Version 8/08rev

ENVIRONMENTAL ASSESSMENT WORKSHEET

Note to preparers: This form and EAW Guidelines are available at the Environmental Quality Board's website at: http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The Environmental Assessment Worksheet provides information about a project that may have the potential for significant environmental effects. The EAW is prepared by the Responsible Governmental Unit or its agents to determine whether an Environmental Impact Statement should be prepared. The project proposer must supply any reasonably accessible data for — but should not complete — the final worksheet. The complete question as well as the answer must be included if the EAW is prepared electronically.

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: Gilmore Creek Restoration, Alango Township, St. Louis County

2. Proposer: Northshore Mining Company

Contact person:	Nathan Schroeder
Title:	Environmental Engineer
Address:	10 Outer Drive
City, state, ZIP:	Silver Bay, MN 55614
Phone:	(218) 226-4125
Fax:	(218) 226-6037
E-mail:	Nathaniel.Schroeder@CliffsNR.com

3. RGU: Minnesota Department of Natural Resources

Contact person:	Jill Townley
Title:	Environmental Review Planner
Address:	500 Lafayette Road
City, state, ZIP:	Saint Paul, MN 55155
Phone:	(651) 259-5168
Fax:	(651) 296-1811
E-mail:	environmentalrev.dnr@state.mn.us

4. Reason for EAW preparation (check one)

☐	EIS Scoping	☒	Mandatory EAW	☐	Citizen petition	☐	RGU discretion	☐	Proposer volunteered

M.R. 4410.4300, Subp. 26, Stream Diversion. For a diversion, realignment, or channelization of any designated trout stream, or affecting greater than 500 feet of natural watercourse with a total drainage area of ten or more square miles unless exempted by part 4410.4600, subpart 14, item E, or 17, the local government unit shall be the RGU.

5. **Project location** County : St. Louis City/Township : Alango

NW ¼ SW ¼ Section 20 Township 61N Range 19W
SW ¼ SW ¼ Section 20 Township 61N Range 19W

GPS Coordinates (near project center) N 5288662, E 515058 (UTM NAD83 Zone 15N)

Tax Parcel Number: 200-0010-03150

Attach each of the following to the EAW:

- County map showing the general location of the project; (Figure 1)
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); (Figure 2)
- Site plan showing all significant project and natural features.
  - Figure 3: 1949 Aerial
  - Figure 4: 1992 Aerial
  - Figure 5: Reference Stream Reach
  - Figure 6: Overview Plan
  - Figure 7: Typical Riffle/Pool Detail
  - Figure 8: Pool Toe Wood Project Sequencing
  - Figure 9: Live Staking, Riffle Bank Protection
  - Figure 10: Culvert Detail
  - Figure 11: MDNR NHIS Map
  - Figure 12: Water Resources Map
  - Figure 13: Hydric Soils Map
- Attachments to the EAW:
  - Attachment A: Northshore Mine Expansion and Mitigation Stream Inventory Report, MPCA/North Biological Monitoring Unit, April 2012
  - Attachment B: MDNR NHIS concurrence letter
  - Attachment C: Minnesota State Historic Preservation Office correspondence.

6. **Description**

a. Provide a project summary of 50 words or less to be published in the *EQB Monitor*.

The project is proposed as permit-driven, compensatory mitigation for loss of an unnamed stream at Northshore Mining Company's (NSM's) Babbitt mine. The project will restore approximately 2,000 feet of an offsite degraded creek, Gilmore Creek, to its original plan and profile; reestablishing natural stream processes, improving floodplain connectivity, and stabilizing hydrology.

b. Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal or remodeling of existing structures. Indicate the timing and duration of construction activities.

Project Location

Gilmore Creek is in Township 61 North, Range 19 West, in the NW1/4 of the SW1/4 and the SW1/4 of the SW1/4 of Section 20, St. Louis County in the Alango Township, Minnesota area (Figure 2). The eastern/upstream terminus of the restoration reach is located approximately 1,260 feet west of St. Louis County Highway 25 (CR-25). The western terminus of the restoration reach is approximately 1,190 feet north of Heino Road and approximately 70 feet downstream of Kyllonen Road, where Gilmore Creek passes through culverts under a road accessing a timber stand north of the creek. The total drainage area for the restoration site is approximately six square miles.

The project is proposed entirely on Gilmore Creek within Parcel ID 200-0010-03150, containing 160 acres owned by the State of Minnesota and managed by the Minnesota Department of Natural

Resources (MDNR) Division of Forestry. At the project location, Gilmore Creek was straightened and deepened sometime between 1939 and 1948. Figures 3 and 4 show Gilmore Creek in historical aerial photographs dated 1949 and 1992, respectively. Evidence of the historical stream meanders is visible in the 1992 photograph (Figure 4). The creek has been chosen for restoration as compensatory mitigation for mining-related stream impacts approximately 44 miles east of Gilmore Creek.

Overview of Stream Restoration Plan

The proposed stream restoration design is based in part on a stable reference reach in a 1,600-foot section of a tributary to Gilmore Creek; approximately 1.25 miles west-southwest of the western terminus of the proposed restoration (Figure 5). The reference stream is a second-order, naturally meandering stream in the Sturgeon River watershed. It has not been channelized or straightened, and drains through a large wet meadow wetland area.

The proposed Gilmore Creek restoration plan will utilize existing historical meanders and additional excavation to reestablish a channel alignment that is longer and more sinuous than the existing, channelized alignment. Based on channel condition history, the new channel alignment will have "E" type entrenchment ratios, using the Rosgen classification system, and will be connected to adjacent floodplain wetlands..

The proposed stream restoration plans and typical drawings are included as Figures 6 through 10. The restoration plans show the existing and proposed channel alignments and dimensions, locations of riffles and pools, typical cross-sections and details. The detailed topographic survey and location of the existing channel and the channel prior to ditching are shown on Figure 6. Riffle pool typicals are shown on Figure 7.

The general components of the restoration plan are described below. Specific details on impacts to water resources, erosion and sedimentation control and surface water runoff are provided in Items 12, 16 and 17, respectively.

The length of the existing channel in the restoration reach is 1,384 feet. The proposed channel length for this reach is 2,004 feet with a planned sinuosity of 1.4 (Figure 6). Most of the additional length will be achieved by directing the restored channel to historical and new meanders that were cut off when Gilmore Creek was straightened. The elevation of the new stream bed will be approximately one to two feet higher than the existing stream bed elevation which will be established by installing grade-control rock riffles within the channel at the upstream and downstream ends of the project and at three riffle sections in between. The new channel will generally have a bankful width of approximately 13 feet wide.

The meandering channel design includes the placement of toe wood, large woody debris, and live shrub stakes to the outer banks of meander bends where the sheer stress will be the greatest (see Figures 8 and 9). The toe wood will be placed below the typical baseflow elevation to ensure that the wood will be preserved by being consistently submerged. Smaller woody debris will be placed above that with sod mats secured with live shrub stakes. Toe wood, woody debris, and live stakes will be obtained from on-site in coordination with the property owner. Woody material collection for the project will follow the guidelines of the Minnesota Forest Resources Council (2005, Part III, pages 29-67). In addition to those guidelines, no wood will be harvested within 50 feet of the proposed stream alignment and shrub cuttings collected from live plants will be limited to that which will allow for continued growth of existing shrubs.

