ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at: The EQB webpage of Environmental Review Guidance Documents. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.
Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addresses collectively under EAW Item 19.
Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. **Project title:** Roseau River Wildlife Management Area (RRWMA) Pool Enhancement

2. **Proposer**

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3. **RGU**

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4. **Reason for EAW Preparation (check one)**

Required:
☐ EIS Scoping
X Mandatory EAW

Discretionary:
☐ Citizen petition
☐ RGU discretion
☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s): Minnesota Rules (M.R.) 4410.4300 Subp. 27, Wetlands and Public Waters.

5. **Project Location**

County: Roseau
City/Township: Unorganized T163N R43W & T163N R44W
PLS Location (¼, ¼, Section, Township, Range): Sec 9, 16, & 17 T163N R43W and Sec 2, 3, 4, 5, 6, 11, 12, &13 T163N R44W

Watershed (81 major watershed scale): Roseau River
GPS Coordinates: N261283 W5426122
Tax Parcel Numbers:

- 463005201
- 463005200
- 503002700
- 453000701
- 453000700
- 243001000
- 453001600
- 453001601
- 453001900

At a minimum 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: Figure 2
- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan. Figures attached as follows:
  - Figure 3. RRWMA Pools - Existing Water Conveyance Infrastructure
  - Figure 4. Emergency Spillway Photo
  - Figure 5. Historic Summary of Annual Water Yield and Precipitation at the USGS gage at Ross
  - Figure 6. RRWMA Pools with Enhancement Project Water Conveyance Infrastructure.
  - Figure 7. Land Use
  - Figure 8. Public Waters Inventory
  - Figure 9. National Wetlands Inventory
  - Figure 10. Vegetation zones within the RRWMA Pools
  - Figure 11. Native Plant Community Class Codes, within Pool 2 and Big Swamp area
  - Figure 12. MBS Sites of Biodiversity Significance, within Pool 2 and Pool 3

6. Project Description

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

MN DNR and Roseau River Watershed District will construct a new outlet channel and modify some existing water level management structures at Roseau River WMA to reduce peak flows, improve timing of outflows and use of existing storage, reduce water level fluctuations during the growing season, and provide better water level management to improve habitat conditions.

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

The Roseau River Wildlife Management Area (RRWMA) Pool Enhancement project is a cooperative effort between the Roseau River Watershed District (RRWD) and DNR Section of Wildlife. The project builds on existing infrastructure and improves the capacity to manage water levels in Pools 2 and 3 of the RRWMA to achieve wildlife habitat and flood damage reduction goals. This section first describes the existing conditions and then the proposed project features.

Existing RRWMA infrastructure and water flow through the system (Figures 1–4)

The project area is located within four miles of the Canadian border in the northwestern corner of Roseau County, MN (Figures 1 and 2). The project area includes Pool 2 and Pool 3 of the existing WMA, the area directly west of Pool 3 between the pool and the Roseau River, the Roseau River channel, and the area to the south of the existing pools including the "Big Swamp" (Figure 3).

The RRWMA covers an area of over 75,147 acres, including approximately 10,600 acres of pools managed for wildlife (Figure 3). The RRWMA was created in the early 1950s as a multipurpose flood damage reduction and wildlife habitat project. The current flood damage reduction benefits are provided by the capacity to retain up to about 29,000 acre-feet of flood waters in spring. The current wildlife habitat benefits include providing resident and migratory wildlife habitat (game and non-game species) and access to public hunting. The RRWMA includes three large pools (numbered 1, 2, and 3 from east to west) aligned north of the Roseau River for a total of 10,600 acres. These pools were created by building 27 miles of embankments. The primary water control is provided by the southern embankment aligned generally east to west. Embankments aligned generally north to south subdivide the impounded area into the three pools. Since construction, these embankments have been maintained and improved (e.g. water control structures were replaced and the entire embankment system was elevated one foot in the 1980s).

Water is supplied to the pools by the Pine Creek Diversion ditch, which was completed in 1953 and originates in Canada. It conveys a percentage of the surface water flow from the Pine Creek watershed to Pool 1 (maximum capacity 600 cfs). Once water from this diversion enters Pool 1 it flows by gravity to the west into Pool 2, and then into Pool 3 through outlet structures located within the embankment. Water flows out of the pools to the Roseau River through two outlets. One outlet is a 0.9-mile-long ditch channel located between Pool 2 and the river. The other outlet is a 0.9 mile channel located between Pool 3 and the river (Figure 3). Emergency spillways are built into the Pool 2 and Pool 3 embankments as well as on the embankment separating Pools 2 and 3 (Figure 4).

Water flows through Pools 2 and 3 by gravity, but this flow is also enhanced by an internal conveyance channel located within the pool and adjacent to the main embankment. This channel was excavated when the embankment was originally constructed (i.e., a borrow area for embankment construction). The channel ranges from 6 to12 feet deep with some shallower areas, particularly along the western portion of Pool 3. On occasion, these internal channels become plugged by floating bog mats, which require regular maintenance to optimize flow. The drainage area at the outlet of Pool 3 is 198.3 square miles.

Water flows out of Pool 2 and Pool 3 to the Roseau River in an area known as the Big Swamp, which is a large wetland complex that attenuates flood peaks for the entire Roseau River watershed (1,399 sq. mi). Once the Big Swamp area is filled to capacity in large runoff events, some water overflows from the Roseau River Watershed south into the Two Rivers Watershed. The capacity of the Big Swamp area to

attenuate high flows and transfer water to the adjacent watershed has been demonstrated on numerous occasions during the past 20 years, when lower flow rates have been observed at the USGS gage downstream of the Big Swamp area compared to the upstream gage.

Preferred water level management regime

The preferred water level management regime was designed to meet both flood damage reduction and wildlife management goals (Table 1). When achieved, this water level management regime provides timely drawdown of the pools prior to spring runoff events to temporarily increase water storage capacity and then management of pool levels for minimal water level fluctuations (bounce) during the open water nesting period. The ability to conduct periodic complete or near complete drawdowns is also important for long-term intensive vegetation management and embankment repairs.

While drawdowns have the potential to affect a variety of species, the three water management pools serve multiple purposes, including wildlife and habitat management, providing recreational opportunities, and managing water levels. The water level drawdown to a winter pool occurs in November and takes about a week. The six inch drawdown occurs after ice has formed. The open water pool area during the drawdown does not change very much because most of the area affected has steep side slopes. MNDNR invertebrate sampling shows no apparent, permanent, effects on herps, (reptiles and amphibians), or invertebrates over many years this drawdown has occurred.

Table 1
Preferred water level management regime, Roseau River WMA

Time Period	Water Level Target	Primary Management Objective
November		Draw down to winter pool elevation
December to March		Maintain winter pool
November to March	Pool 2: 1028.0’ Pool 3: 1023.0’	Draw down pool to increase spring runoff storage capacity
March to Mid-May	Pool 2: 1029.0’-1030.0’ Pool 3: 1024.0’- 1025.0’	Store spring flood waters and provide spring migratory habitat.
Mid-May to Late July	Pool 2: 1029.0’ Pool 3: 1024.0’	Maintain stable water levels for overwater nesting ducks production.
Late July to November	Pool 2: 1028.0‘ -1028.5’ Pool 3: 1023.0’ - 1023.5’	Provide fall migratory habitat and hunting opportunities.
Semi Annual/ Periodic	Pool 2: varies from partial to complete drawdown Pool 3: varies from partial to complete drawdown	Intensive management of vegetation (e.g. promote wild rice production, invasive species management). Maintenance of embankments.

The existing structures in the system are operated with the intent of achieving this water level management regime. In late winter, the existing outlet structures are used to draw the pools down one foot below the normal pool elevation. This provides about 8,300 acre-feet of storage capacity below the normal pool elevation. In spring, during large runoff events, the pool levels bounce up one to two feet

above the normal pool elevation. When this occurs, the pools provide approximately 21,000 acre-feet of storage in a 10-year, 10-day summer storm event. During the rest of the year, the pools are managed to minimize water level fluctuations (bounce) during runoff events by adding and removing boards in the outlet structures. For example, after a rain storm, control boards in the outlet structures may be removed to increase outflows from the pools in order to offset inflows and try to minimize water level fluctuations.

Since the RRWMA was established in the 1950s, this type of preferred water level management regime has been difficult to achieve during the Mid-May to Late July and Late July to November time periods except in small to moderate level storm events (e.g. less than 10-year 24 hour). As described below, the inability to achieve this preferred regime can be attributed to three primary factors: 1) climatic conditions, 2) upstream watershed conditions, and 3) the limited capacity of the conveyance infrastructure.

Climatic conditions have changed, which result in increased runoff from the watershed above the RRWMA. Since 1950, the average annual precipitation has increased about 15% from 20 inches to almost 23 inches (Figure 5). This trend has increased in recent years. Since 1991, annual precipitation was below the long term average in only 5 of 21 years. In addition to the increasing amount of precipitation, the intensity of storm and subsequent runoff event has likely increased as has been observed in statewide climate data.

Upstream watershed conditions have also changed, which has resulted in increased runoff rates from the watershed above the RRWMA. While land use within the Roseau River Watershed has remained relatively unchanged in recent years at about 46% cropland, 7% roads, ditches, and towns, and 47% woodlands, wetlands, and grasslands and with 40% of the lands within the watershed under public ownership, the amount of runoff per year has increased at a faster rate than precipitation (Figure 5). This increasing trend is likely due to overall increases in the size and number of surface drains (ditches, field ditches and scrapes) in the watershed and changes in cropping patterns from small grains to corn and soybeans.

The water conveyance infrastructure for the RRWMA has had limited capacity to manage water levels since the project was constructed. For example, the embankments had substantial failures and repairs soon after original project construction due in part to high water levels. The inadequacies of the infrastructure resulted in moving and modifying outlet structures to improve water management and a complete renovation of the embankments (a one foot raise) in the 1980s in order to reduce the risks of failure.

The combination of these three factors has resulted in an inability to manage water levels to achieve the preferred management regime.

Enhancement Project Features (Figure 6)

This proposed enhancement project will increase the capacity of infrastructure within the system to draw down and manage water levels in Pool 2 and Pool 3. As described in detail below, the project features include:

1. Replacement of the outlet structure between Pool 2 and Pool 3
2. Selective excavation within the western end of the existing Pool 3 Internal Conveyance Channel
3. Install new outlet structure and channel from Pool 3 to the Roseau River

Replacement of the outlet structure between Pool 2 and Pool 3

The existing structure that conveys water between Pool 2 and Pool 3 is located at the south end of the embankment between Pool 2 and 3. The structure is a combination of a weir and stop logs, and was constructed in 1985. The structure is functional with a maximum capacity to convey 160 cubic feet per second (cfs) when the Pool 2 water surface elevation reaches the emergency spillway level. The limited capacity of the existing structure constrains the ability to manage water levels for wildlife habitat and flood damage reduction benefits.

The proposed new outlet structure to convey water from Pool 2 to Pool 3 will be located 0.5 miles north of the current structure, where an old non-functional structure is currently located. The replacement structure will include a sluice gate and stop log bay with a capacity to discharge up to 800 cfs. The increased conveyance capacity will allow managers to move water out of Pool 2 ahead of peak flows on the Roseau River during spring melt and to better manage water levels during precipitation events. The existing, non-functional, structure will be removed and demolition materials will be hauled to a scrap dealer.

