

**CRANE AND SANDHILL BATTERY ENERGY
STORAGE SYSTEM PROJECTS
OLMSTED COUNTY, MINNESOTA
VEGETATION MANAGEMENT PLAN**

MPUC DOCKET NOS.

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Prepared for:



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Prepared by:



EXECUTIVE SUMMARY

This Vegetation Management Plan (VMP) guides site preparation, selecting and planting prescribed seed mixes, controlling invasive and noxious weeds, mitigating erosion and sedimentation, and establishing vegetation goals. This VMP incorporates best practices to establish a sustainable, diverse, perennial grassland community, appropriate to site conditions and safe operation, maintenance, and inspection that complies with all permits and regulations by establishing resilient, site-specific vegetation that enhances soil stability, biodiversity, and aligns with local ecological goals, while also minimizing long-term maintenance costs.

Crane Energy Storage LLC (Crane Storage) and Sandhill Energy Storage LLC (Sandhill Storage), wholly owned subsidiaries of Copenhagen Infrastructure Partners, propose to construct the Crane Energy Storage Project (Crane Project) and the Sandhill Energy Storage Project (Sandhill Project), collectively the Projects, adjacent to one another in Township 107N, Range 15W, Sections 30 and 31, in Olmsted County, Minnesota (Project Location) (refer to Figure 2.1-1). Each Project will consist of a stand-alone up to 200-megawatt (MW) / 800-megawatt hour (MWh) battery energy storage system (BESS) and ancillary support infrastructure. The Projects are being developed to share the same collector substation, an approximately 700-foot-long 161-kilovolt (kV) generation tie line (gen-tie line), and a primary access road. Land within each BESS and the shared collector substation will be graveled and fenced for operation of these facilities and, therefore, the goals and objectives outlined throughout this plan do not apply to these facilities. Given the close proximity of the Projects, a single VMP has been developed. The goals and objectives outlined throughout this plan apply to the areas outside the fencelines of these facilities and the area within the right-of-way of the gen-tie line. For the gen-tie line right-of-way, vegetation management will follow this VMP where the Projects maintain ownership. On interconnecting utility property, management will adhere to agreements with the interconnecting utility, to be documented as an addendum as needed once finalized. All vegetation management will comply with applicable NERC standards and maintain required clearances regardless of ownership.

If approved, the Projects will operate under Site Permits issued by the Minnesota Public Utilities Commission in accordance with the Minnesota Power Plant Siting Act (Minnesota Statutes §216E) and Minnesota Administrative Rules Chapter 7850, in addition to other required state and local permits. Currently, the Projects are scheduled to commence construction activities in Q1 2027, with commercial operations anticipated to begin in Q2 2028.

The Land Control Area for the Crane Project covers about 36.3 acres. Within the Crane Land Control Area, preliminary design of the Crane Project would affect about 35.6 acres; the area required for construction and operation of the Crane Project is herein referred to as the Crane Preliminary Development Area. About 11.3 acres of the Crane Preliminary Development Area would be occupied by the BESS and associated infrastructure and converted to impervious surfaces. About 12.2 acres will be restored in accordance with this Vegetation Management Plan (VMP) (i.e., the Crane Site) and the remaining 12.1 acres will be restored to previous land uses.

Should the Sandhill Project be constructed before the Crane Project, Sandhill Storage would negotiate an agreement with Crane Storage for permission to construct the primary access road, collector substation, and gen-tie line. As such, the Land Control Area for the Sandhill Project covers about 42.7 acres. Within the Sandhill Land Control Area, preliminary design of the Sandhill Project would affect about 39.9 acres; the area required for construction and operation of the Sandhill Project is herein referred to as the Sandhill Preliminary Development Area. Approximately 19.2 of these acres are already accounted for in the 36.3 acres attributed to the Crane Project. About 10.1 acres would be occupied by the BESS and associated infrastructure

and converted to impervious surfaces. About 14.0 acres will be restored in accordance with this VMP (i.e., the Sandhill Site). The remaining 15.8 acres will be restored to previous land uses.

The proposed Projects are primarily located on agricultural land (about 99 percent for both Projects) in a rural landscape. Land use data indicates that the Land Control Areas are primarily managed for row-crop production of predominantly corn and forage crops. The Projects are located on nearly level landforms within a generally gently rolling topography, which is consistent with the current agricultural production.