The planned riffle sections were designed using the regional curve for eastern Minnesota along with more typical reference E channel parameters for the design due to the presence of beaver dams on the reference reach. The eastern Minnesota regional curve was developed using information from stream gaging stations in eastern Minnesota to relate bankfull parameters to streamflow and watershed size.

The reference reach width to depth ratios ranged from 10-12, which is wider than is typical for an E channel type in such a low gradient, meandered channel. This channel type is typically slightly entrenched and exhibits a high level of sinuosity. In an undisturbed state, E channels contain a consistent series of riffle/pool reaches, resulting in more pool areas than other channel types. The wider width to depth ratios in the reference reach are thought to be due to the beaver dam influence on the channel causing over-widening. Therefore, a width to depth ratio of 8 was chosen for the mitigation design. The riffle and pool spacing and riffle design were then determined from the cross-sectional design area of 19 square feet and width to depth ratio of 8.

Approximately 19 riffle/pools will be constructed/established at the bends in the restored stream channel. Pools will generally be four feet deep on the outside of the bend rising at about a 3H:1V slope to the inside of the bend. Pool edges will be stabilized with logs and branches held in place by excavated fill and covered by approximately one foot of natural sod obtained from the construction site. The logs and branches will protect the streambank from erosion and promote scour along the toe of the bank to create habitats for fish.

Riffles will be constructed to control the channel profile and provide spawning habitat. The height of riffles will generally vary from 1 foot to 1.5 feet. Riffles will be created with 3-inch and smaller rock and gravel on the stream bottom at a 20:1 slope. For construction of the pools, toe wood will be installed on the outside of the meander bends by layering wood and small branches to counteract the high sheer stress in those areas. In less erosive areas of new channel construction, natural sod mats obtained during construction will be utilized along with coir fiber fabric to protect new channel banks and allow for vegetation to become established, which will provide the long term protection.

Some floodplain excavation will be completed within the construction limits. Disturbed areas of the floodplain and near bank areas will be seeded with MDNR seed mix. Trees will be planted within the floodplain and along the restored channel banks to increase shading conditions including 150 tamarack and 50 spruce trees.

The overall soil excavation and fill quantities are expected to be balanced on the site. In general, excavated soils will either be utilized to fill portions of the existing channel or sod mats will be utilized in stabilizing the new streambank slopes. If excess soil is generated during the project, it will be placed in an upland location and will be seeded to stabilize the soils. The project will require that gravel and rock be brought in for the riffles.

At the downstream end of the project, there are two undersized and partially collapsed culverts where an access road crosses Gilmore Creek. The restoration design proposes to replace those culverts with two 87-inch by 63-inch aluminized corrugated metal arch pipes (see Figure 10). The culverts were sized and designed according to the MDNR's design approach that simulates natural channel morphology and sediment transport. The culverts will be installed with invert elevations of 1313, approximately one foot below the downstream grade control riffle, and the bottom one foot of each culvert will be filled with streambed material to establish a consistent streambed and maintain biological connections.

The culvert sizing and placement approach aims to match the culvert width with the natural stream dimensions while maintaining sediment balance, including burying the culverts below the streambed and providing a low-flow channel important for late season fish migrations (typically August to November). This approach also minimizes the need for maintenance by reducing scour and aggradation. The result is the design of larger culverts than would be indicated by conventional hydraulic design methods, but benefit the stability of the stream and the aquatic wildlife functions.

Project Reference Reach

A reference reach was selected to assist in design of the restoration reach. The criteria utilized to identify suitable reference stream reaches included:

- First or second order, naturally meandering headwaters streams
- Within the Sturgeon River watershed and in close proximity to the restoration site
- Streams that have not been channelized or otherwise altered from historic conditions
- Low gradient streams with relatively flat channel slope

The selected reference reach is an approximately 1,600 linear foot section of a tributary to Gilmore Creek, located in Township 61 North, Range 20 West, Section 25, approximately 1.25 miles west-southwest of the western terminus of the proposed restoration (see Figure 5). The reference reach was chosen after reconnaissance of several sites selected from aerial photography. Minnesota Pollution Control Agency (MPCA) staff and NSM representatives chose this site after field verification of suitable reference conditions.

The reference reach is a naturally meandering stream that drains through a wet meadow wetland area. Many of the geology and land use characteristics are similar between the two streams. The drainage area to this reach is approximately 3.9 square miles, comprised of large wetland complexes and deciduous and coniferous forests. During the reconnaissance field visit prior to collecting fish and invertebrate data in September 2012, it was determined that recent beaver activity had impounded some of the planned reference reach. Therefore, the sampling location was moved downstream to where no beaver activity was affecting the stream channel.

The reference reach was evaluated and classified as part of the restoration design process using the Rosgen classification system (Rosgen, 1996) to assist in the restoration design. The reference reach is classified as a Type E channel. The reference channel classification was determined to be consistent with the historic condition of the stream mitigation reach and was, therefore, used as a basis for the restoration design.

Proposed Construction Methods and Sequencing

Construction is planned for the summer of 2013 with monitoring and management to follow. Construction is expected to take approximately three to four weeks, and is proposed for construction during late-summer low-flow conditions. However, it may need to be constructed in the winter due to the wet, soft soil conditions in the project area. In general, project construction methods and sequencing will be planned to minimize the potential for erosion and downstream sedimentation to the extent practicable. Stream restoration construction will be sequenced to limit the area of open soil disturbance during construction, typically completing construction of each component of the project by the end of each day. The construction areas will be accessed from the south end of the site with the area of high ground within the south construction limits utilized for equipment and material staging. The equipment employed is expected to include a tracked excavator, small dozer, and possibly a loader. The equipment will be selected by the chosen contractor with specifications that the contractor shall minimize disturbance to wetlands and other areas to the extent practicable.

Project construction will generally be started from the upstream end working downstream because the base level of the stream will be raised, thereby raising the water level upstream. The primary exception is that a rock riffle structure planned at the downstream end of the project will be constructed first to capture sediment during construction. The construction work will be sequenced so that any work within the actively flowing stream will be limited to that which can be completed each day. Excavation of new channel sections will not be connected to the flowing stream until all vegetative restoration features are completed. Stream reaches that are planned to be filled will not be completed until that reach is disconnected from the active, flowing stream. Where the restoration construction frequently crosses the existing channel, the contractor will be required to pump the flow around the active work area until all restoration and site stabilization is completed within that reach. Pumped discharges will be discharged downstream utilizing a flat flow-spreading device (e.g., geotextile sheet with rock) to dissipate the flow velocities and discharge over a larger area to minimize erosion in the channel.

The project construction limits are shown in Figure 6. Perimeter controls are not planned for the entire construction limits, only around temporary soil storage areas. All soil storage areas will be confined within the construction limits. Fill will be obtained by using the native, existing material removed by creating the new channel. It is expected that no off-site fill material will be needed other than rock.

The new stream meanders that are not coincident with the existing channel will be excavated first and maintained offline from the existing flows. After construction work within the planned meanders is completed and stabilized, those meanders will be sequentially reconnected to Gilmore Creek when fully stabilized. Soil excavated within the floodplain and for establishment of the new stream meanders will be utilized to fill the existing channel to the proposed floodplain elevations, thereby maintaining those areas as wetland. With the reestablishment of each meander connection, the adjacent, existing stream segment will be abandoned by filling the channel downstream of the connection point and proceeding with the restoration plans in each of those segments after streamflow has ceased. Grade control stream riffles will be constructed at the upstream end of the project and downstream of the project to establish and maintain the thalweg through the project area and prevent headcutting within and upstream of the project.