Selective excavation of the existing Pool 3 Internal Conveyance Channel

The existing internal conveyance channel within Pool 3 is a channel along the main embankment that was excavated to provide materials to build the embankment (a borrow area). Some of the excavated materials were used to build the embankment and some were cast adjacent to the channel within the pool forming an irregular berm. Several areas within this internal channel are narrow enough to inhibit flow. The project will include selective widening of the existing, narrow areas of the internal conveyance channel in western areas, and will include excavating a collection area near the new outlet structure. These areas will be modified as needed from the northwest extent of the internal channel along the existing alignment of the embankment. The proposed top width of the channel areas that will be excavated will be no greater than 58ft.

New outlet structure and channel from Pool 3 to the Roseau River

The existing outlet structure for Pool 3 is located near the upstream portion of the pool, on the south embankment, near the intersection of Pool 2 and Pool 3 (see Figure 3). When initially constructed, this outlet alignment was selected given its proximity to the Roseau River. The outlet structure is a combination of weir and stop logs, and was constructed in 1987. The structure has a maximum capacity to convey 150 cfs. This existing outlet structure will be maintained and a new Pool 3 outlet structure is proposed to be added near the northwest corner of Pool 3. This new structure will be designed with a capacity to convey up to 1,000 cfs into a new outlet channel.

A new outlet channel will be constructed to convey water (up to 1,100 cfs) from the new Pool 3 outlet directly to the Roseau River at a point downstream of the Big Swamp area. The new Pool 3 outlet channel will be excavated, constructed, and stabilized before any water is allowed to discharge through the new Pool 3 outlet structure.

The increased conveyance capacity provided by the new outlet between Pool 2 and Pool 3, the new Pool 3 outlet, and the selective cleaning and widening of the internal conveyance channel within Pool 3 will

allow managers to move water out of the system faster during spring melt and during precipitation events to better manage water levels (Table 3).

Project Construction Activities

Construction is anticipated beginning in 2015. Typical construction will occur during daylight hours Monday through Saturday. Construction equipment entering and leaving the construction areas will have accumulated soil and plant material removed to prevent spreading of sediment or invasive plants. Construction will be targeted to occur during cold weather months to limit built-up material on equipment and hauling vehicles. Any material tracked from the site will be immediately removed from roadways.

Standard erosion and sediment control best management practices will be used throughout all phases of the project. These elements may include perimeter silt fence, biorolls, concrete washout areas, temporary sedimentation basins, rock construction accesses, riprap, mulch, flotation silt curtain, and erosion control blankets. The sequence of constructing project features will be to start at the downstream end of the project and work towards the upstream end of the project.

Construction of the new Pool 2 to Pool 3 water control structure will consist of removal of the existing structure, excavating a portion of the existing embankment, installing forms and pouring concrete to construct the replacement control structure, compacting and shaping the embankment around the new control structure, and re-establishment of perennial vegetation on exposed soils. BWSR, or other recommended seed mix will be used. The structure will consist of two 5-foot by 6-foot openings, with one opening being a sluice gate and the other being a stoplog bay. The structure will have capacity to discharge 800 cfs with 12 feet of head above the bottom of the openings. Excavation of existing embankment will require drawing down the pool and/or use of coffer dams during construction. This will prevent damage to the embankment and provide greater safety on the construction site. Silt fence, sediment booms and erosion control blankets will be implemented to control any sediment transport from the construction site. Construction will occur during the late growing season to allow proper temperatures for the concrete to set, while posing the least impact to wildlife production.

Selective excavation of the existing Pool 3 internal channel, where needed, will occur on the side of the channel opposite of the existing embankment to prevent damage to the existing embankment. Excavated materials will be sloped at 3:1 to prevent slumping or erosion. All excavated material will be spread on existing embankment to reduce impact to native plant communities in the pool. Construction will occur during the winter months to reduce impacts to plant communities adjacent to the construction site. Winter construction also provides the safest conditions to operate heavy equipment in wetlands and limits potential rutting or compaction in wetlands as well as impacts due to travel on the embankments. Erosion control methods will consist of installing silt fence, erosion control blankets and floating silt booms (following winter) to limit sediment transport outside of the construction limits. Coffer dams will be used during construction to provide improved access to the site during construction.

Construction of the new Pool 3 outlet structure will consist of removing a portion of the existing embankment/road, installing concrete forms, pouring concrete, compacting and reshaping the embankment around the new control structure, and reestablishment of perennial vegetation on exposed soils. The structure will have four 5-foot-wide by 6-foot-high openings, three of these openings will be

controlled by sluice gates with the fourth being a stoplog bay. This structure will have the capacity to discharge over 1000 cfs with maximum head. Excavation of the existing embankment will require drawing down the pool and/or use of coffer dams during construction in order to prevent damage to the embankment and provide greater safety to the construction site. Erosion will be managed on site through installing silt fences, erosion control blankets and sediment booms to control sediment transport from the site. Construction will occur during the late growing season – Fall 2015 – to allow proper temperature for the concrete to cure, while posing the least impact to wildlife reproduction.

Construction of the new Pool 3 outlet channel will consist of excavating 1.9-miles of conveyance from the Roseau River to the new Pool 3 outlet structure. The channel will have a 22-foot bottom width with 4:1 side slopes. The greatest top width of the channel will be 82 feet located 0.9-miles east of the confluence with the river. Portions of the channel will be excavated through sandy soils. The channel dimensions were designed so the maximum water velocities would be 2.5ft/second, assuming the channel was vegetated. Construction of the channel will occur in the fall and winter months to reduce potential impact to adjacent wetland communities from compaction or rutting due to heavy equipment operation. All excavated material will either be placed in a suitable location (non-wetland) or utilized to build up the existing road. Silt fences and erosion control blankets will be placed on the channel side slopes, rock checks will be placed in the channel bottom and floating silt booms will be placed at the outlet into the river to control sediment transport throughout the site.

An energy dissipation basin will be installed at the confluence of the outlet channel and the Roseau River to prevent erosion. The basin will be a riprap fortified structure with a 2-stage drop allowing for approximately 13.5 feet of fall over 55 linear feet. Construction will consist of excavation of a portion of the river bank at the location of the dissipater basin, sloping the base of the basin to the appropriate dimensions, installing geotextile fabric and installing riprap material. Construction will occur during the late fall/early winter – October/November 2015 – when water levels are at their lowest, allowing for greatest mobility and safety on site while posing the least impacts to the riparian corridor. Erosion control measures will consist of silt fences and erosion control blankets/bio-rolls on side slopes and floating sediment booms in the river to prevent sediment transport into the river and adjacent riparian areas.

c. Project magnitude:

Construction/ Infrastructure Elements	Size
Total Project Acreage	8,980.85
Linear project length	10.0 miles
Number and type of residential units	None
Commercial building area (in square feet)	None
Industrial building area (in square feet)	None
Institutional building area (in square feet)	None
Other uses – specify (in square feet)	None
Structure height(s)	NA

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

the project and identify its beneficiaries.

The purpose of this project is to improve the ability to convey water through the RRWMA system to achieve wildlife management and flood damage reduction goals. The project will benefit the resident and migratory wildlife populations that depend on the RRWMA pool habitats, will benefit the citizens who use the RRWMA for recreational purposes (wildlife watching, hunting) and will benefit those citizens that will receive direct and indirect benefits from reducing flood damages in the Roseau River Watershed.

Project Purpose

1. Reduce the frequency and magnitude of water level fluctuations ("bounce") in Pools 2 and 3 during critical nesting periods for overwater and near water nesting birds. Hydrologic modeling suggests that operation of the features of the proposed project will substantially reduce the frequency of water level fluctuations (Table 2). For example, in Pool 2, bounce may be reduced by 7.5" for a 10-year spring event and 8.5" for a 10-year summer event. In Pool 3, bounce may be reduced by 4.0" for a 10-year spring event and 2.25" for a 10-year summer event.
2. Improve habitat conditions in the Big Swamp area by reducing the frequency, magnitude, and duration of water transfers. The increased frequency, depth, and duration of flooding events are likely to have negatively affected native plant communities in the Big Swamp area[1]. While water naturally builds up in the Big Swamp area, the frequent flooding with long durations observed in the past few decades is not within the range of normal occurrences. Terrestrial wildlife species and their habitats are affected by excessive inundation by flood waters for long periods of time. A reduction of water inflows to the Big Swamp from Pools 2 and 3 during large flood events will restore more natural hydrologic conditions to the Big Swamp area and improve habitat conditions.
3. Increase production of diverse and desirable aquatic and emergent vegetation (e.g., wild rice) and reduce abundance of undesirable species (e.g. cattail) in Pools 2 and 3. This project will enable the DNR wildlife managers to manipulate water levels to promote establishment and growth of desirable aquatic plants (i.e. wild rice production) and improve plant community condition. Shallow water hemi-marsh conditions are the primary goal and they will be realized by achieving the preferred water level management regime.
4. Reduce peak flows in the Roseau River by about 5% (Table 3). The ability to discharge more water from Pools 2 and 3 before the peak flow on the Roseau River will maximize the existing storage potential of Pools 2 and 3 and optimize timing of its use for peak flow reduction.
5. Increase the effective capacity of the Big Swamp area for water retention to decrease the magnitude and frequency of break out flows into the Two Rivers Watershed. Hydrologic modeling indicates that approximately 16,000 acre-feet of storage is available in the Big Swamp area and better management of water flowing into the area will result in an 11% reduction in total volume (acre-feet) and 8% reduction in peak flows (cfs) during 100-year 10-day events (Table 4).

[1] Apfelbau, Steven I. and Lewis, Larry (1998). An Overview of the Impacts of Water Level Dynamics ("Bounce") on Wetlands. Working Paper No. 1.St. Paul, MN: Red River Flood Damage Working Group, Minnesota Department of Natural Resources. See also http://www.pca.state.mn.us/index.php/view-document.html?gid=11862 . While this document is directed at storm water pond management, it provides a lot of background information on the susceptibility and effect of bounce on wetland plant communities.

Table 2

Differences in RRWMA Pool Bounce based on hydrologic model scenarios
(Note: WSE = Water Surface Level)

Storm Event	Rainfall Depth (in.)	Pool 2					Pool 3				
		Existing		Proposed		Net Decrease in Bounce (Existing minus Proposed WSE) (ft)	Existing		Proposed		Net Decrease in Bounce (Existing minus Proposed WSE) (ft)
		Peak Pool Elevation[1] (ft)	Max Pool Bounce (ft) (Peak minus starting elev.)	Peak Pool Elevation[1] (ft)	Max Pool Bounce (ft) (Peak minus starting elev.)		Peak Pool Elevation[1] (ft)	Max Pool Bounce (ft) (Peak minus starting elev.)	Peak Pool Elevation[1] (ft)	Max Pool Bounce (ft) (Peak minus starting elev.)	
10-yr 24-hr Spring Event[1,2]	3.47[4]	1029.62	1.62	1028.99	0.99	0.63	1023.84	0.84	1023.51	0.51	0.33
10-yr 24-hr Summer Event[1,3]	3.47[4]	1030.03	1.03	1029.33	0.33	0.70	1024.31	0.31	1024.13	0.13	0.18
2011 Actual Peaks - Synthetic Summer 24-hr Event #1[1,3]	4.75	1030.52	1.52	1029.69	0.69	0.83	1024.82	0.82	1024.39	0.39	0.43
Synthetic Summer 24-hr Event #2 (6" bounce reduced to zero)[1,3]	2.69	1029.50	0.50	1029.00	0.00	0.50	1024.17	0.17	1024.00	0.00	0.17
Synthetic Summer 24-hr Event #3 (large bounce reduced to 5")[1,3]	4.22	1030.34	1.34	1029.42	0.42	0.92	1024.56	0.56	1024.15	0.15	0.41

Highlighted rows indicate measurable and beneficial reduction in bounce - Existing > 6" and Proposed < 6"

[1] Summer Event - Normal Pool Elevations (NGVD29) : Pool 2 = 1029.0, Pool 3 = 1024.0 Spring Event - Drawdown Pool Elevations (NGVD29): Pool 2 = 1028.0, Pool 3 = 1023.0

[2] Existing Structure stoplogs in the existing and proposed scenarios are removed to 1 foot below pool drawdown elevation, near the beginning of event, and then raised to pool drawdown elevation, several weeks after the beginning of the event. Proposed structure gates are initially partially opened, then adjusted to be mostly opened or fully opened prior to the peak WSE. Gates are then closed just prior to peak WSE.