This VMP is a working document, and revisions will be made as new information on vegetation management practices becomes available or if the Project's layouts change.

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Attachment A	Habitat Friendly Solar Site Assessment Forms
Attachment B	Project Historical Climate Data
Attachment C	Seed Mixes

ACRONYMS AND ABBREVIATIONS

BESS	battery energy storage system
BWSR	Board of Water and Soil Resources
Crane Land Control Area	Approximately 36.3 acres for which Crane Energy Storage LLC has site control
Crane Preliminary Development Area	Approximately 35.6 acres within the Crane Land Control Area, that would be affected by construction of the Crane Project.
Crane Project	Crane Energy Storage Project
Crane Site	About 12.2 acres within the Crane Land Control Area that will be restored in accordance with this Vegetation Management Plan.
Crane Storage	Crane Energy Storage LLC
FEMA	Federal Emergency Management Agency
gen-tie line	generation tie line
General Permit	Construction Stormwater General Permit
GIS	geographic information systems
kV	kilovolt
Merjent	Merjent, Inc.
MNDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MW	megawatt
MWh	megawatt hour
NLCD	National Land Cover Database
NRCS	Natural Resources Conservation Service
Project Area	General area surrounding and including the BESS facility
Project Location	Township 107N, Range 15W, Sections 30 and 31, in Olmsted County, Minnesota
Projects	Crane Energy Storage Project and Sandhill Energy Storage Project
Sandhill Land Control Area	Approximately 42.7 acres for which Sandhill Energy Storage LLC has site control
Sandhill Preliminary Development Area	Approximately 39.9 acres of the Sandhill Land Control Area that would be affected by construction and operation of the Sandhill Project
Sandhill Project	Sandhill Energy Storage Project
Sandhill Site	About 14.0 acres within the Sandhill Land Control Area that will be restored in accordance with this Vegetation Management Plan
Sandhill Storage	Sandhill Energy Storage LLC
SSURGO	Soil Survey Geographic Database
SWPPP	Stormwater Pollution Prevention Plan
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
VMP	Vegetation Management Plan

1.0 GOALS AND OBJECTIVES

Merjent Inc. (Merjent), on behalf of Crane Storage and Sandhill Storage developed this VMP to guide site preparation, develop and install prescribed seed mixes, manage undesirable species, implement erosion and sediment controls, and establish vegetation goals. This VMP incorporates best practices for establishing native vegetation, guided by the Minnesota Board of Water and Soil Resources (BWSR) (2019) and the Minnesota Department of Commerce (2021). The primary vegetation management goals of the Projects are outlined below, with corresponding steps to achieve each goal.

1.1 Short-Term Goals

Short-term goals are applicable to the post-construction Establishment Phase of the proposed Projects in Years 1 to 5. The general goal is to establish a sustainable, diverse, perennial grassland community, improves soil health, supports biodiversity, restores natural hydrology and safe operation, maintenance, and inspection that complies with all permits and regulations pertaining to the Crane and Sandhill Sites. The primary short-term goals are:

- **Permit compliance.** Comply with permit conditions for site revegetation, per the Minnesota Pollution Control Agency (MPCA) Construction Stormwater General Permit (General Permit).
- **Stabilize soils and close out the stormwater permit.** After the first growing season, achieve at least 70 percent vegetative cover at the Crane and Sandhill Sites to allow for stormwater permit closure
- **By Year 3:** Achieve at least 85 percent vegetative cover at the Crane and Sandhill Sites and establish native, pollinator-friendly vegetation, with a composition of at least 80 percent native species.
- **By Year 5:** Achieve at least 95 percent vegetative cover and ensure that 95 percent of the site is established with native, pollinator-friendly vegetation.
- **Invasive Species Management and Soil Improvement:** By the end of Year 5, maintain invasive and noxious weed cover at less than 10 percent. Improve soil quality as needed by decompacting and amending soils to support the establishment of native, pollinator-friendly vegetation.