Performance Standards

Listed below are preliminary performance standards.

Ecological Function

1. Health and survival of vegetation – 70 percent survival of planted species after 8 years
2. Restoration reach should mimic natural pre-channelization or reference stream conditions

Channel Stability

1. Should be insignificant change from the as-built dimension
2. Verification of maintaining or increasing channel stability (e.g. decreased width to depth ratio without a decrease in entrenchment ratio)
3. Maintaining the as-built longitudinal profile
4. Pool/riffle spacing remains fairly constant
5. Maintaining pools and riffles
6. Pebble counts showing a change in the size of bed material toward a desired composition

Monitoring

Monitoring and management of the restored stream will be conducted for a period of eight years following the completion of construction to demonstrate that project objectives have been met. The project will adopt an adaptive management approach to monitor the restored reach, identifying and correcting post-construction problems.

The restored stream will be monitored frequently during the first full growing season following completion of construction. For the remainder of the growing season after construction is complete and during the following growing season, the project site will be inspected monthly and following precipitation events exceeding one inch. During years two through eight following construction, site inspections will be conducted three times per growing season and following any precipitation event exceeding two inches. During each site inspection, the entire project area will be observed to identify failures or problem areas, particularly focusing on the stability of the stream bed and banks along with the stability of floodplain areas. In addition, the survival and vigor of seeded areas and planted vegetation will be inspected and documented with photographs and field notes. The site inspections will also be planned to review considerations included in the performance standards. Upon identification of substantial bed aggradation or degradation, erosion, channel stability, and vegetation establishment problems, those features will be documented and communicated to NSM. Northshore will then notify the U.S. Army Corps of Engineers (Corps) of any substantial failures or problems and will develop a corrective measures plan for approval by the Corps before implementation. Upon completion of the

project, an as-built channel survey shall be conducted to document and identify any modifications from the detailed design plans.

Provisions in the anticipated MDNR Public Water Permit will include requiring as-built surveys be conducted. MDNR will coordinate fish, macroinvertebrate, geomorphology and water quality monitoring provisions with the Army Corps of Engineers and Minnesota Pollution Control Agency. Those monitoring provisions will also be included in the MDNR Public Water Permit.

c. 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.

The stream restoration project is the result of a restoration plan developed to provide compensatory stream mitigation required by the Corps as part of Clean Water Act Section 404 authorization for Northshore Mining Company's Peter Mitchell mine near Babbitt, MN. The MPCA also requires stream mitigation as part of the Clean Water Act Section 401 certification, which is needed for the 404 authorization. The Gilmore Creek restoration was recommended by the local Soil and Water Conservation District, and was selected as the preferred alternative after an evaluation of alternatives provided to the Corps and MPCA.

Project Goals and Objectives

The goal of this restoration project is to reestablish a section of Gilmore Creek channel to its original course and profile to the degree practicable. This will reestablish the natural stream processes and reconnect the channel to the surrounding floodplain. The perennial flow of the stream from springs and reconnected floodplain wetlands will help maintain baseflow. A November 18th, 2011 site visit was conducted during a month with precipitation below the normal range preceded by four months with precipitation below the normal range. That site visit revealed that the stream maintains a flow at the very headwaters even in drought conditions. The topographic survey completed to assist in the project design confirmed that the straightening of the channel has resulted in downcutting; therefore the floodplain is not functioning as it was historically.

Moreover, the creek floodplain was historically vegetated by shrubs and trees. Since the straightening of the creek, the floodplain has become dominated by reed canary grass with little woody vegetation. With the straightening of the channel, the downcutting of the channel, and loss of forested and shrub floodplain, the proposed project reach has diminished habitat compared to the reference reach identified to assist in the project design and monitoring.

The goals of the proposed stream restoration project are:

1. Reestablish natural stream processes (physical and hydrologic)
2. Restore Gilmore Creek's historical pattern, profile, and dimension
3. Reconnect the channel to the surrounding floodplain
4. Improve aquatic and floodplain habitat

More specific objectives of the proposed stream restoration plan that were implemented during the final project design include:

1. Design and implement effective pool/riffle and in-stream structures.
2. Increase stream shading through improved riparian planting and well-placed root wad installation
3. Design and implement an effective low flow fish passage
4. Reestablish woody vegetation within the riparian zone
5. Reduce peak flows through more effective floodplain connection
6. Increase stream sinuosity
7. Reduce sediment loading

In addition, the proposed Gilmore Creek restoration meander design was developed to reestablish the historic meanders to the extent practicable along with matching the characteristics in the undisturbed reference reach.

Improved ecological health of the stream will benefit the surrounding plants and organisms, which are public resources. As such, beneficiaries of the proposed project will be the citizens of Minnesota. Additionally, Northshore Mining will benefit from meeting their permit conditions.

d. Are future stages of this development including development on any other property planned or likely to happen? __Yes _X_No

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

e. Is this project a subsequent stage of an earlier project? __Yes _X_No

If yes, briefly describe the past development, timeline and any past environmental review.

7. **Project magnitude data**

Total project acreage ~5 acres (80'-150' width over a 2,000' length)
Number of residential units: unattached: 0 attached: 0 maximum units per building
Commercial, industrial or institutional building area (gross floor space): total square feet
Indicate areas of specific uses (in square feet):

Office 0	Manufacturing 0
Retail 0	Other industrial 0
Warehouse 0	Institutional 0
Light industrial 0	Agricultural 0

Other commercial (specify) 0
Building height NA If over 2 stories, compare to heights of nearby buildings

8. **Permits and approvals required.** List all known local, state and federal permits, approvals 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
MDNR	Public Waters Work Permit	Application to be submitted
MDNR	Dewatering Permit	Application to be submitted if dewatering becomes necessary
MDNR	Wetland Conservation Act	If needed
MPCA	NPDES General Construction Stormwater Permit	Application to be submitted
U.S. Army Corps of Engineers	Clean Water Act Section 404	Existing permit to be amended
MPCA	Clean Water Act Section 401	Existing permit to be amended

9. **Land use.** Describe current and recent past land use and development on the site and on adjacent lands. Discuss project compatibility with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazards due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.

Project site
Gilmore Creek is a second-order tributary to the Sturgeon River and lies within the Little Fork minor watershed of the Rainy River major watershed. The immediate project area is a portion of the existing Gilmore Creek channel and associated riparian wetlands. The section of Gilmore Creek to be restored is within Parcel ID 200-0010-03150, owned by the State of Minnesota. Current and past land use in the project area itself is limited to passive recreation and occasional hunting.

Adjacent lands
Pre-settlement vegetation was aspen-birch hardwood forest trending to conifers. The area adjacent to the project site is approximately 46% forested, 39% wetland, 8% disturbed land and 7% shrub/scrub. Land along the north side of the project area was still forested as recently as 2008, but was logged between 2008 and 2009. Other lands adjacent to the project area were used for agriculture and/or pasture in the past, and the area was ditched to enhance these land uses. However, agricultural activities have ceased, and the adjacent area is used primarily for recreational activities, mainly hunting.

While there have been historic land use changes in the watershed, there appears to be a general trend towards a return to a more forested condition with some hay and pasture with little to no intensive agricultural practices. Therefore, it appears that the design characteristics are consistent with future land uses.

There are five single family residences within one half mile of the project area, with the nearest approximately 1,100 feet away. The St. Louis County zoning designation for the project area is primarily Forest Agricultural Management (FAM-3), with some Multiple Use Non-Shoreland 4 (MUNS-4).