[3] Existing Structure stoplogs in the existing and proposed scenarios are removed to 1 foot below normal pool elevation, near the beginning of event, and then raised to normal pool elevation, several weeks after the beginning of the event. Due to variability in the timing of each event, the proposed structure gates are initially opened 25% to 40%, then fully opened, and then closed prior to peak WSE.

[4] Source: Bonnin, G. M., Martin, D., Lin, B., Parzybok, T., Yekta, M., & Riley, D. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. (2011). *NOAA Atlas 14: Precipitation-Frequency Atlas of the United States.* Silver Spring, MD.

Table 3
Existing and proposed peak flow rates on Roseau River near Caribou, MN (on state Hwy. 53)

Storm Event	Existing	Proposed	Proposed % Decrease
100-year 10-day	4,231	4,022	4.9%
100-year 24-hour	2,617	2,486	5.0%
10-year 24-hour	2,005	1,900	5.2%

Table 4
Flow transfer from the Roseau River to the Two Rivers Watershed through Big Swamp

	Scenario	100-Year 10-Day		100-Year 24-Hour	
			% Reduction		% Reduction
Total Volume (Ac-ft)	Existing	108,357	-	12,344	-
	Proposed	96,407	11%	9,427	24%
Peak Flow (cfs)	Existing	2,106	-	317	-
	Proposed	1,935	8%	266	16%

Project Needs

1. The RRWMA pools have historically provided diverse wetland habitats for important waterfowl and wetland dependent birds. Much of the habitat in the pools is now in a degraded/ poor condition. The primary cause of this degradation is excessive and frequent water level fluctuations during the growing season. The limited capacity of the outlet channels and associated water control structures has significantly compromised the ability of wildlife managers to achieve the preferred water level management regime. The limited capacity of water management structures has resulted in frequent water level fluctuations during spring and summer which exceed the preferred range of water levels. These fluctuations negatively affect nesting success and the types and quality of habitats (plant communities) present in the pools. For example, in 14 of the last 20 nesting seasons (May 1 – July 15), the water level on Pool 3 has fluctuated in excess of 6 inches resulting in reduced nesting success of ducks and other overwater nesting birds in this area. In addition, during that time period, water levels have exceeded the preferred water level for up to 8 weeks, which compromises re-nesting efforts.

   Water levels in the pools have also fluctuated beyond the preferred range later in the growing season. This makes it difficult to manage vegetation that is sensitive to fluctuations at key times in the plant's life cycle (e.g., wild rice at the floating leaf stage). Production of ducks, as well as

other water dependent bird species, has also declined on the RRWMA in recent years as a direct result of excessive water level bounce on the pools. Significant bounce events have occurred approximately 2 out of every 3 years during the past 20 years that have resulted in a large reduction in duck production from the RRWMA (Table 5).

Table 5
Average duck brood counts on Pools 2 and 3 of the RRWMA

Time Period	Pool 2	Pool 3
	Dabbler ducks	
1970-78	14.6	12.6
1989-2001	10.4	6.5
2002-2013	5.6	5.3
	Diver ducks	
1970-78	24.1	20.1
1989-2001	23.8	37.5
2002-2013	9.7	8.8

As described in subsequent items in this EAW, the frequency, depth, and duration of water level fluctuations have degraded the overall habitat conditions in the pools creating a gradient from higher quality habitats in areas with more natural water level fluctuations (less bounce) to lower quality habitats in areas with highly variable (and sometimes extreme) water conditions. This project will improve the capacity to effectively manage water levels in the RRWMA to meet wildlife management objectives.

2. The use of the flood water storage capacity of the pools is currently not being optimized to reduce flood damages, because the outlet structures have limited capacity to effectively convey the water that enters the system. The inability to effectively convey water, therefore, limits the ability to adequately time the discharge from the pools in order to maximize their water storage capacity. The maximum water storage capacity of the system is about 29,000 acre-feet. The volume of water that can be stored during any event depends upon the starting water level. A lower water level at the start of an event will result in more available storage that can be used to reduce peak flows downstream. The ability to manage water levels to achieve maximum water storage in the pools during the peak of a large runoff event is critical to achieving flood damage reduction goals. The ability to manage water levels primarily depends upon the outlet capacity of the existing outlet ditches and the water levels in the Big Swamp area.

e. 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.

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

The RRWMA pools were built in the early 1950s to create wildlife habitat. The 27 miles of embankments built to create the pools require regular maintenance and were upgraded in the 1980s (top elevation raised one foot, widened as needed). The water control structures between pools have also been maintained and replaced as needed since their construction. The operating plan for Pools 2 and 3 was altered in the mid-1980s to include a 1-foot overwinter drawdown to provide an additional 8,300 acre-feet of flood water storage in spring to meet flood damage reduction benefits. No formal environmental review has been required to complete past work on the pools or to modify the operating plan.

7. Cover types

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

The existing cover types of the project area are described in detail in response to Item 9. The RRWMA enhancement project has the potential to change land cover types within three areas within the pools. The cover type acreages for each of these areas are provided in the description and tables below. The information in the tables is based on the National Land Cover Dataset (NLCD 2006) and the information for the Pool 3 outlet channel is supplemented by more refined information from the wetland delineation report.

Pool 2: This area includes all lands and waters contained within the Pool 2 embankments. The cover types will remain unchanged within the embankments. The condition of the cover types within the pools is expected to improve.

Pool 3: This area includes all lands and waters contained within the embankments that contain Pool 3. The project will result in about a 2.2-acre change in wetland type on the far west end of Pool 3 in association with an expansion of the internal conveyance channel (Table 6). The conversion will be primarily from wet meadow (Type 2) to open water wetland (Type 4 and 5).

The project will also result in a 2.0-acre loss of wooded/forest habitat associated with expansion of the water collection area in front of the new Pool 3 outlet structure. The loss of forest will largely occur in a stand of white spruce planted 60 years ago. These impacts will be minimized to the extent that the internal conveyance channel is sized to match the outlet capacity of the new outlet structure.

Table 6
Pool 3 Area Land Cover

Cover Type	Before	After	Cover Type	Before	After
Wetlands	5,944	5941.8	Hay land	10.5	10.5
Deep water/streams	0.7	0.7	Impervious surface	0	0
Wooded/forest	70.5	68.5	Stormwater Pond	0	0
Brush/Grassland	0	0	Other (Embankment, ditch, and excavation)	63.3	67.5
Cropland	0	0			
			TOTAL	**6,089**	**6,089**

Acreage estimates based on maximum top-channel width alternative, actual acres converted will likely be less than estimates shown.

New Pool 3 Outlet Channel: This area consists of a 250-foot wide corridor area starting at the new Pool 3 outlet and ending 1.9 miles to the west at the Roseau River channel. The proposed route for the channel follows the township road and was selected to minimize wetland loss.

In this area, the project will result in a conversion of 3.7-acres of wetlands, primarily wet meadow Type 2, into Type 3 when the existing road ditch is excavated to become a conveyance channel (Table 7).

The project will also result in the conversion of up to 19.0 acres of wooded/forest habitats to ditch and ditch corridor. The existing woodlands are natural; they do not occur as a result of previous development (e.g., trees growing on spoil piles that cut through a wetland).

The project will result in a 6.2-acre loss of cropland as a result of excavation and placing spoil into an adjacent crop field. This loss may be short term. If the excavated materials are suitable, they may be incorporated into the existing field and farming will continue under the terms of a cooperative farming agreement with a local farmer to improve wildlife habitat.

There will also be a 4.0-acre loss of hay land, which is primarily upland brome grass/alfalfa, as a result of excavation and placing spoil into the adjacent hay land.

Table 7
New Pool 3 Outlet Channel Area Land Cover

Cover Type	Before	After	Cover Type	Before	After
Wetlands	12.0	8.3	Hay land	6.1	2.1
Deep water/streams	0.036	0.036	Impervious surface	0	0
Wooded/forest	24.5	5.5	Stormwater Pond	0	0
Brush/Grassland	0	0	Other (Embankment, ditch, and excavation)	0.2	33.1
Cropland	9.7	3.5			
			TOTAL	**52.5**	**52.5**

Acreage estimates based on maximum top-channel width alternative and land spreading on-site, actual acres converted will likely be less than estimate shown.

8. Permits and approvals required

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

Unit of Government	Type of Application	Status
US Army Corps of Engineers	404 permit	Not applied for yet
MPCA	401 certification	Not applied for yet
MN DNR Eco-Waters	Work in public waters	Not applied for yet
MPCA	Construction Stormwater NPDES/SDS	Not applied for yet
SHPO	Review for archaeological sites	Review complete
MN DNR Lands & Minerals	Additional easement for ROW (power line) affected by outlet ditch	Not initiated yet
Roseau County	Work within ROW of unorganized township road	Not requested yet
MN DNR FAW	Compliance with WCA	Not initiated yet
MN DNR Eco-Waters	Dam safety permit	Not initiated yet

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

9. Land use

a. Describe:

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

Lands within the project area are predominantly public lands consisting of forest, wetland, riparian, open water and grassland habitats (Figure 7). Scattered parcels of lands owned by The Nature Conservancy occur nearby in Kittson County. A small amount of private land exists in the project area consisting of agricultural lands which are primarily used for grazing or hay production. The area is sparsely populated. A few private seasonal cabins are located immediately north of the unorganized township road that is adjacent to the new proposed outlet channel. No industry or manufacturing is present in the area. Land use has essentially remained unchanged for more than 20 years.

The portion of Roseau River WMA affected by the project (i.e., Pool 2, Pool 3, and the corridor of the proposed outlet channel) is used primarily for natural resources management and outdoor recreation. A few acres of pasture and hay land exist along the new outlet channel but no prime or unique farmlands are present in the area.

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

The planned land use for the project site has been to maintain natural or near natural habitat in accordance with the RRWMA and County Water Plans. The Roseau County Water Plan (2010) and the Roseau River

Overall Plan (2004) identify land use within the area as being largely for conservation. The RRWD Overall Plan (2004) identifies the current proposed activity as a Flood Damage Reduction/Natural Resource Enhancement goal. The RRWMA Master Plan (1980-1989) describes the biotic and abiotic resources of the WMA, indicates strategies to be used in managing the site, defines natural resource management goals, and indicates the historical use of the site.

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

Roseau County does not have land use zoning within the project limits. Shoreland rules (M.R. 6120), Roseau County shoreland ordinance, and floodway setbacks associated with the Roseau River apply.

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

There are no zoning issues related to land use within the project limits. This project will enhance opportunities to achieve wetland management and flood damage reduction objectives in the project area and is compatible with nearby uses of the land, which are dominated by haying and grazing, conservation, and outdoor-based recreation. The project will minimally change land use within the area and is consistent with the Roseau River WMA Master Plan (1980-89), the Roseau River Watershed District Comprehensive Plan (2010), and the Roseau County Water Plan (2004).

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

Not Applicable.