1.2 Long-Term Goals

Long-term goals are defined as goals beyond Year 5, following implementation of the short-term goals. Crane Storage and Sandhill Storage will implement adaptive management of vegetation cover, guided by strategic integration of site-specific environmental conditions to maintain a perennial grassland community that keeps the soils on the Crane and Sandhill Sites stabilized, improves soil conditions and preserves the Site for agricultural use in the future. The primary long-term goals include:

- **Vegetation establishment.** Maintain 95 percent of the Crane and Sandhill Sites in a vegetated state, and at least 90 percent of the cover comprised of native species.

- **Increase biodiversity of vegetation.** Establish six or more species of planted native graminoids and 12 or more species of planted native forbs across the Crane and Sandhill Sites.
- **Control invasive species and noxious weeds.** Prioritize the implementation of all required vegetation management activities for safe and efficient operations support, including woody species control, height control of herbaceous species, wet area management, and natural vegetation landscape/screening management.
- **Meet or exceed BWSR habitat friendly vegetation goals.** The Project meets or exceeds the minimum standards for the BWSR Habitat Friendly Solar Program when scored using the Habitat Friendly Solar Site Assessment Form (refer to Appendix A).

1.3 Vegetation Management Phases

The VMP describes the Establishment, Maintenance, and Long-term Maintenance and Monitoring Phases in detail.

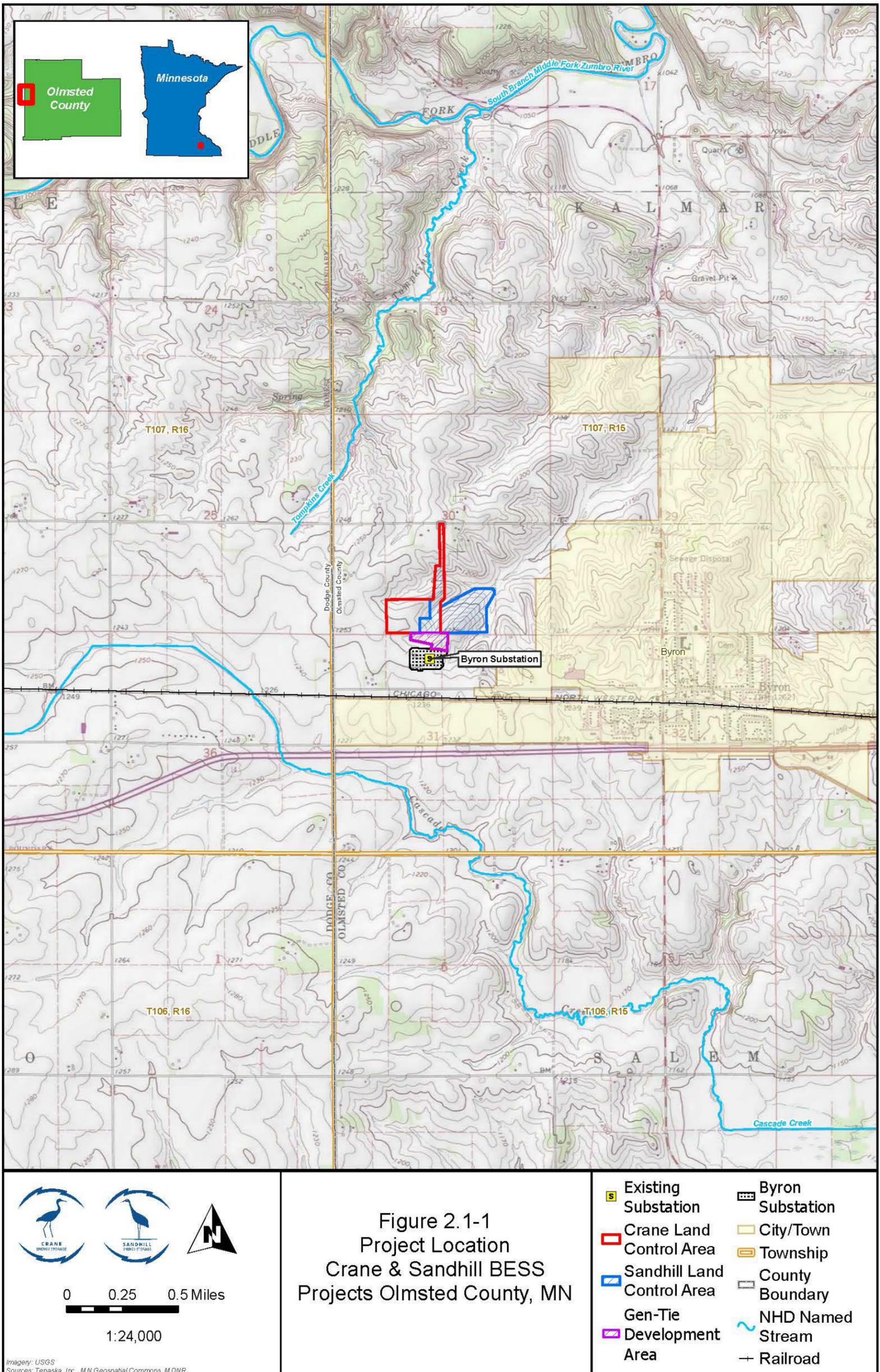
- The Establishment Phase addresses the initial four years of vegetation installation and management. The first year of establishment is focused on consistent undesirable plant control on a Site-wide basis through a variety of management techniques. The second year of establishment continues undesirable plant control, but generally employs more targeted techniques. In the third and fourth years of the Establishment Phase, undesirable plant control will consist of spot treatment to control the remaining small patches of undesirable species.
- The Maintenance Phase, which generally begins in the fifth year after initial seed mix installation, promotes and maintains the desired vegetation community, controls the reestablishment or spread of any undesired species, and combats the establishment of invading trees and shrubs.
- The Long-term Maintenance and Monitoring Phase includes quantitative and qualitative measures to assess how well the Project goals and performance standards are being achieved. During these years, the frequency of maintenance is greatly reduced and dependent on yearly soil moisture and vegetation growth.