No environmental hazards from past land use have been observed at the site or are known to exist at the site. The MPCA "What Is In My Neighborhood" interactive map of potentially contaminated sites and sites with MPCA permits shows no such sites within one mile of the project area. The nearest MPCA site is an MPCA-permitted feedlot approximately 1.6 miles north of the upstream end of the project, off of County Road 25.

10. **Cover types.** Estimate the acreage of the site with each of the following cover types before and after development:

	Before	**After**		**Before**	**After**
Types 1-8 Wetland	4.8	4.6	Lawn/Landscaping	0	0
Wooded/forest	0	0	Impervious Surface	0	0
Brush/Grassland	0	0	Stormwater Pond	0	0
Cropland	0	0	Stream	0.2	0.4
			TOTAL	**5.0**	**5.0**

If **Before** and **After** totals are not equal, explain why: Restoring meanders to Gilmore Creek will lengthen the reach, resulting in a minor increase in stream acreage, and a minor reduction in total wetland area. Gilmore Creek is considered a riverine wetland system under the Cowardin classification of wetlands. Therefore, despite, the minor reduction in Type 1-8 wetlands, the overall wetland acreage remains the same. Moreover, the complexity and ecological quality of the wetland complex is improved by the restoration project.

11. **Fish, wildlife and ecologically sensitive resources –**

a. Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.

Fisheries, Wildlife and Habitat

The Minnesota Department of Natural Resources and the U.S. Forest Service have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota following the National Hierarchical Framework of Ecological Units (ECOMAP 1993). The proposed project area lies in the Nashwauk Uplands Subsection of the ECS.

The Nashwauk Uplands Subsection covers 810,000 acres (1,265 square miles) in northeast Minnesota. The subsection includes rolling till plains and moraines and flat outwash plains. There are over 63 lakes greater than 100 acres in size in this subsection. Many are found on the Nashwauk Moraine.

Presettlement vegetation was a mixture of deciduous and coniferous trees. White pine-red pine forest and jack pine barrens were common on outwash plains. Aspen-birch forest and mixed hardwood-pine forest were present on moraines and till plains. Wetland vegetation included conifer bogs and swamps.

At a landscape scale, Quaking aspen is the dominant tree species presently. The Subsection consists of three primary habitats, including Forest-Upland Deciduous (Aspen), Forest-Lowland Coniferous, and Shrub/Woodland-Upland (Jack pine woodland). The floodplain within the project area is currently dominated by reed canary grass.

Surveys in the area conducted in 2005, 2008 and 2012 do not reveal any game fish, but the approximately 3-mile distance to the Sturgeon River makes it a possibility. A biological site immediately downstream of Gilmore Creek's confluence with the Sturgeon River reveals good numbers of northern pike, which spawn in low gradient wetland dominated streams, such as Gilmore Creek.

MPCA staff characterized the aquatic habitat of the project area in the April 2012 Northshore Mining Expansion and Mitigation Stream Inventory Report (Appendix A). The MPCA biologists found poor to fair habitat conditions in the project area. In particular, channel morphology was consistent with the effects of ditching, including a lack of depth variability, channel development and sinuosity. Only one bend was observed in the project area, with most of the reach dominated by run habitat, and no riffles.

Macroinvertebrate populations in the restoration reach were characterized in April 2012 by MPCA and in September 2012 by Barr Engineering. Macroinvertebrates were collected from undercut banks and from woody debris. The April 2012 MPCA survey identified 36 unique taxa, 96-percent of the taxa identified were insects, primarily flies (Diptera), but also mayflies (Ephemeroptera) and caddisflies (Trichoptera). The remaining 4-percent of the species found were non-insect species, including fingernail clams, crayfish and snails. Species that are sensitive to habitat stressors, including mayfly, caddisfly and chironomids, made up approximately 29-percent of the taxa observed.

Although current conditions are poor to fair habitat for aquatic organisms, the possibility exists for direct impacts from in-stream construction activities. The temporary impacts from operating construction equipment, such as increased levels of noise and air pollution, would affect behavior and movement of local wildlife. The project's proposed sedimentation and erosion control measures, as well as the short construction period and planned sequencing of activities, will minimize impacts to downstream fish and wildlife. Disturbances to resting or nesting wildlife could increase, potentially causing some animals to leave the project area. Wildlife that can adapt to human presence will likely continue to use the area. The overall condition of the stream for supporting wildlife should remain relatively intact, or be improved.

A positive effect of the proposed project is that the biological diversity and species abundance will likely increase in Gilmore Creek from an increase in a diversity of habitats. Naturally functioning, stable stream systems promote the diversity and availability of habitats. The project is designed to enhance the natural ecological function of Gilmore Creek and improve the habitat for fish and wildlife species. The proposed project is intended to have Gilmore Creek function as a natural stable stream to not just reduce sediment and reconnect floodplains, but also function as a natural stable stream so that the Creek may potentially be more biologically productive and maintain the diversity of habitats important to aquatic organisms and wildlife. The proposed restoration project alone may not provide the necessary access to the entire stream, but if continued efforts were focused on Gilmore Creek it could be a good candidate for a Northern Pike spawning stream, which may result in improving the fishery in the Sturgeon River.

Invasive Species

The floodplain within the project area is currently dominated by reed canary grass (*Phalaris arundinacea*), a MDNR listed invasive species. No other aquatic or terrestrial invasive species have been documented in the project area. Reed canary grass is a major threat to natural wetlands. It's thick, mat-like root structure, called rhizomes, make it difficult for other species to establish, thus creating a monoculture of grass. Invasion of reed canary grass is associated with disturbances, such as ditch building, stream channeling sedimentation and intentional planting. Research suggests the most effective method of eradication is applying a chemical treatment late in the fall.

Although chemical treatment may be an effective procedure to minimizing the risk of increasing the dominance of reed canary grass on site, it is not recommended in every situation. Chemical treatment should be applied before work is conducted, unless the patches are big. Since the patches of reed canary grass at the project location are considered large, other methods of invasive species minimization must be used.

The contractor will ensure that equipment brought onto the site is cleaned prior to entering the site to prevent introducing additional non-native or invasive species. When possible, the contractor will work first in uninfested sections of the work zone, transitioning into infested sites. Any soil removed from the site will not contain sod that may contain reed canary grass to prevent the spread elsewhere. Prior to removing equipment from the site, the contractor will clean all equipment to avoid the spread of invasive species seed elsewhere. The contractor will also inspect the site daily for invasive plants that are germinating from contaminated soil that was washed off. It is best to treat infestations quickly after their presence has been detected. All seed and mulch used on the project will be certified weed free. Any soil or rock material brought onto the site will be free of weed seeds. Ongoing monitoring and management of invasives will also be conducted.

b. Are any state-listed (endangered, threatened or special concern) species, rare plant communities or other sensitive ecological resources on or near the site? __Yes _x_No

If yes, describe the resource and how it would be affected by the project. Describe any measures that will be taken to minimize or avoid adverse impacts. Provide the license agreement number (LA- 501) and/or Division of Ecological Resources contact number (ERDB #20130133-0002) from which the data were obtained and attach the response letter from the DNR Division of Ecological Resources . Indicate if any additional survey work has been conducted within the site and describe the results.