10. Geology, soils and topography/land forms

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

Geology of the entire project area is identified as having 200-250ft of glacial till consisting of sands, silts and clays overlying Paleozoic limestone, sandstone and dolomite. There are no limitations of the site due to karst or limestone features. Ground water is high within this region, often encountered from 0-15 feet from the surface. According to the County Well Index (CWI) online database, wells within the region range in depth from 60 feet to 260 feet with one artesian well having a depth of 20 feet; pumping depths range from 35 feet to 90 feet (USGS Hydrologic Investigations Atlas HA-241).

b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during

and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.

Soils within Pools 2 and 3 are derived from glacial lake deposits of silt, sand and clay; accumulations of peat or muck less than 10 feet in depth are found overlying mineral soils primarily in the wetlands that are within the site (Roseau County Soil Survey). Soils within the pools are characterized as very poorly drained soils dominated by mucks with underlying clay and silty clay loams. Local relief within the pools ranges from 0-2% slope, the dominant (>99%) K-factor soil erodibility for the pools is 0.02, indicative of stable soil condition (NRCS Web Soil Survey Database). Preliminary estimated volume of excavation is 150,000 cubic yards.

Soils encountered in the proposed outlet channel corridor consist of primarily sandy loam, with muck and dense clay soils encountered in wetland and stream corridors (Roseau County Soil Survey). Soils within the outlet channel corridor are poorly drained to very poorly drained, slopes vary from 0 to 5% with one steep slope attributed to the river channel. Erosion potential of soils within is moderate to low, with the K-factor ranging from 0.02-0.37 with a median value of 0.15 (NRCS Web Soil Survey Database).

During construction, erosion control measures will be implemented to contain sediment and other potential contaminants within the site limits. Silt fencing will be installed around all sites of soil disturbance, stockpiles of soil, or soil-containing material. Erosion control measures will be implemented to prevent discharge of material into the Roseau River located at the western extent of the project.

All sites with soil disturbance will be seeded with an appropriate seed mix in accordance with Board of Water and Soil Resources (BWSR) seeding guidelines (Native Vegetation Establishment and Enhancement Guidelines). Upland areas of disturbance will be seeded with native construction mix (32-241), channel bottom, wetland and transitional areas will be seeded with emergent wetland mix (34-181). A cover crop of winter wheat will be spread with native seed mixes, winter wheat will allow for early soil stabilization and reduce weed establishment of disturbed areas. Sites will then be mulched and disc-anchored where applicable. Erosion control blankets and geotextile material will be installed in portions of the project site that have the potential for wasting or excessive erosion due to operation or construction on site. Soil stabilization during discharge of water into the outlet channel is addressed in a final engineering document. Operation of the proposed water level control structures will have little or no impact on soils within Pool 3.

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

11. Water resources

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

   i. Surface water – lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include

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

The project area includes a number of water resources including public water basins and channels, judicial ditches and wetland communities (Figure 8, Figure 9).

Basins and wetlands

Pool 2 and Pool 3 are public water basins, almost completely designated as wetland, scattered with small island areas of upland. There is a 114-acre type 3 wetland, (DOW #68001000) located approximately 0.25 miles to the south of the proposed outlet channel. Five wetlands have also been identified within the outlet channel corridor: three isolated depression wetlands, one large complex of type 1, 2, 3 and 6 wetlands that extend southward to the public water basin #68001000, a fragmented type 2 wetland along the existing road, and the riparian wetland corridor along the Roseau River.

Watercourses

The Roseau River (H-024-B002), also known as State Ditch 51, runs through the RRWMA from east to west-northwest. This reach of the Roseau River is included in a designation of impaired waters by the Minnesota Pollution Control Agency (MPCA) due to mercury in fish tissue, low dissolved oxygen, and turbidity (2012 303(d) impaired waters list, MPCA). The Total Maximum Daily Load (TMDL) study for mercury in fish began in 1998 and has a targeted completion date of 2025. The start date for the low dissolved oxygen and turbidity TMDL studies is 2015, with target completion by 2019. A watershed restoration and protection strategy (WRAPS) for the entire Roseau River Watershed will begin 2015.

County Ditch (CD 17) runs parallel to the exterior of the RRWMA embankment system on Pool 1 East and Pool 1 West, and for 2+ miles along the eastern portion of Pool 2 before it outlets into the Roseau River.

There are no trout streams or lakes identified within the project limits.

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

The shallow water table and varying depths of private wells indicate the potential for unconfined aquifers within or adjacent to the project site; the depth of groundwater identified in the region is 0-15 feet beneath the surface (USGS Hydrologic Investigations Atlas HA-241, Sheet 3). Project design within the wildlife pools would consist of enlarging a portion of an existing internal ditch and installation of a concrete water level control structure. These activities would likely have no discernible impact to subsurface water levels or quality. Construction of the external ditch from Pool 3 into the Roseau River may impact subsurface hydrology within wetlands due to lateral effect. Water use interference to wells north of the external ditch

is possible but unlikely due to the barrier effect provided by the existing road. Any water use interference would be addressed on a case-by-case basis by providing an alternative water supply.

There are no Minnesota Department of Health (MDH) wellhead protection areas within or adjacent to the project site. One well has been identified within the limits of the RRWMA in accordance with the CWI database. Well #247041 is located in Section 8 of Pohlitz Township (T163N, R42W). Well #671805 is located to the south of the RRWMA in Section 27 of Pohlitz Township (T163N, R42W). Five wells have also been identified west of the project extent in Caribou Township (T163N, R45W), Kittson County, they include; well #125723, #215226, #215227, #215228 and #712391.

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

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

(1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

No wastewater will be discharged.

(2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.

No wastewater will be discharged.

(3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

No wastewater will be discharged.

ii. Stormwater – Describe the quantity and quality of stormwater runoff at the site prior to and post construction.

The quantity and quality of runoff should be similar pre- and post-construction. On an annual basis, the amount of water that currently passes through the pool system will be the same after the project is completed; water flow through Pool 3 may increase slightly, post construction. However, the project will alter the timing of runoff through the pools. During spring operation, this water will be discharged at a faster rate prior to flood peaks on the Roseau River and most of the water will be discharged from the west end of Pool 3 rather than near the east end of the pool.

There is potential for a minor increase in nutrient flushing from Pool 3 as a result of an additional outlet. Final engineering has found that, during operation of the new Pool 3 outlet structure, water velocities within 100 feet upstream of the outlet will increase by approximately 1-ft/sec, with 0.47-ft/sec increase 1000 feet upstream of the structure and 0.07-ft/sec increase up to 15,000 feet upstream of the structure. The modeled velocities are considered to remain reasonable (even with the slight increase in the middle of

the pools), and are not high enough to scour nutrients or vegetation from the bottom of the pool at 1000 feet or greater distance from the structure. Average shear stress in the new Pool 3 outlet channel are expected to be less that those under existing conditions; nutrient flushing and scouring in the channel, adjacent to the dike, are not expected to increase with the new construction[2].

Post-construction runoff may temporarily increase in quantity and decrease in quality near construction sites (structures, outlet channel). In particular, slopes on embankments, ditch banks, and structure locations where soil has been exposed may produce more runoff, sediment, and nutrients than current conditions. Implementing standard erosion control measures will minimize changes to stormwater runoff near construction sites.

> Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters).

Runoff from the pools will flow into the Roseau River through the existing and new outlet structures and conveyance channels. Runoff from the township road to the immediate north of the Pool 3 outlet ditch will collect in the outlet ditch before discharging to the Roseau River. Surface water flows from the north of the county road flow south via existing culverts to prevent backwatering damage to the road.

> Discuss any environmental effects from stormwater discharges.

Stormwater discharges could result in increased siltation and turbidity in the Roseau River, which would negatively affect stream biota, decrease oxygen levels, and perhaps even affect river flows at the confluence of the river and the outlet ditch. Additional stormwater discharges associated with construction will be minimal compared to current volumes of water flowing through the system from the contributing drainage area.

> Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

The following measures will be included in pollution prevention planning for this project:

1. Install coffer dams at the sites of the new water control structures sufficient in strength and elevation to steer water discharges away from construction sites to alternative discharge sites (e.g., primary current outlets for either pool or the emergency spillways for either pool) during construction.
2. Use silt fences to contain erosion at vulnerable sites (e.g., new water control structures) during construction.
3. Use erosion control blankets to cover vulnerable slopes after construction and before vegetative cover becomes established.
4. Seed ditch slopes and other embankments, etc., that were exposed during construction to BWSR 32-241 native construction mix (including winter wheat) to establish, at minimum, an 80% aerial coverage of vegetation to anchor topsoil.

[2] See the Final Engineering Report, available online at http://roseauriverwd.com/wordpress/wp-content/uploads/2013/02/RRWD_WMA_FinalEngReport_Jun30-2014_wAppA_Final.pdf

5. Construct side slopes on the outlet ditch that are gradual enough (e.g., 4:1) to ensure adequate slope stabilization for the water velocities that the site will be subjected to.

iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required.

The project does not propose to appropriate surface water or groundwater.

Describe any well abandonment.

No wells will be abandoned or need to be established as a result of the project. There are no known wells in the vicinity that will be affected by the development of the project.

If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure.

No municipal water supply is involved.

Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

No water appropriation is necessary.

iv. Surface Waters

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

Effects of the Outlet Channel

Several alternative routes were explored during project development to identify the proposed outlet channel alignment. Alternative alignments were assessed based on distance from outlet to river, physical/topographic limitations and potential wetland impacts. All potential routes included unavoidable wetland impacts. The chosen route presented the least potential impact based on wetland delineation and NWI data (1980-1986). The proposed route along the township road also is the shortest length from Pool 3 to the Roseau River and has least cost among all routes considered.

During construction, wetland impacts will be minimized by ensuring no fill is placed within delineated wetland boundaries. Potential lateral effect caused by the ditch will be investigated during final engineering and as part of post construction monitoring (wetlands adjacent to proposed ditch have been

delineated and will provide a baseline condition). Any wetland impacts due to lateral effect will be mitigated.

Direct wetland replacement will occur within the major watershed boundary. There has been no specific direct replacement site identified at this time. On-site mitigation, through creation of wetland communities in the new channel bottom may be feasible. Feasibility will be analyzed during final engineering and in Wetland Conservation Act permitting (WCA).

Effects of improving the existing conveyance channel within the western portion of Pool 3

Enlarging portions of the existing internal conveyance channel to have a 58-foot top-width will result in a conversion of wetland type. The channel is aligned along the existing embankment.

Total wetland disturbance will be reduced through timing of construction (winter), reducing potential rutting and compaction due to heavy equipment. Excavated material will be either placed on the side slope of the existing embankment or transported out of Pool 3 and land-spread in a suitable upland location.

Direct wetland replacement will occur at a suitable site within the watershed district. Wetlands will be replaced based on WCA and Section 404 permitting. There are no anticipated indirect impacts to wetland communities adjacent to the enlarged channel, as water levels will be managed by operation of control structures. There is the potential for conversion of Type 2 wetlands to Type 3, 4, and 5 wetlands through channel enlargement. Success of wetland type conversion will be dependent on depth and period of inundation.

Within the wildlife pools there are two jurisdictions for wetland regulation, above the Ordinary High Water Level and below the Ordinary High Water Level. All excavation and filling occurring below the ordinary high water elevation of Pool 3 will be under the jurisdiction of MN DNR within public water related rules (M.R. 6115) and Section 404 authorities of the U. S. Army Corps of Engineers. Activities above the ordinary high water elevation, specifically in wetlands will be under the jurisdiction of Section 404 (Clean Water Act – U. S. Army Corps of Engineers) and WCA (MN DNR Division of Fish and Wildlife). Selective excavation of existing spoil near the main embankment and associated wetland areas will occur below the Ordinary High Water Level elevation. Excavation of wetlands above the determined ordinary high water level will occur and be minimized. To minimize impacts, excavated material will not be placed in existing wetlands. There are no anticipated indirect impacts to wetland communities adjacent to the enlarged pool ditch, as the ditch and wetland hydrology will be managed by operation of the control structures. Alternative analysis will be conducted during final engineering to minimize wetland impacts for all aspects of proposed construction.

