

Project Title: **Moore Creek Assessment and Conceptual Restoration Plan
Valley Garden Ranch near Ennis, Montana**

Date: November 2, 2021

Applicability to Project 2188 License Article(s)

This proposal will fund a resource assessment and conceptual restoration design for a 5-mile reach of Moore Creek, a tributary to Ennis Lake north of the town of Ennis, Montana (Figure 1). NorthWestern Energy (NWE) is successfully enhancing Project 2188 wildlife habitats through funding aimed to protect, restore, and enhance riparian, wetland, and upland habitats on private lands. This planning and conceptual design phase will ultimately lead to the implementation of on-the-ground restoration projects to help offset impacts to river resources associated with Project 2188 (Madison-Missouri River). The project meets the purpose and intent of License Article 423, which requires development of a vegetation and wildlife monitoring and enhancement plan intended to enhance native plants and wildlife populations on Project 2188 wildlife habitats adjacent to the Madison River. Specifically, NWE is successfully enhancing Project 2188 wildlife habitats through funding aimed to protect, restore, and enhance riparian, wetland, and upland habitats on private lands.

Priority Classification

The Moore Creek project area classifies as a Priority 2 2188 license project. The project is located on Moore Creek, a snowmelt dominated, cold-water tributary to Ennis Lake located within 0.5 miles of the Madison River. The project will address limiting factors related to degraded wildlife, wetland, and aquatic resources.

Project Sponsor(s): Valley Garden Land & Cattle, LLC
River Design Group, Inc.

Location of Proposed Project

The project is in Madison County approximately one mile north of the town of Ennis, Montana (Figure 1) and is located entirely on private land owned by Valley Garden Land & Cattle, LLC.

- Geocode: 25-0510-15-1-01-01-0000
- DMS: 45° 23' 54.38" N; 111° 42' 49.39" W
- DD: Latitude: 45.3984389°N; Longitude: 111.71372192°W