MDNR Natural Heritage Information System (NHIS) database (Barr license agreement LA-501) indicates that there are no state endangered, threatened or special concern species within one mile of either terminus of the stream restoration. The nearest NHIS record is for the American bittern (*Botaurus lentiginosus*), approximately 1.7 miles west-northwest of the western terminus of the project (Figure 12). A letter was sent October 3, 2012 to the MDNR Endangered Species Environmental Review Coordinator reporting the results of the NHIS database search. MDNR responded on November 2, 2012, concurring with the findings of the database search (Appendix B).

The only federally-listed species known to occur in St. Louis County are the piping plover (*Charadrius melodus*) and Canada lynx (*Lynx canadensis*). There is no suitable habitat for piping plover on or near the project site. The proximity of forested, marsh and scrub-shrub cover may have some habitat value for Canada lynx. However, the projects is outside of the USFWS designated critical habitat for Canada lynx. Moreover, the stream restoration is not expected to affect Canada lynx due to the small scale and short term of the project.

12. **Physical impacts on water resources.** Will the project involve the physical or hydrologic alteration — dredging, filling, stream diversion, outfall structure, diking, and impoundment — of any surface waters such as a lake, pond, wetland, stream or drainage ditch? _X_ Yes __No

    If yes, identify water resource affected and give the DNR Public Waters Inventory number(s) if the water resources affected are on the PWI: **Gilmore Creek.** Describe alternatives considered and proposed mitigation measures to minimize impacts.

    Local water resources, including streams and wetlands, are shown on Figure 12. There are 12 wetland basins within 1,000 feet of the proposed project area. The total area of these wetlands is approximately 88 acres, including 70 acres of palustrine forested/scrub-shrub wetland and 18 acres of palustrine emergent wetlands. The proposed project construction area lies within wetland immediately adjacent to the existing channel. As such, temporary wetland impacts would occur as a result of construction activities. These activities include excavating a new channel, filling the existing channel, material stockpiling, grading, and movement of construction equipment and could result in up to 3.4 acres of temporary wetland impact. Project construction will disturb floodplain wetland adjacent to Gilmore Creek, primarily as a result of shallow scraping of floodplain soils and excavation of the new channel. All disturbed floodplain wetlands will be seeded with a native wet meadow seed mix. The stream restoration will also restore the natural hydrologic regime to approximately seven acres of floodplain wetland along Gilmore Creek. No permanent wetland impacts are anticipated.

    Gilmore Creek is a first-order, headwater stream up to the beginning of the proposed project, where a tributary discharges into Gilmore Creek (Figure 12). Therefore, the proposed project area is technically a second-order stream. Gilmore Creek is a relatively flat, low-gradient stream. In the April 2012 MPCA Northshore Mine Expansion and Mitigation Stream Inventory Report, the restoration reach gradient was estimated to be 1.5 meters per kilometer. Flow was measured at 0.19 cubic meters per second. The MPCA report states that, based on historical aerial photographs, the restoration reach was channelized sometime between 1939 and 1948. The existing channel is incised by one to two feet. Due to the ditched and resulting incised nature of the channel, the existing bankfull elevation was difficult to determine; however, field survey data indicates that existing bankfull elevations range from 1316 feet to 1317 feet from downstream to upstream.

    The project is conceived and designed to improve Gilmore Creek by reestablishing the channel's original plan and profile, restoring natural meanders and improving connectivity with adjacent wetland floodplain communities. This will reestablish the natural stream processes and reconnect the channel to the large surrounding floodplain. The straightened channel has more energy to move sediment, resulting in greater potential for entrenchment of the channel and reducing the frequency of flooding onto the floodplain. The proposed channel will be reestablished approximately less than one to two feet higher than the existing channel, allowing flood flows to spread over the floodplain more frequently. Bankfull elevations will be modified accordingly to range from 1317.5 feet to 1319 feet, from downstream to upstream.

    The perennial flow of the stream from a spring and newly connected floodplain wetlands will help maintain a more consistent baseflow. The spring is located approximately midway along the alignment at an approximate discharge elevation of 1316.7 feet. The spring location is shown on Figure 12. The elevation of the new channel will not cut off the spring from the channel, nor will it inhibit discharge from the spring to the channel. It is thought that through the historical straightening of the channel, the

profile has been downcut into the floodplain and therefore is not functioning as it did historically. The existing, straightened reach of Gilmore Creek is rated poor for stream habitat due to the absence of riffle habitats, substrates dominated by sand and silt, a lack of depth variability, and poor channel morphology (MPCA, 2012). The new stream channel will improve habitat complexity by adding bends, riffles, and depth variability.

The length of the existing channel in the restoration reach is 1,384 feet. The proposed channel length for this reach is 2,004 feet with a planned sinuosity of 1.4 (Figure 6). Most of the additional length will be achieved by directing the restored channel to historical and new meanders that were cut off when Gilmore Creek was straightened. The elevation of the new stream bed will be approximately one to two feet higher than the existing stream bed elevation which will be established by installing grade-control rock riffles within the channel at the upstream and downstream ends of the project and at three riffle sections in between. The new channel will generally have a bankful width of approximately 13 feet wide.

Approximately 19 riffle/pools will be constructed/established at the bends in the restored stream channel. Pools will generally be four feet deep on the outside of the bend rising at about a 3H:1V slope to the inside of the bend.

The majority of the proposed construction activities will not take place in the actively-flowing stream. Two exceptions to this will occur when the riffles at the beginning and end of the project area are constructed, and when a newly-constructed stream meander is ready to be re-connected to the creek. In these instances, there will by necessity be brief need to perform in-water work. Portions of the new channel will be constructed within portions of the old/remnant stream channel. Riffles will be added in these areas. Flow will be pumped around the active channel during construction of these riffle areas.

The overall soil excavation and fill quantities are expected to be balanced on the site. In general, excavated soils will either be utilized to fill portions of the existing channel or sod mats will be utilized in stabilizing the new streambank slopes. If excess soil is generated during the project, it will be placed in an upland location and will be seeded to stabilize the soils. The project will require that gravel and rock be brought in for the riffles. Pool edges will be stabilized with logs and branches held in place by excavated fill and covered by approximately one foot of natural sod obtained from the construction site. The logs and branches will protect the streambank from erosion and promote scour along the toe of the bank to create habitats for fish.

The proposed stream restoration design is based in part on a stable reference reach in a 1,600-foot section of a tributary to Gilmore Creek, approximately 1.25 miles west-southwest of the western terminus of the proposed restoration (Figure 5). The reference stream is a second-order, naturally meandering stream in the Sturgeon River watershed. It has not been channelized or straightened, and drains through a large wet meadow wetland area. The reference reach is classified as a Type E channel. The reference channel classification was determined to be consistent with the historic condition of the stream mitigation reach and was, therefore, used as a basis for the restoration design.

The measured meander characteristics of the reference and restoration reaches are compared in Table 12-1.

Table 12-1: Gilmore Creek Reference and Design Meander Characteristics

Planform	Gilmore Creek Reference			Gilmore Creek Design
	Average (ft)	Minimum (ft)	Maximum (ft)	Average (ft)
Radius of Curvature	28	13	60	28
Meander Belt Width	95	89	102	100

Planform	Gilmore Creek Reference			Gilmore Creek Design
Meander Length	160	80	170	130
Linear Wavelength	115	113	120	115

13. **Water use.** Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)? _x_Yes __No

    If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and DNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells known on site, explain methodology used to determine.