Effects of reducing water level bounce in Pools 2 and 3

The project is intended to improve the condition of existing wetlands in the pool by building additional capacity to reduce water level fluctuations.

Effects of increasing conveyance through the pools prior to peak flood events

Wetland features within the pools are not likely to change due to increased conveyance within the pools prior to spring flood events. The normal drawdown elevation and normal pool water elevations will not change with this project. Operation of the new outlet structure on Pools 2 and 3 will not affect water quality since water velocities are generally not high enough to scour nutrients or vegetation from the bottom of the pool at 1,000 feet or greater distance from the structure[3].

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

New Outlet Channel

The banks and channel of the Roseau River will be altered where the new outlet channel intersects the Roseau River. The design of this outlet will consist of a two-stage drop dissipation basin armored with riprap. During construction, erosion control Best Management Practices will be used to prevent erosion and sediment transport into the river (Stormwater Best Management Practices Manual, Minnesota Pollution Control Agency). Routine inspection and occasional maintenance of the outlet channel and dissipation basin may be required to reduce erosion and sediment transport once the channel is operational.

The chosen confluence site presents the most suitable location for discharging surface water into the Roseau River due to the shallow angle and the low fall from channel to the river. The dissipation basin will be designed to ensure greatest energy reduction feasible. Higher flows (up to 1,000 cfs) in the Roseau River channel downstream of the project are expected in early spring when water is moved through the system, through the new outlet channel, rather than being moved to the Big Swamp area. The new outlet will only be operated at this high capacity during early spring runoff events, when discharge in the Roseau River is above bankfull level. Operation during these early spring events will have a low potential to negatively affect the river at the confluence, the opposite river bank, or downstream.

Summer and fall operation of the new outlet will also occur when the capacity of the existing outlets is exceeded, in order to achieve the preferred water level management regime. Operation during these time periods will also occur during runoff events and are unlikely to occur below bankfull discharge, thus minimizing any potential negative effects. No other substantial changes in flow regime are expected in the Roseau River due to the new outlet. The current water management regime has been in place for many years, and annual water yield will not change. The contributing drainage area from the pools is less than

[3] See Tables 20 and 21, respectively, in HDR (2014). Roseau River Wildlife Management Area Pool 2 and Pool 3 Outlet Project Final Engineer's Report. http://roseauriverwd.com/wordpress/wp-content/uploads/2013/02/RRWD_WMA_FinalEngReport_Jun30-2014_wAppA_Final.pdf

14% of the total drainage area at the point where the new outlet ditch will enter the river channel. The 5% reduction in peak flows in a 100-year event (see Table 3) is not expected to affect channel morphology.

Excavation of material and placing rock and other grade stabilization measures will reduce erosion/sedimentation where these two watercourses meet. Silt fence, erosion control fabric, geotextile fabric and floating sediment barriers may be installed to minimize short-term construction related effects on the Roseau River. Erosion control measures will remain in place until the site is deemed stable following construction.

Grade stabilization structures may be necessary to control in-channel sediment transport to the river. The slopes of the channel are designed at a 4:1 slope to limit potential sediment transport; portions of the channel have been identified as having sandy soils, which have greater potential to erode when acted on by surface water flow. To reduce the potential loss and transport of sandy soils, the channel dimensions were engineered to convey a maximum flow of 2.5ft/second. It is assumed that the channel will be heavily vegetated following construction; sandy soils with established vegetative cover are expected to withstand maximum designed flows for the channel.

There is no proposed draining, excavation or modification of the Roseau River's in-channel dimensions. The river bank at the confluence of the outlet channel will be sloped and armored to prevent erosion. The confluence of the outlet channel with the river is aligned at a shallow angle, nearly tangential to the curve of the Roseau River, which provides the least potential opposite-bank erosion. There are no known indirect impacts to the Roseau River, but the proposed channel may encounter backwatering during prolonged periods of high water on the Roseau River.

12. Contamination/Hazardous Materials/Wastes

a. Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines.

There are no known environmental effects to the project site based on pre-existing conditions. The only known environmental hazards in close proximity to the project site is an existing electrical power line, which is in the same road right-of-way as the proposed Pool 3 outlet structure and outlet channel. There are no known contamination areas or potential environmental hazard sites identified within the project boundaries, in accordance with the Minnesota Pollution Control Database. There is one inactive leak site located 1 mile to the east of the RRWMA, there are 2 feedlots located within five miles of the RRWMA.

Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation.

The electrical power line along the new outlet will need to be rerouted or buried in cooperation with PKM Electric Cooperative, Inc., which is based in Warren, MN. The existing right-of-way agreement will either need to be modified or replaced.

Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards.

Bury electrical power lines under the north shoulder of the township road to avoid increasing the width of the existing electrical power line/outlet ditch right-of-way to accommodate the new Pool 3 outlet channel.

Include development of a Contingency Plan or Response Action Plan.

A contingency plan will be included in the SWPPP or NPDES permit.

b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project.

Removal of an old, nonfunctional water control structure (located 0.5 miles north of the current Pool 2-to-Pool 3 outlet structure), including sheet piling, control structure and culvert, will result in construction waste.

Indicate method of disposal.

Haul away to a local scrap dealer.

Discuss potential environmental effects from solid waste handling, storage and disposal.

No known effects.

Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

Any waste products generated or contamination of soils due to fuel or chemical spills will be disposed of off-site at a suitable facility. There are no proposed activities that would generate these waste products in accordance with the project goals.

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

The only toxic or hazardous materials to be used or present at the project site are fuel, oil, and hydraulic fluid associated with construction equipment and machinery. Refueling will be done away from the project site and equipment will be inspected and maintained to prevent accidental loss of hazardous fluids.

Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials.

None.

Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling.

We will specify that fuel will not be stored onsite; instead, it will be trucked in as needed and removed after each fill.

Include development of a spill prevention plan.

There are no proposed storage locations of hazardous waste generated from project construction or operation. Any contaminated material encountered during construction on the site will be removed and deposited at a proper waste facility. There is no proposed installation of petroleum tanks.

d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project.

No hazardous wastes will be generated or stored.

Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal.

None.

Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

The proposed project will not generate hazardous waste. Any accidental leaks or spills on site will be immediately mitigated and contaminated materials will be removed from site in accordance with the SWPPP (to be developed).

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

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

Wildlife species common to the Aspen Parklands Subsection of the state dominate the species assemblage. Avian species common to extensive grasslands, ephemeral wetlands, and young brushlands/aspen woodlands are of particular note (RRWMA Master Plan, 1980 – 1989, pp 15-19).

The RRWMA contains significant habitat for a number of avian species (see RRWMA Bird Checklist available at http://maps1.dnr.state.mn.us/faw/wma/bird_lists/wma0900600_birdlist.pdf). It is listed as part of the state's Pine-to-Prairie Birding Trail (www.mnbirdtrail.com) as well as part of Audubon's Kittson-Roseau Aspen Parklands Important Bird Area (http://mn.audubon.org/important-bird-areas-3).

Waterfowl and other waterbirds, in particular, do well in pool wetland habitats. Production of waterfowl has been estimated to have been 10,000 annually in the 1970s (RRWMA Master Plan, 1980 – 1989, p 15). Ring-necked ducks, a species that commonly nests in wet meadows adjacent to large open water/cattail marshes, is the most common breeding duck on the WMA. Numbers of ring-necked ducks (and overall ducks) produced on Pools 2 and 3 have noted a large declined in the past 20 years (Table 5 and RRWMA unpublished annual reporting of waterfowl brood counts).

The Roseau River WMA is dominated by an extensive mosaic of fen, wet meadow, lowland brush, and shallow marsh habitats with scattered aspen forest and upland grasses/agricultural lands. All habitats present evolved with fire as the major disturbance factor.

The Minnesota State Wildlife Action Plan describes the Ecological Section (Lake Agassiz, Aspen Parkland Section--http://www.dnr.state.mn.us/ecs/223N/index.html) and Ecological Subsection (Aspen Parklands Subsection-- http://www.dnr.state.mn.us/ecs/223Na/index.html) that the RRWMA lies entirely within. In addition, the RRWMA Master Plan, 1980 – 1989, provides a comprehensive description of the biotic resources contained within the project area. The following summary provides an overview of habitat conditions found in the pools.

Habitat conditions in the RRWMA pools

The types and quality of habitat within Pool 2 and Pool 3 can be described for three different zones (Figure 10) as follows:

- Zone 1 (borrow ditch & hemi-marsh zone) is the area along the main dike generally 0.25 miles wide. This zone has the lowest elevation, deepest water, and is most directly influenced by water level fluctuations.
- Zone 2 (emergent plant zone) is the area adjacent to Zone 1, and is from 0.25-1.0 miles in width. This zone has moderate elevations, shallow and deep water, and is moderately influenced by water level fluctuations.
- Zone 3 (sedge meadow/bog zone) is adjacent to Zone 2 and extends northward to the margins of the pools. This zone has the highest elevations, shallowest water, and is least influenced by water level fluctuations.

Zone 1 includes approximately 1,301 and 1,238 acres of hemi-marsh habitats in Pools 2 and 3, respectively. This zone is characterized by a mosaic of open water and emergent cover, the latter being dominated by cattail that grows on a floating bog mat. The bog mat, which exists on organic soils, was formed when the original habitats were flooded. Cattails now dominate the plant community of this zone and have demonstrated a competitive advantage over sedges and rushes. These cattail mats rise and fall with water levels. In selected areas of Zone 1, islands of bulrush and wild rice are also present, especially in Pool 2 along the southern dike. Approximately 200 acres of wild rice currently exists in this zone in Pool 2 (Annual Shallow Lakes Accomplishment Report – Appendix I). Open water areas within this zone contain submerged aquatic vegetation including coontail, American water milfoil, bladderwort, muskgrass, floating leaf pond weed and elodea.

Zone 1 provides habitat for a variety of species including: waterfowl (nesting and migratory habitat for ring-necked ducks and mallards); terns and allied species (overwater nesting); herons and bitterns (foraging late in the growing season); grebes and loons (overwater nesting); swallows and other passerines that forage over open water; aquatic furbearers; and amphibians and reptiles – primarily turtles (production and wintering habitat). As mentioned in the preferred water management section, drawdowns have been occurring in November, showing no apparent effects on reptiles or amphibian, based on invertebrate sampling. Pools 2 and 3 provide seasonal and annual habitat for northern pike within this zone. Pike move into the pools during spring to spawn. Common carp, stickleback and fathead minnows have been observed in Pools 2 and 3 during informal vegetation surveys. The relatively deep borrow ditch area adjacent to the dikes allows some fish to survive the winter in most years.

Zone 2 includes approximately 2,988 and 1,285 acres of emergent vegetation marsh in Pools 2 and 3, respectively. This zone is characterized by an area of emergent plants dominated by a monoculture of

narrow-leaved cattail species. A few open water areas are interspersed within the expanse of cattail, which exists on a floating bog mat. The influence of water level fluctuations and inundation is generally less here than in Zone 1; additionally, the bog mat is anchored to the substrate and less likely to move laterally. Vegetation in this zone grades from a dense monoculture of cattail near Zone 1 to a more diverse mixture of sedges and rushes (Juncus spp including NPC - WMn) interspersed among areas of cattail near Zone 3. Wild rice and submerged aquatic vegetation are not common and few areas in this zone have conditions favorable for their establishment.