2.0 DESCRIPTION OF SITES

To understand the ecosystem and landform characteristics surrounding the Projects, a baseline Site analysis was conducted for each Site to inform the appropriate seed mix composition(s), anticipated period(s) of establishment, and maintenance perspectives required for a successful Establishment Phase. The baseline Site analysis consists of a desktop review of publicly available datasets, such as soil characteristics, land use, landform, historical aerial photos, linear hydrology, wetlands, and historical climate data. Additional considerations, such as annual precipitation, weather, and historical climate data inform the likelihood of adequate establishment of propagated seed mixtures.

2.1 Project Locations

The proposed Projects are adjacent to one another in Township 107N, Range 15W, Sections 30 and 31, in Olmsted County, Minnesota. The locations of the Projects are shown on Figure 2.1-1.



2.2 Crane Project Overview

The Crane Project covers about 36.3 acres. Within the Crane Land Control Area, preliminary design of the Crane Project would affect about 35.6 acres; the area required for construction and operation of the Crane Project is herein referred to as the Crane Preliminary Development Area. About 11.3 acres of the Crane Preliminary Development Area would be occupied by the BESS and associated infrastructure and converted to impervious surfaces. About 12.2 acres will be restored in accordance with this VMP (i.e., the Crane Site) and the remaining 12.1 acres will be restored to previous land uses. The breakdown of this Project is shown on Figure 2.2-1.