    As noted in the Project Definition (Item 6b), in locations where the restoration construction frequently crosses the existing channel, the contractor will be required to temporarily pump the flow around the active work area until all restoration and site stabilization is completed within that reach. Pumped discharges will be discharged downstream utilizing a flat flow-spreading device (e.g., geotextile sheet with rock) to dissipate the flow velocities and discharge over a larger area to minimize erosion in the channel. The anticipated MDNR Public Water Permit will include a provision that pump intake(s) be screened to preclude entrapping animals; and that screening is practical and a typical BMP for pumping intakes.

14. **Water-related land use management district.** Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district? _x_Yes __No

    If yes, identify the district and discuss project compatibility with district land use restrictions.

    Shoreland Zoning
    The proposed project area is located in a shoreland district. According to Minnesota Rule 6120.2500, Subp. 15, shoreland is defined as "land located within…300 feet from a river or stream." Gilmore Creek is a classified public water and as such has "shoreland" along it.

    Minnesota Rule 6120.2500-3900 outlines the State's Shoreland Management Program. The basis of these sets of rules is to preserve and enhance quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of water and related land resources of the state. The Shoreland Management Program provides the backbone of statewide standards that local governmental units must adopt into their own land use controls to provide for the orderly development and protection of Minnesota's shorelands (both rivers and lakes). St. Louis County adopted these State Standards in 1993.

    St. Louis County Shoreland Standards have limits or thresholds of allowable land alteration which if exceeded may cause a project to require a permit. The Gilmore Creek Restoration project would exceed the "limits" for land alteration. Specifically, two of the four limits would be met, including 1) more than 10 cubic yards of material grading, filling, or excavating within the shore impact zone and 2) more than 50 cubic yards of material altering (grading, filling, excavating) in the rest of the shoreland area (within 300'). Since a limit is exceeded, St. Louis County would require a shoreland alteration permit and would require an evaluation of the project to determine if benefits resulting from this project were greater than potential negative impacts and to determine if there was any unnecessary erosion risks involved with the project. Minnesota Rule 6120.3300, Subp.4. requires that evaluation of

such projects include determining if other permits, such as 404 authorization and 401 certification, are required.

Additionally, Minnesota Rule 6120.3300, Subp.4.B. would apply to this project. This Rule states that "Before grading or filling on steep slopes or within shore or bluff impact zones involving the movement of more than ten cubic yards of material or anywhere else in a shoreland area involving movement of more than 50 cubic yards of material, it must be established by local official permit…" The proposed project will comply with Minnesota Rule 6120.3300, Subp.4.B.

Although this project is located within St. Louis County and the County has adopted State Shoreland Standards, the proposed project is also located on land owned by the State of Minnesota. As such, the State is not mandated to obtain permits from local units of government per Minnesota Statute 394.24, subd. 3, which states "…no land owned or leased by the federal or state government shall be subject to official controls of the county." Despite not being required to obtain a permit, MDNR policy is to comply with local zoning standards.

100-year Floodplain
The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps were referenced and the proposed project is unmapped. However, this project will affect the floodplain, as construction activities will occur within the floodplain of Gilmore Creek. Disturbed soils or disturbed areas will be seeded and revegetated to reduce erosion and sedimentation. These activities will restore Gilmore Creek segments or reaches to a more active, functional floodplain.

Wild or Scenic River Land Use District
The proposed project area is not located in a scenic river land use district.

15. **Water surface use.** Will the project change the number or type of watercraft on any water body?
__Yes _X_No

    If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

16. **Erosion and sedimentation.** Give the acreage to be graded or excavated and the cubic yards of soil to be moved:

    Acres 3.7 ; Cubic yards 5985 . Describe any steep slopes or highly erodible soils and identify them on the site map. Describe any erosion and sedimentation control measures to be used during and after project construction.

    Soils in the project area consist of Map Units B5B and B9A. The majority of the existing and proposed channel is located in B9A, mapped as Greaney and Dora soils with 0-1% slopes that are frequently flooded. This soil type was formed from clayey deposits and is largely comprised of silt and clay.

    Map Unit B5B, Alango-Taylor-Woodslake depressional complex with 0-6% slopes, is located immediately north of the existing channel. This soil type was also formed from clayey deposits and is primarily comprised of clay and silt. Both of these soils have relatively low susceptibility to sheet and rill erosion by water and also are not susceptible to wind erosion. There are no steep slopes within the project area other than the streambank slopes. Due to the site's soil characteristics and lack of significant slopes, the site is not anticipated to be highly erodible.

    Project construction methods and sequencing will be planned to minimize the potential for erosion and downstream sedimentation to the extent practicable. Stream restoration activities will be sequenced to limit the area of open soil disturbance during construction, typically completing construction of each component of the project by the end of each day. The overall construction is planned during the summer low flow period when the potential for erosion and sedimentation are reduced.

A rock riffle structure is planned at the downstream end of the project to capture sediment that may be generated during construction and limit downstream impacts. Sediment levels in the downstream filter dike/riffle structure will be monitored throughout the project and will be cleaned out before sediment overtops the structure. Any temporary soil stockpiles that will not be utilized within three days of placement will be protected from erosion and sedimentation by placing silt fence around the stockpile. Constructed or modified stream banks will be stabilized by three primary methods depending on the location within the stream:

1. Outside Bends – toe wood and woody debris will be placed as shown on Figure 8 within the nine planned outside bends
2. Pools – slopes along the planned 19 pools will be stabilized by placing sod mats staked in place with live shrub stakes as shown on Figure 9
3. Riffles – the five planned riffle sections will be lined with rock and gravel less than three inches in diameter anchored into the banks with large wood structure keys (Figure 7)

Excavation of new channel sections will not be connected to the flowing stream until all vegetative restoration features are installed. Stream reaches that are planned to be filled will not be completed until that reach is disconnected from the active, flowing stream. Where the restoration construction frequently crosses the existing channel, the contractor will be required to temporarily pump the flow around the active work area until all restoration and site stabilization is completed within that reach. Pumped flows will be discharged downstream utilizing energy dissipation methods to minimize erosion in the channel.

The contractor will be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for construction sites and to follow the requirements of that permit.

Any soil storage areas will be protected with perimeter controls to contain sediment utilizing silt fence or embedded, staked biologs. All disturbed, open soil areas within the project area, but outside of the streambed, will be seeded with a cover crop and native seed mix within seven days of completion of work. Tree planting will occur after the flow is directed to the new channel.

The majority of the proposed construction activities will not take place in the actively-flowing stream. Two exceptions to this will occur when the riffles at the beginning and end of the project area are constructed, and when a newly-constructed stream meander is ready to be re-connected to the creek. In these instances, there will by necessity be brief need to perform in-water work. Also, portions of the new channel will be constructed within portions of the old/remnant stream channel. Riffles will be added in these areas. Flow will be temporarily pumped around the active channel during construction of these riffle areas.

Immediately after restoration and prior to full vegetative cover becoming established, soil fill placed in the abandoned stream segments may be slightly susceptible to erosion temporarily due to flood flows. The exact timing of the reconnection cannot be predicted; however, the reconnection will would occur during low flow periods, and not during flood flows. Additionally, the flat slopes and dense grass vegetation within the floodplain will minimize the potential for sediment transport outside of the project area. The maximum total graded area, including the new channel and the associated floodplain grading limits, would be 3.7 acres. The actual graded area will likely be less than this.

17. **Water quality: surface water runoff**

a. Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any stormwater pollution prevention plans.

Water chemistry in the Gilmore Creek restoration reach has been sampled on several occasions dating to July 2005, including three samples taken in 2012. Water chemistry parameters from these sampling

events are provided in Table 17-1.