This zone provides habitat for a variety of wildlife species including sora rails, marsh wrens, red-winged blackbirds, and other marsh birds, which require large expanses of dense emergent vegetation. This zone may provide some seasonal habitat for fish when water levels are high in the spring.

Zone 3 includes approximately 12,216 and 2,607 acres of sedge meadow and bog habitat in Pools 2 and 3, respectively. Habitat conditions in this zone are the least influenced by management of water levels since their elevations are near or above the upper end of the total range of water level manipulation. Much of the original native vegetation community persists in Zone 2. No floating bog is present in this zone, and vegetation is rooted in the bottom substrate. In Pool 2, the habitat typically grades from wet meadow characterized by a variety of sedges with a minor component of willow brush into the more oligotrophic bog habitats characterized by narrow-leaved sedges, bog birch, and pitcher plants. In Pool 3, the wet meadow habitats grade into wet meadow areas characterized by native Phragmites, sedge and bluejoint grass communities, encompassing willow brush and aspen islands in the upper reaches of the zone.

As indicated above, water level management that moderates the influence of excessive inundation on vegetation in Zone 2 will serve to preserve Zone 3 vegetation. Prescribed fires are needed in Zone 3 to keep woody species from dominating these sites. Wildfires used to burn more frequently in Zone 3 of Pool 2, but their frequency has lessened during the past decade. There are no opportunities for management of wild rice, floating plants, or submersed aquatic vegetation in Zone 3. The Minnesota Biological Survey (MBS) has surveyed Zone 3 in Pool 2 and has preliminarily assigned the pool a biodiversity significance of “outstanding”, largely due to the vast expanse of intact bog habitat that contains rare vegetation such as pitcher plants, twig rush, English sundew; plant communities such as rich fens; and birds such as Nelson’s sharp-tailed sparrow and yellow rails.

The Big Swamp Area contains vegetation similar to Zone 3 vegetation in Pool 3. The southern portions of the Big Swamp area have been assigned a biodiversity significance of “high” by MBS, whereas the biodiversity significance of the northern portion of the Big Swamp (i.e., either side of the Roseau River south of the dike system) is rated as “moderate”. The difference in ratings is most likely due to the differences in hydrologic conditions. The conditions are more altered (compared to natural conditions) near the river compared to away from the river. The river has been channelized through the Big Swamp, which has lowered the water table. In addition, the area near the river floods more frequently and for a longer duration than more southern portions of the area.

The combination of a lowered water table and frequent flooding for long durations have caused a shift in the plant community similar to the one observed between Zones 3 and 2. A mosaic of wet meadows (both sedge meadow [WMn82a] and shrub subtype [WMn82b]), fens (OPn92), and shallow marshes (MRn83)

with isolated aspen stands (WFn54) dominates the Big Swamp area. Near the Roseau River, sedge/Canada bluejoint communities have been compromised over the decades due to the invasion of reed canary grass. In addition, shallow marshes near the river have been invaded by narrow-leaved cattail species such that many of the potholes that formerly appeared on the landscape have become choked with emergent vegetation. Farther south in the Big Swamp, the effects of altered hydrology on vegetation are largely confined to the immediate area next to ditches, and many of the native plant communities remain intact. The presence of invasive plant species such as reed canary grass and narrow leaf cattail is mostly confined to narrow corridors of disturbance in this portion of the Big Swamp.

Roseau River Aquatic Habitats contain a variety of warmwater fish species in a relatively wide stable channel of the Roseau River, downstream of the project area. Thirty-eight fish species were captured in the Roseau River in recent fish surveys (Van Offelen et. al. 2008). Thirty-one species were captured at sampling stations downstream of the City of Roseau. The Index of Biotic Integrity scores for sampling stations above the RRWMA enhancement project were rated as "very poor" to "poor", whereas the sampling site downstream of this project area was rated at the upper end of the "fair" category. The reach of river flowing through the WMA was channelized as part of a U.S. Army Corps of Engineers Project in the 1950s. This has resulted in the loss and degradation of stream habitat. The reach of river downstream of the WMA was not channelized and has maintained better aquatic habitat conditions. The altered hydrology of the watershed has also contributed to degraded habitat conditions in the Roseau River. Increases in the frequency and duration of peak runoff and increases in annual water yield tend to increase erosion in stream channels.

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA) and/or correspondence number (ERDB_ 20130246) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

State-listed animals and plants that occur in the project area are presented in Table 8. The RRWMA contains habitat for state-listed (i.e., Endangered [END], Threatened [THR], or Special Concern [SPC]) species that have been documented as state Natural Heritage element occurrences on or within a few miles of the project's boundaries in the recent past.

Table 8

Rare biological features in the project area of the Roseau River WMA Pool Enhancement

Rare Element	Scientific name/ code/ designation/ ranking	State listed[a]	SGCN[b]	Fed. Listed[c]	S rank[d]	G rank[e]
MAMMALS						
Northern long-eared bat	*Myotis septentrionalis*	SPC	Yes	P (E)		
BIRDS						
Baird's sparrow	*Ammodramus bairdii*	END	Yes	NL	S1B SNRM	G4
Sprague's pipit	*Anthus spragueii*	END	Yes	C	S1B SNRM	G4
Horned grebe	*Podiceps auritus*	END	Yes	NL	S1B	G5
Wilson's phalarope	*Phalaropus tricolor*	THR	Yes	NL	S2B	G5
Trumpeter swan	*Cygnus buccinator*	SPC	Yes	NL		
Marbled godwit	*Limosa fedoa*	SPC	Yes	NL	S3B	G5
Nelson's sharp-tailed sparrow	*Ammodramus nelsoni*	SPC	Yes	NL	S3B	G5
Short-eared owl	*Asio flammeus*	SPC	Yes	NL	S3B	G5
Yellow rail	*Coturnicops noveboracensis*	SPC	Yes	NL	S3B	G4
COLONIAL WATERBIRD NESTING COLONIES						
	Pool 2: red-necked grebe *Pool 1: red-necked grebe/ horned grebe/eared grebe*		Yes	NL		
FISH						
Lake Sturgeon	*Acipenser fulvescens*	SPC	Yes	NL		
MUSSELS						
Black sandshell	*Ligumia recta*	SPC	Yes	NL		
PLANTS						
English sundew	*Drosera anglica*	SPC		NL	S3	G5
Few-flowered spike-rush	*Eloeocharis quinqueflora*	SPC		NL	S3	G5
McCalla's willow	*Salix maccalliana*	SPC		NL	S3	G5
Twig-rush	*Cladium mariscoides*	SPC		NL	S3	G5
NATIVE PLANT COMMUNITY						

Prairie Rich Fen (peatland)	*OPp91b*				S3	
N. Rich Spruce Swamp (Water Track)	*FPn71a*				S3	
BIODIVERSITY SIGNIFICANCE[f]						
	Pool 2: Outstanding *Pool 3: Moderate* *Big Swamp: Moderate north,* *High south*					

a Categories are: END = endangered; THR = threatened; and SPC = Special Concern.

b Species in Greatest Conservation Need (SGCN), as identified in Minnesota's State Wildlife Action Plan (http://www.dnr.state.mn.us/cwcs/index.html)

c P (E) = proposed as endangered; C = candidate for federal listing; NL = not listed.

d S-ranks reflect the statewide degree of endangerment for high quality examples of native plant communities in Minnesota as described in *Minnesota's Native Plant Community Classification.*S1= critically imperiled; S2= Imperiled; S3= Rare or uncommon.

e G rank is a global conservation designation. G4= apparently secure; G5= demonstrably widespread, abundant, and secure.

f Ratings of biodiversity significance as provided by MN Biological Survey (MBS; http://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html).

Colonial waterbird nesting colonies occur on RRWMA's pools (Table 8). A red-necked grebe colonial nesting site has been observed on Pool 2, and a colonial nesting site containing horned grebes, eared grebes, and red-necked grebes has been observed on the adjacent Pool 1.

A state-listed mussel, the black sandshell, has been documented in the Roseau River (Table 8) as has a state-listed fish, the lake sturgeon.

Avian Species of Greatest Conservation Need (SGCN) that are not state-listed species are presented in Table 9. Most of these SGCNs occur in Pools 2 and 3 and the Big Swamp area, as the mosaic of shallow marsh-wet meadow-lowland brush habitats that these species occur in are present in abundance on these sites.

Table 9
Avian SGCNs that are not state-listed species and have been observed within the RRWMA Pool Enhancement project boundaries

Species	Scientific Name	Location[a]
Western grebe	*Aechmophorus occidentailis*	P2, P3
Northern pintail	*Anus acuta*	P2, P3, BS
Lesser scaup	*Aythya affinis*	P2, P3
American bittern	*Botaurus lentiginosus*	P2, P3, BS
Black tern	*Chlidonias niger*	P2, P3
Northern harrier	*Circus cyaneus*	P2, P3, BS
Sedge wren	*Cistothorus platensis*	P2, P3, BS
Olive-sided flycatcher	*Contopus cooperi*	BS
Least bittern	*Ixobrychus exilis*	P2, P3, BS
Black-crowned night heron	*Nycticorax nycticorax*	P2, P3, BS
Red-necked grebe	*Podicepsgrisegena*	P2, P3
Eared grebe	*Podiceps nigricollis*	P2, P3
Greater yellowlegs	*Tringa melanoleuca*	BS
Sharp-tailed grouse	*Tympanuchus phasianellus*	P2, P3, BS

[a] P2 = Pool 2; P3 = Pool 3; and BS = Big Swamp

Rare native plant communities (NPCs) have been documented within and near the project area (Figure 11). Prairie Rich fen (peatland) (OPp91b) occurs in Pool 2 and is ranked S3 – vulnerable to extirpation (Table 8). OPp91b covers the majority of Vegetation Zone 3 of Pool 2 (Figure 10). Northern Rich Spruce Swamp (Water Track) (FPn71a) occurs 8 miles east of Pool 2 in the Pine Creek Scientific and Natural Area. It is also ranked S3. This FPn71a community occurs within a larger tamarack-black spruce community at the western extent of the Lost River State Forest.

Pool 2 is an MBS site of "outstanding" biodiversity significance. The presence of the aforementioned OPp91b NPC and the rare plant species elements cited (Table 8) in the Tallgrass Aspen Parklands

ecological subsection are reasons for this designation. Pool 3 and the northern portion of the Big Swamp are sites of "moderate" biodiversity significance. The hydrology (and consequently, the vegetation) of these two areas has been influenced by the embankment (i.e., on Pool 3) and channelization of the Roseau River and ditching (i.e., for the northern portion of the Big Swamp). NPCs and rare plant and animals in the southern portion of the Big Swamp, though also affected by drainage ditches, are largely intact and of high quality; thus, this area has a ranking of "high" biodiversity significance.

MBS surveys were completed in the mid-1990s in the project area; the presence of most of the rare species cited above was documented during these surveys (Figure 12). A wildlife lake habitat survey was conducted in the open-water portions of Pool 2 and Pool 3 in 2013 (MN DNR Shallow Lakes Program 2014); the only rare species of animal or plant cited in those reports was the trumpeter swan, for which successful reproduction was documented.

Data for occurrences cited above were obtained through a Natural Heritage database query by the RRWMA wildlife manager and confirmed by the Endangered Species Review/NHIS Data Distribution Coordinator.