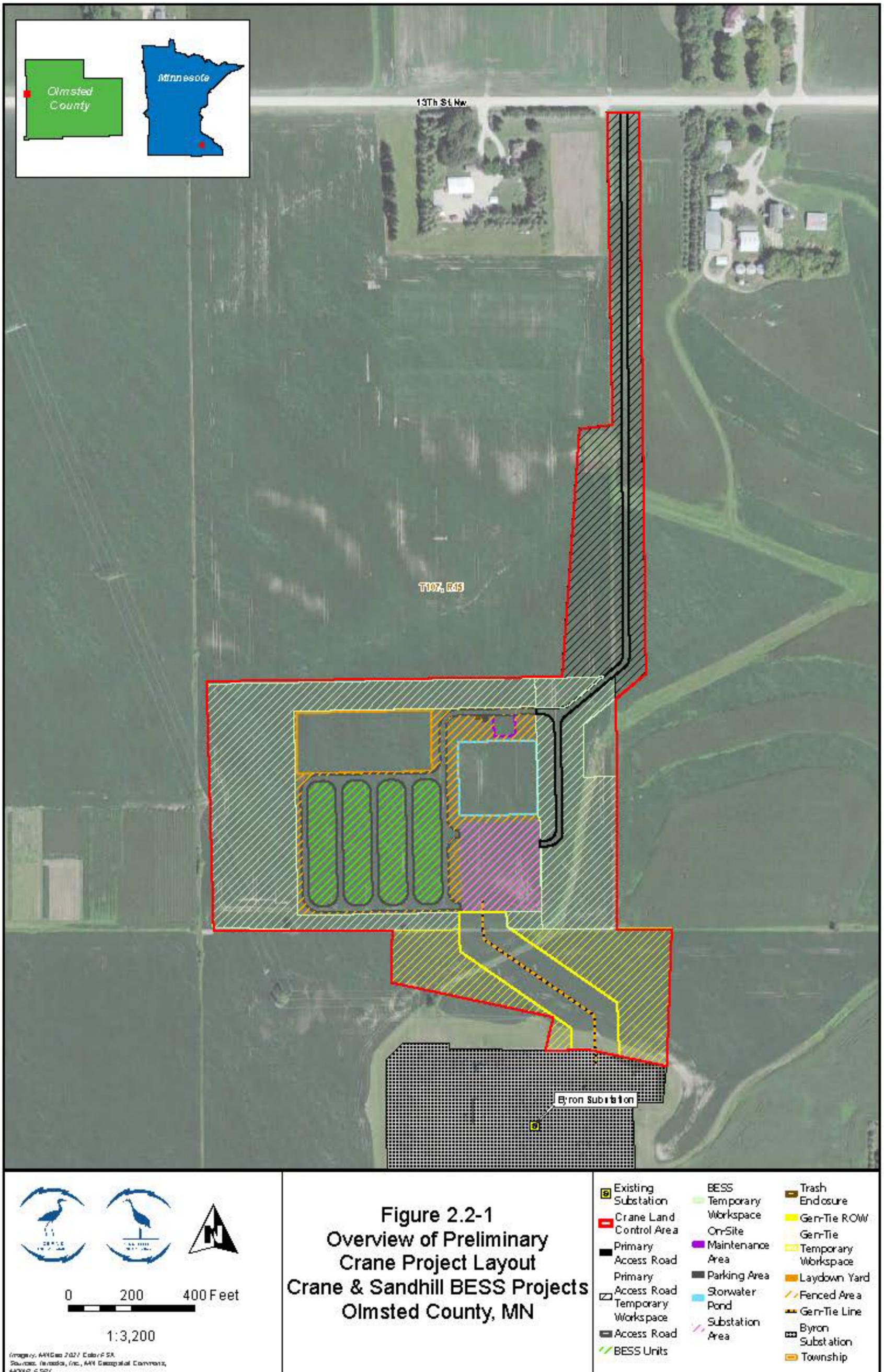
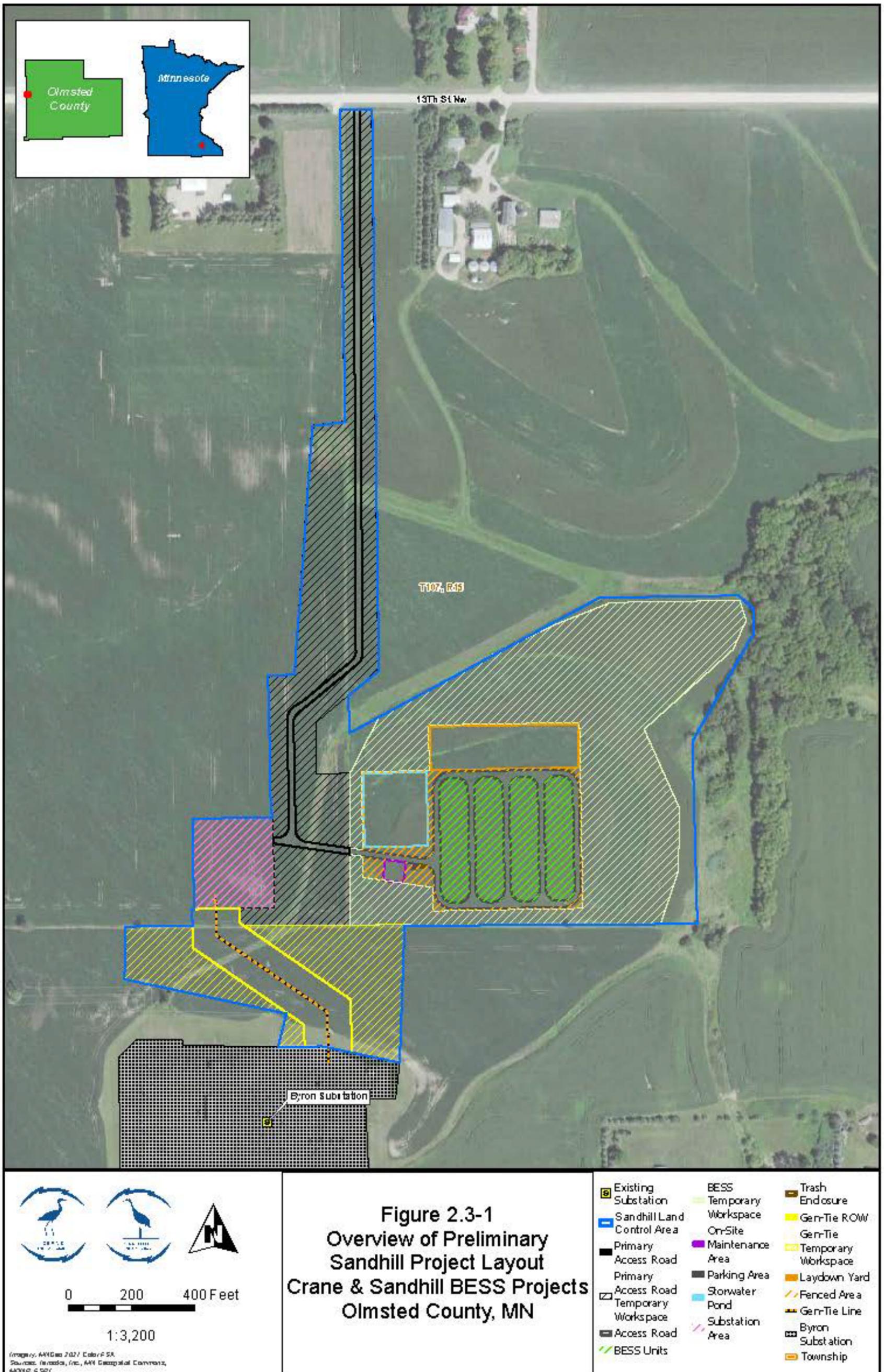