Table 17-1: Gilmore Creek Water Chemistry – 2005 through 2012

Parameter	7/13/2005	6/18/2008	4/5/2012	4/12/2012	8/23/2012
Temperature (deg C)	28.5	16.7	2.72*		13.7
Flow (cfs)	0.012	NA	NA	NA	0.084
pH	5.84	6.59	6.54*		6.8
Specific Conductivity (umhos/cm)	186	69.8	173*		261
Field Turbidity (NTU)	4.97	NA	NA	NA	2.7
Dissolved Oxygen (mg/L)	NA	6.66	10.6*		6.3
Nitrate + Nitrite (mg/L N)	<0.05	<0.05	3.4	2.9	<0.04
Total Phosphorus (mg/L)	0.182	0.108	0.019	0.018	0.018
Total Suspended Solids (mg/L)	28	55	2	<RL	4.0
Total Volatile Suspended Solids (mg/L)	NA	NA	1.6	<RL	<2.0
Ammonia (mg/L N)	0.08	<0.05	0.08	0.06	<0.020

Notes on the above table.

NA = Not Available

<RL = Result was below reporting limit.

<2.0 = Result was below indicated reporting limit.

2.72* = Average value of data collected by MPCA at 15-minute intervals over period of 4/5/12-4/12/12.

As shown in Table 17-1, the temperature of Gilmore Creek has decreased by about half between 2005 and 2012, while pH has increased from 5.84 in 2005 to 6.80 in 2012. Flows have increased slightly from 0.012 cfs in 2005 to 0.084 cfs in 2012, but turbidity has decreased by almost half during this time. Total suspended solids have decreased even more, from 28.0 mg/L in 2005 to 4.0 mg/L in 2012. Total phosphorous and ammonia have also decreased between 2005 and 2012, Nitrate/nitrite levels recorded in late 2012 are similar to those recorded during 2005 monitoring, though there was a notable peak in levels in the spring of 2012. Similar water chemistry monitoring could be included as provisions in the MDNR Public Water Permit.

Due to the nature of the project, water quality parameters are anticipated to improve. Better connectivity with adjacent emergent wetlands will reduce nutrients reaching the channel. Additionally, re-meandering the channel and providing better floodplain connectivity will reduce channel velocity during periods of high flows, in turn reducing sediment loads and the potential for the channel to become incised. Monitoring of the Gilmore Creek restoration will provide water chemistry data to

document changes in water quality once the restoration is completed. Please refer to Question 16 above for a discussion of measures to avoid or minimize potential in-stream water quality impacts during project construction.

A Stormwater Pollution Prevention Plan (SWPPP) will be prepared prior to project construction.

b. Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.

Runoff from the site flows into Gilmore Creek. Gilmore Creek flows into the Sturgeon River approximately 5.5 miles west-northwest of the western terminus of the project. The Sturgeon River is currently listed as impaired for mercury in fish tissue, affecting aquatic consumption. The proposed project would not alter atmospheric mercury deposition within the watershed, nor would it create a point source of mercury. Therefore, the proposed restoration project would not contribute to the current mercury impairment in the Sturgeon River.

Due to the nature of the project, Gilmore Creek may temporarily experience minor amounts of additional sediment load during construction. These impacts would be mitigated by creating the downstream connection between the existing and restored channel segments prior to the upstream connection. A rock riffle structure will be placed at the downstream end of the project to capture sediment that may be generated during construction; this structure will be monitored regularly and cleaned out as need to avoid downstream impacts. Best management practices (BMPs), including sequencing construction to limit exposed soil area, would be implemented during construction to further minimize erosion and sedimentation affects. Temporary sediment impacts are anticipated to be localized and would not affect water quality in downstream reaches of Gilmore Creek or in the Sturgeon River.

Water quality in Gilmore Creek, and to a lesser degree the Sturgeon River, is anticipated to remain unchanged or improve incrementally upon project completion. The restoration would return meander features to Gilmore Creek, reducing sedimentation by allowing opportunity for in-channel sediment deposition. This would also allow nutrients attached to sediment to be deposited and settle out of the water column before reaching the Sturgeon River.

18. **Water quality: wastewaters**

a. Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.

There are no sanitary, municipal or industrial wastewater sources in the project area. Portable sanitary facilities may be needed for use by work crews during construction of the project.

b. Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies (identifying any impaired waters), and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.

Not applicable.

c. If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility's ability to handle the volume and composition of wastes, identifying any improvements necessary.

Not applicable.

19. **Geologic hazards and soil conditions**

a. Approximate depth (in feet) to ground water: 10' minimum, 28' average;

to bedrock: 32' minimum; 118' average.

Describe any of the following geologic site hazards to ground water and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

The project site does not overlay karst geology; therefore the formation of sinkholes will not occur. Bedrock is overlain by a layer of glacial till approximately 60 feet thick. Given the considerable depth of soil to bedrock, the construction of the proposed project would not be limited or constrained by encountering bedrock.

b. Describe the soils on the site, giving NRCS (SCS) classifications, if known. Discuss soil texture and potential for groundwater contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.

See Figure 13. The glacial deposits in the area are mapped as lake-modified till of the Erskine moraine association with silt and clay typically exceeding 50 percent of till (Hobbs and Goebel, 1982). Soils along the creek channel and within the floodplain are mapped as Greaney and Dora, 0 to 1 percent slopes, frequently flooded. Dora soils are described as up to three feet of mucky peat over silty clay loam, with a high water table common. Greaney soils are described as silty clay soils that formed in alluvium on floodplains with 0 to 1 percent slopes and frequent flooding in April to June of years with normal precipitation. Adjacent to the flooplain on the north side, is a narrow band of soils mapped as Alango-Taylor-Woodslake, depressional complex, 0-6 percent slopes, all clay or silty clay texture soils. Beyond the floodplain, soils are mapped predominantly as Dora muck, depressional, 0-1 percent slopes or as Rifle muck, 0 to 1 percent slopes, both wetland soils commonly associated with hardwood and coniferous swamps and bogs.

Clay silt soils, such as described above, are not susceptible to groundwater contamination by spills.

20. **Solid wastes, hazardous wastes, storage tanks**

a. Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.

Sludge, animal waste and ash material will not be generated during construction or operation of the proposed project.

b. Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

The proposed project area has generally clay silt soils, which are not susceptible to groundwater contamination by spills. The planned restoration activities at Gilmore Creek have limited potential for releases of toxic or hazardous substances. Herbicide applications may be necessary to control reed canary grass on the site. Toxic and/or hazardous materials to be used or present at the site would be limited to fuels and oils used in equipment, as well as hydraulic fluids within some of the heavy machinery. Contractors will be required to have adequate measures (e.g., spill kits) on-site or readily

accessible to respond to accidental spills of fuel, oil, hydraulic fluid or other hazardous substances. The NPDES Construction Site permit requires a site specific Stormwater Pollution Prevention Plan (SWPPP) to be completed for construction. This SWPPP is required to include pollution prevention management measures for solid waste and hazardous material spills that occur during construction. Refueling spills and equipment breakdowns, such as a broken hydraulic line, could introduce contaminants into the soil during construction. Equipment operators are instructed to take precautions when refueling equipment. Refueling would be conducted away from surface waters and equipment would be regularly inspected and repaired to prevent inadvertent loss of fuels, oils, or other hazardous fluids. Spills will be reported to the Minnesota Pollution Control Agency, the Minnesota Duty Officer, and St. Louis County.

c. Indicate the number, location, size and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

None.