Total Project Cost: \$40,000

TAC Funds (Cost-Share) Requested for Project: \$22,500

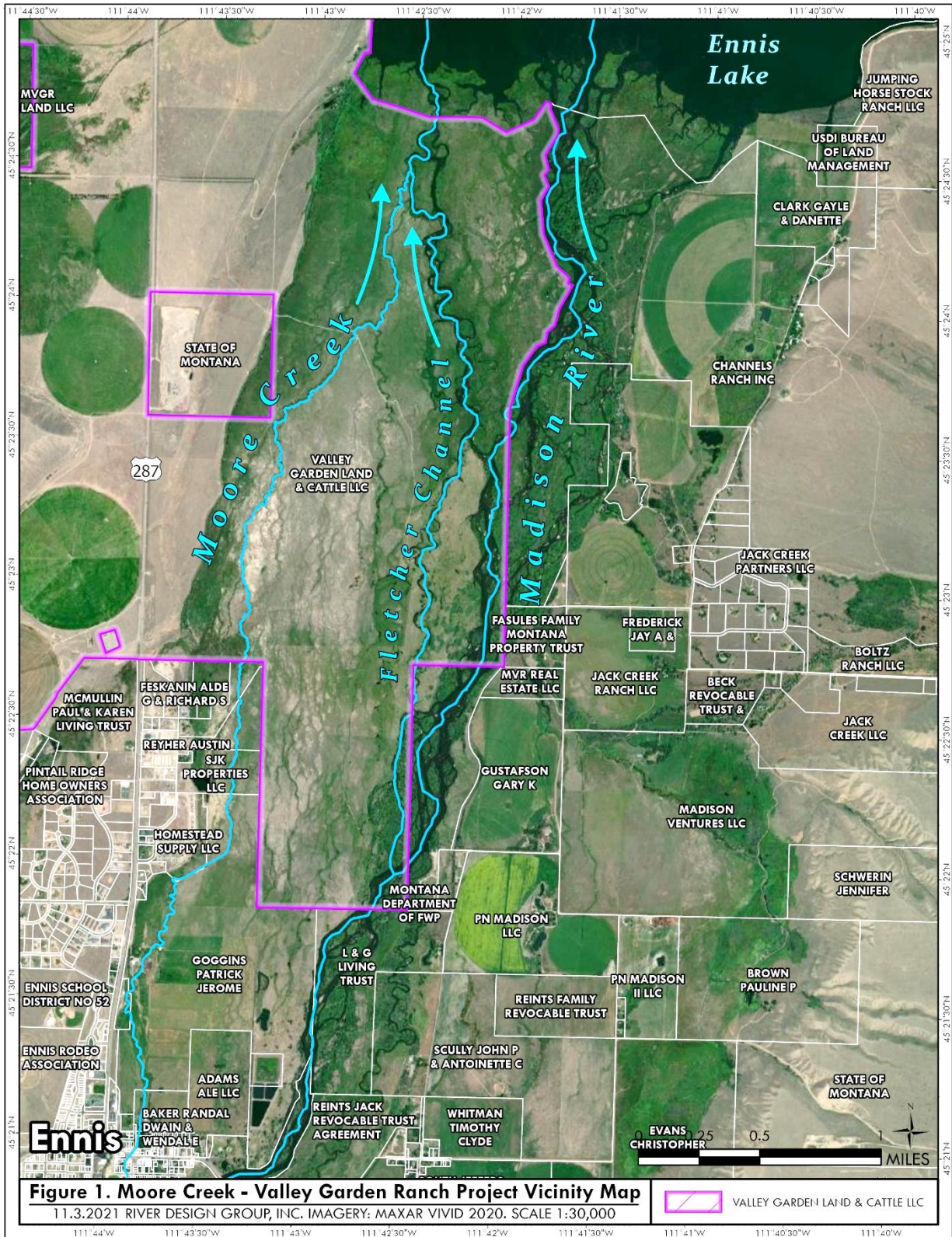


Figure 1. Moore Creek – Valley Garden Ranch Project Vicinity Map.

I. INTRODUCTION

Moore Creek is an important cold-water, snowmelt dominated tributary to Ennis Lake. Agencies and resource managers have recently expressed interest in pursuing restoration actions on Moore Creek to improve water quality and address degraded aquatic, riparian and wetland resources. This project will involve assessing existing stream morphology, instream habitat, and riparian- wetland conditions on a five-mile reach of Moore Creek located on the Valley Garden Ranch, a working cattle ranch owned by Valley Garden Land & Cattle, LLC. In June 2021, River Design Group, Inc. (RDG) was approached by the landowner, Mr. Patrick McGee, who expressed his family's desire to pursue wildlife and aquatic habitat conservation measures on Moore Creek and associated riparian and terrestrial habitats.

The project area includes approximately five miles of Moore Creek, tributary channels and springs, and prior converted wetlands. Moore Creek has been impacted by livestock grazing, channelization, ditching, and agricultural practices that have led to stream incision, entrenchment, high rates of bank erosion, and compromised aquatic and wetland habitats. In the mid-1900's, a four-mile-long drainage ditch was constructed on the west side of the valley to intercept springs and seeps to drain emergent and scrub-shrub wetlands. The ditch was subsequently plugged to create open water wetlands. These efforts were mostly unsuccessful, and the current ditch system and open water features provide marginal wetland functions and values and continue to alter wetland hydrology.



Figure 2. Photo point of Moore Creek illustrating high rates of bank erosion, simplified aquatic habitat conditions, and altered channel geometry (photo left). The existing ditch system intercepts springs and seeps, altering wetland hydrology and overall functions and values (photo right).

This assessment and preliminary design effort will identify restoration opportunities through a master plan approach. The purpose of future restoration projects will be to improve aquatic habitat conditions of Moore Creek and associated riparian and wetland habitats. We envision this will be accomplished by restoring Moore Creek to its likely historical geomorphic condition, and by enhancing and creating off-channel, shallow to deep emergent, and shallow to deep open water wetlands.

