impacts, if any, and/or similar wetland gains.

Hydrological effects

The draft EIS will discuss hydraulic impacts within the affected environment for the proposed project and the partially engineered restoration alternative. Based on hydraulic analysis, the proposed project would not increase flood stages downstream of the dam and would not increase flood risk to structures or property. Since the fully engineered restoration alternative would include the same areas of flow, it is expected that the fully engineered restoration alternative would have similar results, particularly due to the higher level of engineering that would be involved with this alternative, to avoid potential impacts downstream.

Sediment and contaminants

The draft EIS will discuss impacts within the affected environment for the proposed project and the partially engineered restoration alternative as it relates to release of contaminants from the reservoir sediments. Shallow sediment encountered during the sediment study consisted of sandy silt, silty sand, or sandy clay from 0.5 to 6 feet below top of sediment, which was underlain by native medium to coarse sand and gravel. Arsenic was detected in all samples, with four sample locations having values that exceed the Level 1 and Level 2 Soil Reference Values (SRV) of 9 mg/kg. These sample locations also exceed the Level 1 Sediment Quality Target (SQT) of 9.8 mg/kg.

The soil excavation proposed with the fully engineered restoration alternative could remove the areas with higher levels of arsenic, which could offer improved sediment conditions within the project area and areas downstream which could receive sediment. However, since the fully engineered restoration alternative would involve more manipulation and use of heavy equipment, it is possible that the potential for sediment release downstream could increase during construction with this alternative, as compared to the proposed project or the partially engineered restoration alternative. Additionally, hauling the sediment away in trucks would increase impacts in other areas, such as increased traffic, increased impacts to roads, and increased space needs at landfills. If all sediment would be removed from the site this could be up to 1,000 truckful's. The nearest potential landfill which might accept this type of sediment is located about 20 miles (40 miles round trip) from the project site, however, it is unclear at this time if this landfill would accept this type of sediment and the volume it could accept. The Minnesota Pollution Control Agency (MPCA) is the agency that regulates contaminants and dredged materials (i.e materials that are excavated at or below the ordinary high water level of waters defined by Minn. Stat. ch. 103G.005), based on conversations with MPCA staff, and in reading the MPCA guidance document "Managing Dredge Materials in the State of Minnesota," permits for disposing of dredged material are required within five specific geographic areas in Minnesota; if a project is not located within one of those areas a permit for management of dredge material is not required. The proposed project is not located within one of the identified areas, and therefore a permit to manage dredge materials would not be required for this project. In conversations with the MPCA, it has been determined that the area of soil which would be exposed is small, would be planted with vegetation, and would not be an area with high public contact, limiting risk exposure to humans. In addition, the proposed project would include mitigations measures regarding sediment release. Given these factors, the fully engineered restoration alternative would likely offer similar, but not significantly improved impacts to the resources.

Plant communities, wildlife, fish, and sensitive resources

The draft EIS will discuss plant communities, wildlife, fish, and sensitive resources (i.e., state listed species including mussels, the Blanding's turtle, mudpuppy, and lake sturgeon), and invasive species within the affected environment for the proposed project and the partially engineered restoration alternative. Considering that the fully engineered restoration alternative would involve much more manipulation of the river channels, it is not expected that this alternative would have significant benefits to these resources as compared to the alternatives to be discussed. It is expected that this alternative would have similar, but not improved, impacts to these resources as compared to the alternatives to be discussed in the EIS.

Geology (karst environment)

The draft EIS will discuss karst geology within the affected environment for the proposed project and the partially engineered restoration alternative. Since the affected environment would be the same for the fully engineered restoration alternative, it is expected that this alternative would have similar, but not improved, impacts to resources as compared to the alternatives to be discussed in the EIS.

Groundwater (private well impacts)

The draft EIS will discuss impacts to groundwater and private wells within the affected environment for the proposed project and the partially engineered restoration alternative. The fully engineered restoration alternative could potentially affect groundwater resources differently than the proposed project or the partially engineered restoration alternative with impacts being less extreme as you move away from the dam. However, each of these alternatives (the proposed project and the partial and fully engineered restoration alternatives) would result in the same maximum seven-foot decrease in groundwater and surface water levels, though decrease may vary within certain areas. It is expected that the fully engineered restoration alternative would not have significant benefits to groundwater resources, as compared to the alternatives which will be discussed in the EIS.

Public waters and riparian rights

The draft EIS will discuss impacts to public waters and riparian rights within the affected environment for the proposed project and the partially engineered restoration alternative. Considering that the fully engineered restoration alternative would involve more manipulation of the river channels, the fully engineered restoration alternative would have similar or increased impacts to public waters as compared to the alternatives to be discussed in the EIS. The fully engineered restoration alternative would be expected to have similar impacts to riparian rights as the partially engineered restoration alternative, which will be analyzed in the EIS.

3.3 Does the fully engineered restoration alternative have substantially less adverse economic, employment, or sociological impacts as compared to any other alternatives being considered?

The scoping environmental assessment worksheet (EAW) analyzed socioeconomic effects from the proposed project. Since the fully engineered restoration alternative includes all aspects of the proposed project and the partially engineered restoration alternative, the fully engineered restoration alternative would not be expected to have less adverse economic, employment, or sociological impacts compared to the other alternatives being considered. Impacts from the fully engineered restoration alternative would likely be similar to the alternatives that will be analyzed in the EIS.

Conclusions

During the EIS scoping process, the fully engineered restoration alternative was conceptually developed as an alternative to the proposed project and this alternative was included in the Final Scoping Decision Document for further evaluation in the EIS. An alternative may subsequently be excluded from analysis in the EIS if it is determined that the alternative would not meet the purpose of the project or offer significantly less environmental or social impacts. If a scoped alternative is excluded from the EIS analysis, it must be discussed briefly and the reasons for its elimination shall be stated (Minn. R. 4410.2300).

For these reasons, the DNR evaluation of the fully engineered restoration as an alternative to the proposed project was warranted. Evaluating the fully engineered restoration alternative against the project purpose, it becomes clear that this alternative would not offer significantly less environmental or social impacts compared to alternatives which will be analyzed in the draft EIS. Due to the lack of significant benefits that would likely result from the fully engineered restoration alternative, this alternative will not be included in the analysis of impacts in the Grindstone Dam Removal Project EIS.



Figure 1. The aerial image in this figure shows the Grindstone Reservoir, the North and South Branches of the Grindstone Rivers and the areas surrounding the reservoir, which include forested habitat, residential lots, and agricultural land. The image also shows the 2021 DNR River Ecology Unit stream survey locations.