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

Expected improvements to plant communities in Pools 2 and 3

The reduced frequency and magnitude of water level fluctuations expected from the RRWMA enhancement project will improve the capacity to manage the plant communities for improved habitat conditions of Pools 2 and 3 as follows:

Zone 1:

- Improved quality and abundance of submerged aquatic vegetation (e.g., floating-leaved and sago pondweeds) due to ability to better manage water levels during times critical for establishment of each year's annual crop.
- Improved establishment of submerged aquatic plants in shallow water areas with less risk of dislocation into deeper areas and passing from the system due to water level fluctuation.
- Reduced frequency of cattail mat movement during large water fluctuations, which scours the pool bottom and dislocates submerged plants.
- Improved quality and abundance of wild rice due to the ability to better manage water levels during times critical for establishment of each year's annual crop
- The ability to convey greater quantities of water through new structures should improve drawdown capability. This should improve the success rate of special seeding projects (e.g., wild rice seeding).
- The incidence of bog mat migration should be reduced, thereby enhancing the ability to respond to rain events in a timely manner (i.e., time spent on managing bog mats is time that could be better spent on making the water conveyance system in the pools work more effectively).

Zone 2:

- Reduced density and abundance of cattail by reducing the frequency and magnitude of water level fluctuations that promotes their establishment.
- Increased density and abundance of native plants communities, particularly along the border with Zone 3.

Zone 3:

- Reduced risk of expansion of cattail into native plant communities.

The benefits of effective vegetation management in each zone will provide a foundation for other parallel benefits, in particular, aquatic invertebrate populations associated with each vegetation type. The standing crop of invertebrates available for ducks and other waterbirds should improve as their habitats (the vegetation) become more diverse and robust.

In addition to long-term plant community benefits, reducing bounce will also reduce the frequency of flooded nests of overwater nesting birds in the pools during nesting. Nest success of overwater nesters like the red-necked grebe should increase dramatically due to this project. In addition, by discharging water further downstream and ahead of peak flows on the river, the maximum water elevation attained in the pools during a given flood event will be lower.

Effects of Ditch Channels (internal and outlet)

Ditches through and adjacent to wetland areas have the potential to drain or drawdown the water table (which is the reason they are being proposed for installation) and affect adjacent wetland and upland habitats. Likely effects to wetlands include a conversion in wetland type and/or in conversion to non-wetland. Adjacent upland areas would likely experience changes in plant species composition, structure and diversity. The internal ditch has the potential to impact a Rare Natural Community (Site of Biodiversity), but with limited degree of impacts. This fact, combined with the overall project goals and benefits, leads the MNDNR to expect no permanent adverse effects.

Effects on Habitat in the Big Swamp Area

The benefits to habitats in the Big Swamp area are expected to be similar to those in Pool 2 and Pool 3. Plant community conditions in the Big Swamp area have been affected by the altered hydrology in the area, particularly near the Roseau River (lowered water table, frequent inundation with long duration). This project will divert less than 14% of the watershed that reaches the Big Swamp area to an area downstream. This will reduce flood flows into the Big Swamp area by 0.03 to 8 percent (Table 2). The frequency, duration, and depth of water inundation within the Big Swamp should be reduced compared to current conditions. This change to hydrology of the Big Swamp is an improvement toward more natural hydrologic conditions. Native plant communities should benefit from these changes to hydrologic conditions that now tend to favor more invasive plants species (especially reed canary grass and narrow-leaved cattail species).

Effects on Aquatic Habitat in the Roseau River

Impacts due to construction would be short term and temporary. These impacts would consist of potential short term impact to water quality in association with disturbances below the river bank and potential erosion from up gradient areas. The potential for these impacts will be low so long as required best management practices are adhered to as part of construction (NPDES and DNR permits include conditions requiring BMPs such as floating silt curtain, rapid stabilization measures, timing, etc.).

Post-construction - as part project operation - some water will be diverted from the Big Swamp. Since bankfull flows are flows that impact the channel formation process the most, extending or reducing bankfull flows tend to have the most impacts on aquatic habitat. This diversion of water during high flows will not substantially change the volume of water in the Roseau River downstream of the new outlet channel. Downstream large flood peaks will be reduced slightly and the timing of flows will change so that a larger volume of water moves through the river channel downstream of the project each winter. These changes to hydrologic conditions are not expected to affect in stream aquatic habitat or reduce floodplain access critical floodplain habitats.

Impacts to aquatic habitat in proximity to the new outlet channel confluence and scouring of the opposite river bank can occur with the introduction of new outlets. In order to minimize these impacts, the channel will be operated during conditions that are above a 2-year stage, and a sweeping angle of entry was added to the project design.

Potential impacts to listed species & rare plant communities

As mentioned above, the internal ditch has the potential to impact a Site of Biodiversity, but with limited degree of impacts; no permanent adverse effects are expected to state-listed species or rare native plant communities as a result of the construction and operation of this project.

Northern long-eared bat habitat will not be affected by the project. All impacts to woodlands (i.e., potential habitat for northern long-eared bats) adjacent to the new outlet channel and the internal conveyance channel in Pool 3 will occur during winter. USFWS interim habitat guidelines for northern long-eared bat management restrict the harvest of trees greater than 3 inches diameter at breast height (dbh) between 1 April and 30 September.

Project impacts should be positive for all state-listed avian species that use the hemi-marsh portions (i.e., Vegetation Zone 1 and, to a lesser degree, Zone 2) of the pools for nesting and feeding. Trumpeter swans, horned grebes, eared grebes, and red-necked grebes should benefit by the provision of more natural water fluctuation levels post-nest initiation. Furthermore, additional ability to manipulate water levels to accentuate availability of important seasonal foods should benefit these species during brood-rearing, fledging, and spring and fall migration.

Avian state-listed species that use either the Big Swamp or the vegetation in Zone 3 of the upper reaches either pool will benefit from an enhanced ability to reduce the frequency, duration, and depth of inundations during nesting and other times of the growing season critical to sustaining these populations. These species include Nelson’s sparrow, short-eared owls, and yellow rails.

Avian state-listed species associated grasslands and ephemeral wetlands (i.e., marbled godwit, and Wilson's phalarope) use shallow-water areas for foraging. This project aims to even out peak flows on the Roseau River, such that shallow water areas are attractive for wading and feeding.

Grassland bird species (i.e., Baird's sparrow and Sprague's pipit) are not likely to be affected by the project. There may be a minor improvement in the amount and quality of grassland habitat provided for these species due to a decrease in the land area of the Big Swamp that is inundated during the nesting season.

Lake sturgeon and black sandshell occur in the Roseau River but not the pools. The habitat of these species downstream of the project should not be affected by the project. There is potential for siltation to occur during project construction. Measures will be taken to minimize siltation (e.g., silt fence) during construction; see items 10b and 13d for additional details. The outlet channel from Pool 3 to the river will be designed to avoid sediment transfer post-construction given the capacity of the new outlet structure and the soils on site.

The four state-listed plant species (English sundew, few-flowered spike-rush, McCalla's willow, and twig-rush) occur in native plant communities that will benefit from reduction in peak flows on the Roseau River and peak water elevations on the pools. In particular the rare plant community OPp91b will benefit in the upper reaches of Pool 2 (Vegetation Zone 3) where it occurs as the threat of invasion by narrow-leaved cattails will be reduced by operation of the project to sustain hydrology favorable to fen habitats.

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

Construction Related

Water control structures (including Pool 3 outlet) will be constructed during the late growing season in order to allow for the concrete to set, while posing the least impact to wildlife. The excavation of the existing Pool 3 internal channel will take place during winter months in order to reduce impacts to plant communities adjacent to the construction site. Construction of the new Pool 3 outlet channel will occur in the fall and winter months, to ensure low impacts to adjacent wetland communities, from compaction or rutting due to heavy equipment.

Temporary impacts will be limited to areas directly adjacent to embankments and will have no negative impact on nesting birds in the pools. The internal conveyance channel and new outlet channel construction will occur in winter. Erosion control measures will control sediment transfer from construction sites, limiting potential sedimentation to adjacent terrestrial and aquatic communities. Any areas where sediment accumulation is encountered will be restored to pre-construction condition (i.e., removing sediment). MPCA stormwater permit documents that will be developed include guidance that requires sediment removal and stabilization of the area to occur within seven days of discovery or obtaining access.

Water levels will be maintained during project construction to prevent invasion of narrow-leaved species of cattail into open water bays of Pools 2 and 3. In addition, seeding, erosion protection measures, and aggressive weed control on slopes exposed as a result of construction needs to be undertaken to reduce

the opportunity for invasive species establishment. Tansy, corn chamomile, and spotted knapweed are recently discovered invasive plants on the WMA that need to be controlled. Invasive communities that become established in construction areas will be removed or chemically treated to prevent expansion into adjacent plant communities.

14. Historic properties

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

The site(s) contain no known historical properties. See Appendix II for the historic properties determination.

15. Visual

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

The large pools afford a scenic view when the embankment road is open for public travel. However, the embankment roads are gated throughout most of the year, in order to reduce disturbance to wildlife using the pools. Throughout most of the construction season therefore, it is anticipated that public access to the embankment system where these pools may be observed is restricted. The gate for the Pool 3 embankment is located 0.3 miles south of the proposed location for the new Pool 3 outlet structure.

No visual impacts are expected during construction. As noted in Figure 1, the project area is located in the northwest corner of Roseau County, very near the Canadian border. The area is managed as a wildlife refuge and no permanent residences exist nearby. No significant lighting will be required, given that construction will take place during daylight hours. As mentioned above, much of the construction is expected to take place during the season when public access is restricted.

16. Air

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

Heavy construction equipment will create dust during construction, which may cover vegetation adjacent to construction sites. Given the background conditions of the area, which is far away from heavy traffic and characterized by unpaved roads, the amount of dust is not considered significant, and would wash away with the first rainfall/heavy dew. The public may be steered away from areas of the project that occur outside of embankment gates (e.g., the proposed outlet channel) where dust from construction becomes a visual hazard.

b. Vehicle emissions – Describe the effect of the project's traffic generation on air emissions.

Diesel emissions will be the primary source of air emissions created by the project. The project construction duration is expected to last approximately 3 months. Some of the construction duration may include winter months as well as summer construction. On any given workday, there will be 3-10 pieces of heavy equipment in operation. All of this equipment is diesel-powered. Heavy equipment (excavator, bulldozer, front end loader, skid steer, road grader, agricultural tractor, cement trucks, semitractor/trailers, dump trucks, & fueling trucks) will be employed by contractors to remove the old structure on Pool 2, install the new structures on Pool 2 & 3, install & subsequently remove the required coffer dams, widen the existing borrow ditch on the far west end of Pool 3, excavate, haul, and level spoil from the Pool 3 outlet ditch, maintain the access road(s) to and from work sites, install erosion control devices (e.g., silt fence), and seed constructed slopes of ditch banks and adjacent to new water control structures.

Discuss the project's vehicle-related emissions effect on air quality.

The heavy equipment listed above will emit diesel exhaust on days when project work is occurring. No emissions are anticipated to linger beyond work days; all emissions will cease upon project completion. Depending on the season of work, additional emissions may occur when warming up equipment during cold weather.

Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

The logistics of accessing the site (e.g., limited room and sites to turn large equipment around when transporting materials to work sites) will place constraints on waiting times of trucks (due to narrow access roads) and how many large trucks may access the site at a given time. This will minimize the concentration of significant emissions.

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

Sources

Odors from diesel-powered equipment emissions will occur during construction. These emissions will be temporary and short in duration. Heavy construction equipment may create dust during construction if removal of excavated material and/or transport of suitable construction material are extremely dry when removed from the ground.

Effects

Given that the construction areas are extremely remote, and the area is generally wet, dust is anticipated to be minimal and temporary. While dust may temporarily cover vegetation adjacent to construction sites, the amount is not considered significant, and would wash away with the first rainfall or heavy dew. Due to the lack of population in this remote area, dust is not anticipated to cause any human health effects.

17. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation.

Construction equipment noise will occur at work sites throughout the project. Other than traffic noise along the haul road for trucked-in materials, noise is expected to be confined to active work sites where excavation and construction is taking place. Where water control structures are to be installed, sharp, loud noises associated with construction (e.g., setting in pilings) may occur for 1 – 2 weeks. Most construction will occur during the fall and winter months which will limit the potential impact during the breeding season for most wildlife species.

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

Man-made noises are not common in this area. The exception may be some limited activity associated with the few private seasonal cabins sites located immediately north of the unorganized township road that is adjacent to the new proposed outlet channel. Quality of life may be influenced at the cabin sites for a few days, and neighbors may be alerted by project staff in advance of construction. The project construction of the water control structures is located further south from the cabin sites, and the expected noise associated with their construction is thus not likely to cause impacts to human receptors. To minimize the impact of noise disturbance on wildlife using nearby habitats, seasonal limits (e.g., nesting season) on construction may be implemented at key sites (i.e., water control structure construction sites) to reduce impacts. Primary construction will occur post nesting season to minimize potential disturbance and nesting success. Noise impacts are anticipated to be minimal and temporary and will not last beyond the duration of construction.

18. Transportation

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

The project area is in a remote area with limited access. Parking exists at various sites with the WMA, and no additional parking spaces are needed. Daily traffic will consist of contractors accessing work sites for their daily work and transportation of equipment and materials to work sites. Traffic will be minimal

when no materials or equipment are transported. Borrow sites for project-related fill are likely several miles into Kittson County. Given the narrow access roads into the work site(s) and the logistics of operating heavy trucks and other equipment in remote areas, truck traffic to bring in fill will be limited; total trips during summer will likely be <30/day. Concentration of traffic will be at construction sites and will occur throughout the day. Trip generation rates are derived from the experience of the RRWMA wildlife manager with similar construction projects on the embankment system. No transit system exists in the project area.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system.

The project is located in a remote area. Some local traffic congestion may occur from increased traffic by construction vehicles which may temporarily delay access to areas within the WMA or for private landowners attempting to access cabins.

If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 *(available at:* Minnesota Department of Transportation Access Management Resources*)* or a similar local guidance.

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

Traffic control personnel (flagman, etc.) will be used as needed and, with limitations on season of construction, will avoid or minimize conflicts for use of the road during important time periods (e.g., during the summer Wildlife Embankment Drive or during the fall hunting seasons).

19. Cumulative potential effects

Note: Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items.

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

The geographic scale of the primary environmentally relevant area is the subwatershed within the Roseau River Watershed. This is the watershed in which the Roseau River WMA and the Big Swamp area are located. The environmentally relevant area is defined in this way because the principal potential effects of the project would be on water quality, and the principal concern is whether its effects will result in additional erosion or contributions to current water quality impairments. Water flows out of the project area to the Roseau River into the Big Swamp, which flows into the Minnesota portion of the Red River Watershed. When the Big Swamp area is filled to capacity in large runoff events, some water may overflow from the Roseau River Watershed south into the Two Rivers Watershed.

The timeframe of the proposed Project construction is estimated to be three months. This is part of restoration plans for overall floodplain management and support of the wildlife and water quality benefits that the WMA provides. Construction of the proposed project components are scheduled to occur during

the late growing season in fall of 2015 to allow for proper temperature for the concrete to cure, while posing the least impact to wildlife reproduction in the proposed Project area.

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

The Roseau River Watershed District recently completed the Hay Creek Setback Levees and Norland Impoundment project just upstream of the RRWMA as part of their long term plans. The project involved a six-mile section of straight ditch channel bordered by setback levees (encompassing 455 acres), with a high water diversion channel (encompassing 46 acres) leading to a new 2,932 acre dry impoundment. The primary objective of the project was to provide a flood reduction for the City of Roseau. Secondary objectives included reducing riverbank erosion and bank sloughing along Hay Creek and the Roseau River, augmenting stream flow from the Norland Impoundment pool contributing to County Ditch (CD) 18, restoring wetlands and enhancing vegetation resulting from plugged ditches, and enhancing water quality by reducing sedimentation resulting from detention of floodwaters within the impoundment and improving dissolved oxygen levels during periods of low flow.

The U.S. Army Corps of Engineers, St. Paul District, is in the final construction stages for a flood risk management project upstream of the RRWMA. This project's primary goal is to identify and implement a technically and economically feasible long-term solution to long-term catastrophic flood risks. The project was begun in 2009 and its central feature is a 4.5-mile diversion channel that will reduce flows within the city of Roseau. Construction is expected to be complete in the summer of 2015.

The District is now working cooperatively with a number of watershed project team composed of local, state and federal agency representatives and landowners to develop several other projects in the watershed area upstream of the RRWMA. These projects will be consistent with the watershed plan goals and objectives related to reducing flood damages and improving natural resources. The primary purpose of these projects will likely be to reduce flood damages and reduce the frequency, magnitude, and duration of peak flows downstream. However, projects are all in the early stages of development and therefore cannot be fully analyzed for potential environmental effects. The MNDNR consulted the watershed district and other local governments to identify any other reasonable foreseeable projects for which a basis of expectation has been laid. No future projects were identified for analysis of cumulative potential effects.

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

The proposed project is a continuation of habitat improvements and reduction of flood damage in a within this watershed. The cumulative impacts of the projects are intended to complement and facilitate each other to improve wildlife habitat and water quality. Overall, impacts are expected to be minimal and temporary; long term benefits are expected from these projects. RRWMA projects can provide significant flood storage in the middle timing zone for flood flow contribution in the Roseau River watershed when managed. The improved habitat conditions are directly related to this project's purpose of providing

improved water level management in the pools. The Pool Enhancement project is expected to improve wetland wildlife habitat and provide additional storage capacity.

There is potential for a minor increase in nutrient flushing from Pool 3 as a result of an additional outlet. Preliminary engineering has found that, during operation of the new Pool 3 outlet structure, water velocities within 100 feet upstream of the outlet will increase by approximately 1-ft/sec, with 0.47-ft/sec increase 1000 feet upstream of the structure and 0.07-ft/sec increase up to 15,000 feet upstream of the structure. The modeled velocities are generally not high enough to scour nutrients or vegetation from the bottom of the pool at 1000 feet or greater distance from the structure.

Given the location and purpose of the new Pool 3 outlet structure, potential cumulative effects from the U.S. Army Corps of Engineers Roseau River Diversion Project were briefly assessed. Indeed, the original proposed plan for the Roseau diversion project would have caused a 0.1-foot increase in stage downstream of the Wildlife Management Area (WMA), for the 100-year flood event. This increase would likely have taken place concurrently with increased flow from the RRWMA's Pool 3 outlet structure, which may have had negative effects on the aquatic habitat. However, the diversion's increase in stage was unacceptable to the City of Roseau, and the project design was changed to include two large storage areas. This current design for the diversion project means that the area impacted by a 100-year flood event is the same before and after the project (the flood depth however, increases 2 inches after the project, going from approximately 12, to 14 inches).[4] Any cumulative effects from the diversion project upstream of the RRWMA are thus expected to be negligible and minor in nature.

The short-term increase in sediment during the clean out of the watercourse is mitigated by the long-term improvements to wildlife habitat and water quality in over 900 acres of shallow lake and wetland habitat. The environmental effects expected with the implementation of this project are improved habitat conditions in the RRWMA, improved habitat conditions within the Big Swamp area, and changed hydrologic conditions in the Roseau River. The RRWMA enhancement project combined with other upstream projects with similar flood damage reduction goals has the potential to significantly improve the quality of wildlife habitat in the Roseau River WMA, the Big Swamp, and the Roseau River watershed.

20. Other potential environmental effects

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

None

[4] See the Feasibility Report and Environmental Assessment, available online at http://www.usace.army.mil/Portals/2/docs/civilworks/CWRB/rrr/RoseauRiv_Documentation_of_Review_Findings_27Nov06.pdf .

RGU CERTIFICATION

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

I hereby certify that:

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

Sign  Date: February 9, 2015

Title: Planner Intermediate, Environmental Review Unit

APPENDIX I – ANNUAL SHALLOW LAKES ACCOMPLISHMENT REPORT

Calendar Year 2013			WILDLIFE OFFICE: ROSEAU RIVER WMA								
	LAKE INFO **Required, if DOW is unknown, give detailed location under public land column			**MANAGEMENT INFO** (Fill out as needed)					**WILD RICE INFO**		
	LAKE NAME	**DOW#**	**PUBLIC LAND or TRS**	**LAKE SURVEY**	**FISH BARRIER**	**STRUCTURE WORK**	**MANAGED DRAWDOWN**	**COMMENTS / OTHER PROJECTS**	**WR ACRES**	**WORK TYPE**	**WR COMMENTS**
	**** 2012 Data, please delete old data and replace with 2013**			Done independently of Shallow Lakes Program					(Estimated)		
					1 = new 2 = repair / maintenance	1 = new 2 = repair / maintenance	1 = full 2 = partial (Via structure or pumping)			MA = managed MO = monitored TA = tech assistance O = other N = no work done / incidental observation	
1	Pool 1	68000500						2300 acres			
2	Pool 2	68000600				2	1	4600 acres; 6-inch drawdown for	200	MA and MO	Concentrated in and around potholes in Pool 2
3	Pool 3	68000700						3700 acres	15	MA and MO	Mainly along borrow ditches; especially near the
4	Pool 1 Sanctuary MSU--Avocet							18 ac			
5	Pool 1 Sanctuary MSU--Brood						1	21 ac			
6	Pool 1 Sanctuary MSU--Crane						1	20 ac (J. millet seeded in summer)			
7	Pool 1 Sanctuary MSU--Dabbler						1	20 ac			
8	Pool 1 Sanctuary MSU--Eagle							31 ac (J. millet seeded in summer)			
9	Pool 1 Sanctuary MSU--Frog						1	30 ac			
10	Olson West MSU							17 ac			
11	Olson West 2 MSU							3 ac (J. millet seeded in summer)			
12	Berry's MSU							5 ac (disked for 2014 moist soils management)			
13											
14											
15											

APPENDIX II – HISTORIC PROPERTIES DETERMINATION

Minnesota Historical Society

Using the Power of History to Transform Lives

STATE HISTORIC PRESERVATION OFFICE

August 29, 2014

Mike Magner
DNR Forestry/ Fish & Wildlife Archaeologist
DNR Forestry Resource Assessment Office
483 Peterson Road
Grand Rapids, MN 55744

RE: Roseau River WMA Wetland Enhancement Project
T163 R43 S9 and T163 R44 S4, 5, 6
Blooming Valley Twp., Roseau County
SHPO Number: 2014-2730

Dear Mr. Magner:

Thank you for the opportunity to comment on the above project. It has been reviewed pursuant to the responsibilities given to the Minnesota Historical Society by the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act.

We have reviewed the cultural resources survey report that was prepared for this project. Based on the results of the survey, we conclude that there are no properties listed in the National or State Registers of Historic Places, and no known or suspected archaeological properties in the area that will be affected by this project.

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36CFR800, Procedures of the Advisory Council on Historic Preservation for the protection of historic properties. If this project is considered for federal assistance, or requires a federal permit or license, it should be submitted to our office by the responsible federal agency.

Please contact our Compliance Section at (651) 259-3455 if you have any questions on our review of this project.

Sincerely,

Sarah J. Beimers

Sarah J. Beimers, Manager
Government Programs and Compliance

Minnesota Historical Society, 345 Kellogg Boulevard West, Saint Paul, Minnesota 55102
651-259-3000 • 888 727 8386 • www.mnhs.org