Specifically, restoration goals will include: 1) improving aquatic, riparian, and terrestrial habitat diversity for fish and wildlife; 2) establishing riffle and pool sequences and reconnecting floodplains; 3) modifying the existing ditch system to create a complex matrix of variable depth wetlands; 4) isolating wetlands from the channel to lower stream temperature; 5) converting areas within the existing upland herbaceous plant communities to emergent and scrub-shrub wetlands by creating new, lower floodplain surfaces adjacent to Moore Creek and tributary channels; and 6) restoring willow and riparian shrub communities in patches along streambanks and within portions of the floodplain.

II. Objectives

The following objectives have been developed for the Moore Creek Assessment and Conceptual Restoration Plan:

1. Complete a rapid geomorphic, vegetation, and wetland assessment of Moore Creek utilizing remote sensing (e.g. aerial imagery and LiDAR data) and standard field techniques;
2. Complete a geomorphic reference reach survey on a relatively undisturbed section of Moore Creek to characterize potential stream channel, streambank, and floodplain morphology, including vegetation communities;
3. Evaluate the existing ditch system and provide recommendations to improve wetland functions and values;
4. Develop a conceptual restoration plan that identifies project phases and restoration opportunities, along with final design, permitting and construction cost estimates for high priority project areas; and
5. Coordinate work with upstream restoration activities on Moore Creek being sponsored by NorthWestern Energy, Madison Conservation District and Montana Fish, Wildlife & Parks.

III. Methods

A reconnaissance-level geomorphic, vegetation, and wetland assessment will be completed to support development of the conceptual restoration plan. Surveys and methods will follow standard protocols and include both existing and reference conditions in the project area. Reference data will be collected to support development of geomorphic, aquatic habitat, wetland habitat and vegetation design criteria, as appropriate, and will be used in conjunction with other methods to inform the conceptual design. Geomorphic data collection will include channel cross-sections, longitudinal channel profiles, streambed substrate characterization and channel classification. Vegetation data collection will include observations of all occurring plants and absolute percent canopy cover of dominant species by strata. Sampling of wetlands will occur through establishment of plots at select representative wetland areas, and description of the soil in the upper part of the soil profile, absolute percent cover of vegetation by strata, and hydrology. Reference floodplain surfaces that support active side channels, alcoves, and off-channel riverine wetlands

will be assessed in the field to help guide development of floodplain, wetland, and vegetation design criteria. Historical aerial photos will be analyzed to evaluate geomorphic trends over time.

Data Collection Tasks

- Historical aerial photograph and LiDAR analysis;
- Rapid geomorphic investigations including typical channel cross-sections, longitudinal channel profiles, substrate enumeration, and planform geometry;
- Basin flood frequency analysis and determination of channel forming, or bankfull discharge;
- Remotely sensed existing vegetation assessment to categorize broad vegetation communities;
- Reference geomorphic and vegetation surveys to characterize potential conditions or desired future conditions; and
- Inventory of existing ranching infrastructure and constraints to restoration.

Following field data collection, and with assistance from Valley Garden Land & Cattle, LLC and NWE, conceptual restoration drawings will be developed for the project area. The conceptual plan will include plan views and GIS illustrations in an 11"x17" plan set prepared in ArcGIS or AutoCAD Civil 3d. A construction phasing plan will be developed and estimates for final design, permitting, and construction will be provided for high priority sites.

IV. Schedule

Table 1 includes a proposed project schedule. Work will begin immediately following contract award, and the field assessment and remote sensing tasks will be completed in the summer of 2022. A draft conceptual plan will be distributed to project stakeholders for comments in November 2022. Based on comments received, a final conceptual design plan set will be prepared.

Table 1. 2022 project schedule for the Moore Creek Assessment and Conceptual Restoration Plan.