21. **Traffic.** Parking spaces added: 0

    Existing spaces (if project involves expansion):
    Estimated total average daily traffic generated: 0

    Estimated maximum peak hour traffic generated and time of occurrence: 0

    Indicate source of trip generation rates used in the estimates.

    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. Using the format and procedures described in the Minnesota Department of Transportation's Traffic Impact Study Guidance *(available at: http://www.oim.dot.state.mn.us/access/pdfs/Chapter%205.pdf)* or a similar local guidance, provide an estimate of the impact 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.

22. **Vehicle-related air emissions.** Estimate the effect of the project's traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation measures on air quality impacts.

    Construction of the entire project is expected to be completed in three to four weeks during late summer 2013. Construction equipment used at the site, including an excavator, skid-steer, bulldozer and dump truck, would have a localized, short-term effect on air quality. The impact on overall air quality is expected to be negligible. Moreover, not all equipment would be operating at the same time, further reducing emissions from construction equipment.

23. **Stationary source air emissions.** Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult *EAW Guidelines* for a listing) and any greenhouse gases (such as carbon dioxide, methane, nitrous oxide) and ozone-depleting chemicals (chloro-fluorocarbons, hydrofluorocarbons, perfluorocarbons or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

    No equipment proposed for construction of the project meets the definition of a stationary source for air emissions. Since the project area is in wet soils with dense graminoid vegetation, the potential for generation of fugitive dust is minimal. There are no hazardous pollutants associated with the construction of the project.

24. **Odors, noise and dust.** Will the project generate odors, noise or dust during construction or during operation? _X_Yes __No

    If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at item 23 instead of here.)

    Execution of the stream restoration plan will require the use of construction equipment such as an excavator, skid-steer, bulldozer and dump truck. This equipment would generate noise and potentially dust. Construction noise should be minimal and limited to the noise generated by a diesel excavator. Some dust may result; however, since the site is generally very moist, any dust generated should be minimal. Construction would be limited to daylight hours. There are no known sensitive receptors in the vicinity of the site. The nearest residences to the project are approximately 1,100 feet away.

25. **Nearby resources.** Are any of the following resources on or in proximity to the site?

    Archaeological, historical or architectural resources? __Yes _X_No
    Prime or unique farmlands or land within an agricultural preserve? __Yes _X_No
    Designated parks, recreation areas or trails? __Yes _X_No
    Scenic views and vistas? __Yes _X_No
    Other unique resources? __Yes _X_No
    If yes, describe the resource and identify any project-related impacts on the resource. Describe any measures to minimize or avoid adverse impacts.

    The Minnesota State Historic Preservation Office (SHPO) was contacted September 20, 2012 to consult the SHPO database for known occurrences of archaeological, historical or architectural resources in the vicinity of the project. The SHPO responded on September 26, 2012, reporting that no archaeological sites or historic structures were identified in a search of the Minnesota Archaeological Inventory and Historic Structures Inventory for the search area requested (see Appendix C).

26. **Visual impacts.** Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks? __Yes _X_No

    If yes, explain.

27. **Compatibility with plans and land use regulations.** Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency? _x_Yes __No..

    If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

    MDNR is developing forest resource management plans using the subsection level of its ecological classification system (ECS). A more standardized, structured planning process involved public participation and is found in the Subsection Forest Resource Management Plans (SFRMPs).

    A SFRMP is a MDNR plan for vegetation management on forestlands administered by the Divisions of Forestry and Wildlife (and on occasion lands administered by Fisheries, Parks, and Trails and Waterways). ECS subsections, not administrative boundaries, are the basic units of delineation. The strategic component of SFRMPs focuses on long-term strategic direction in response to identified issues, strategies to implement the general direction, and identification of quantifiable long-term desired future forest composition (DFFC) goals.

Plans identify forest stands on MDNR administered lands proposed for treatment (e.g., harvest, thinning, regeneration, prescribed burning, reinventory) over a10-year planning period. Forest stands are selected using criteria developed to begin moving MDNR forestland toward the long-term DFFCs. Stand management consists of a series of actions (including no action) that will best move the forest landscape toward the DFFC goals. DFFC goals are most commonly expressed in terms of desired changes in the age-class structure, the amount of various forest types within the subsection, and the geographic distribution of forest types and age-classes across the subsection.

The Gilmore Creek proposed project area lies within the Nashwauk Uplands Subsection. This subsection is included in the St. Louis Moraines, Tamarack Lowlands, Nashwauk Uplands, and Littlefork-Vermilion Uplands Subsections SFRMP. The proposed project outcomes work to achieve many of the long-term, strategic directions outlined in the SFRMP.

MDNR Division of Forestry was consulted on the capability of this project with their future plans for the project area. The Division completed timber harvest in this locale in 2009 and there are not any immediate future harvesting plans, but they will be checking on the tree regeneration every three years to ensure its survival and growth is adequate. It is possible that the Division might have to do some timber stand improvement work on the young regeneration, but assessment of that need will follow the goals of the SFRMP. Overall, MDNR Division of Forestry supports the proposed project, and believes that as proposed, the project improves management access to state and private lands on the north side of Gilmore Creek.

28. **Impact on infrastructure and public services.** Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project? __Yes _X_No.

    If yes, describe the new or additional infrastructure or services needed. (Note: any infrastructure that is a connected action with respect to the project must be assessed in the EAW; see *EAW Guidelines* for details.)

29. **Cumulative potential effects.** Minnesota Rule part 4410.1700, subpart 7, item B requires that the RGU consider the "cumulative potential effects of related or anticipated future projects" when determining the need for an environmental impact statement.

    Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this EAW in such a way as to cause cumulative potential effects. (Such future projects would be those that are actually planned or for which a basis of expectation has been laid.)

    Describe 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 *(or discuss each cumulative potential effect under appropriate item(s) elsewhere on this form).*

    The effects of all past projects comprise the existing conditions of the project area. Cumulative environmental effects add to the existing condition the proposed project and future projects.

    Cumulative environmental effects for future projects are assessed by evaluating the effect on the environment resulting from the incremental effects of the project under review plus similar effects from certain future projects that overlap spatially or temporally with the proposed project.

    Consultation with St. Louis County Department of Planning and Community Development, and with MDNR Division of Forestry indicates that there are no known projects in the Gilmore Creek watershed that are currently underway or planned in the foreseeable future that would have impacts on the creek.

30. **Other potential environmental impacts.** If the project may cause any adverse environmental impacts not addressed by items 1 to 28, identify and discuss them here, along with any proposed mitigation.

    No adverse environmental impacts would result from the project.

31. **Summary of issues.** *Do not complete this section if the EAW is being done for EIS scoping; instead, address relevant issues in the draft Scoping Decision document, which must accompany the EAW.*

    List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.

    There are no additional issues or effects identified in the EAW that would warrant further investigation before project construction could be initiated. No additional mitigation measures, other than those described in the EAW, are being considered or are anticipated.

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 9b and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature Date: June 21, 2013

Title: Environmental Review Planner

Environmental Assessment Worksheet was prepared by the staff of the Environmental Quality Board at the Minnesota Department of Administration, Office of Geographic and Demographic Analysis. For additional information, worksheets or for *EAW Guidelines*, contact: Environmental Quality Board, 658 Cedar St., St. Paul, MN 55155, 651-201-2492, or http://www.eqb.state.mn.us