Task	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Task 1. Project Management				
Task 2. Assessment and Data Collection				
Task 3. Conceptual Restoration Plan				
Task 4. Direct Costs				

V. Personnel

The project will be guided and implemented under the auspices of a diverse group of stakeholders including NorthWestern Energy, Valley Garden Land & Cattle, LLC, and agency partners. Our continued collaboration and history working in the Madison River Valley underscores the importance we place on offering a team that will continue to be compatible with the community and stakeholders.

RDG is an approved consultant on NorthWestern Energy's Qualified Vendor's List for stream and wetland restoration services. John Muhlfeld, Principal Restoration Hydrologist with RDG, will serve as the project manager and technical lead on behalf of the design team. Selita Ammond, RDG's Geographic Information Systems analyst and Wetland Ecologist, will participate in the assessment and prepare the Conceptual Restoration Plan drawings.

VI. Budget

Table 2 includes a not-to-exceed cost estimate to perform the Scope of Work (SOW). The total cost to perform the SOW is \$40,000. The landowners have committed \$17,500 in cost-share to demonstrate their commitment to this project, and to broader, landscape-level conservation goals. The cost-share match accounts for approximately 45% of the total project cost. This proposal is requesting TAC funds in the amount of \$22,500. While not reflected in Table 2, it is our intent to submit a proposal to MadTAC in the amount of \$7,500, to support tasks related to the geomorphic and aquatic habitat investigations.

Table 2. Moore Creek Assessment and Conceptual Restoration Plan Cost Estimate.	
Task	Cost
1. Project Management	\$ 1,500.00
Coordination with NWE, Landowners and MCD	\$ 1,500.00
2. Field Assessment and Data Collection	\$ 17,250.00
Vegetation and Wetland Data Collection	\$ 7,250
Hydrologic and Geomorphic Data Collection	\$ 6,500
Remote Sensing Analysis (Imagery, LiDAR Data)	\$ 3,500
3. Conceptual Restoration Plan	\$ 18,500
Data Processing	\$ 3,500
Preliminary and Final Restoration Plans (Drawings)	\$ 11,000
Cost Estimating and Project Phasing Plan	\$ 4,000
4. Direct Costs	\$ 2,750
Mileage	\$ 650
Per Diem (4 Person Crew for Four Nights)	\$ 500
Lodging (4 Person Crew for Four Nights)	\$ 1,600
Estimated Project Cost	\$ 40,000
*Cost-Share (Valley Garden Land & Cattle, LLC)	\$ 17,500
Total TAC Funds Requested	\$ 22,500

VII. Deliverables

Project deliverables will include the following:

- 11"x17" conceptual restoration plan.
- Cost estimates and phasing plan for high priority projects.

This project will culminate in a 'master plan' for over 5 miles of spring creek and associated riparian wetland areas. The importance of investing in this planning effort is three-fold:

1. Developing a restoration vision for wetland and wildlife resources in the project area will help generate support from landowners, agencies, and local organizations who have contributed to past phases of restoration work in the Madison River Valley.
2. A "road map" for future restoration work leads to cost-effective implementation, as restoration constraints can be identified early in the planning process. Developing a realistic implementation phasing plan is critical when implementing restoration actions over such a large area.
3. Alternative funding sources exist, including Section 319 funding from Montana Department of Environmental Quality to address temperature and water quality impairments. The preliminary design, phasing plan, and cost estimates will prove useful in applying for grants and other state, federal, and local funding opportunities.

VIII. Cultural Resources

This project will not result in ground disturbance or active construction therefore a cultural resources survey is not needed.

IX. Water Rights

At a future date as final designs are prepared, appropriate analysis will be performed to demonstrate the projects comply with the intent of Montana DNRC's "*Guidance for Landowners and Practitioners Engaged in Stream and Wetland Restoration Activities*", issued by the Water Resources Division on March 9, 2016.

DNRC guidelines state that "any wetland project (restoration) whose final design approximates the natural characteristics of adjacent natural wetlands or approximates something smaller in magnitude does not require a water right". The guidelines also state that restored wetlands should have characteristics similar to other natural wetlands in the area and should function entirely in the absence of artificial controls and diversions of water that intentionally appropriate water for wetland use