Figure 2.2-1
Overview of Preliminary
Crane Project Layout
Crane & Sandhill BESS Projects
Olmsted County, MN

- Existing Substation
- Crane Land Control Area
- Primary Access Road
- Primary Access Road Temporary Workspace
- Access Road
- BESS Units
- BESS Temporary Workspace On-Site
- Maintenance Area
- Parking Area
- Storwater Pond
- Substation Area
- Trash Enclosure
- Gen-Tie ROW
- Gen-Tie
- Temporary Workspace
- Laydown Yard
- Fenced Area
- Gen-Tie Line
- Byron Substation
- Township

2.3 Sandhill Project Overview

Should the Sandhill Project be constructed before the Crane Project, Sandhill Storage would negotiate an agreement with Crane Storage for permission to construct the primary access road, collector substation, and gen-tie line. As such, the Land Control Area for the Sandhill Project covers about 42.7 acres. Within the Sandhill Land Control Area, preliminary design of the Sandhill Project would affect about 39.9 acres; the area required for construction and operation of the Sandhill Project is herein referred to as the Sandhill Preliminary Development Area. About 10.1 acres would be occupied by the BESS and associated infrastructure and converted to impervious surfaces. About 14.0 acres will be restored in accordance with this VMP (i.e., the Sandhill Site). The remaining 15.8 acres will be restored to previous land uses. The breakdown of this Project is shown on Figure 2.3-1.



2.4 Vegetation and Land Use

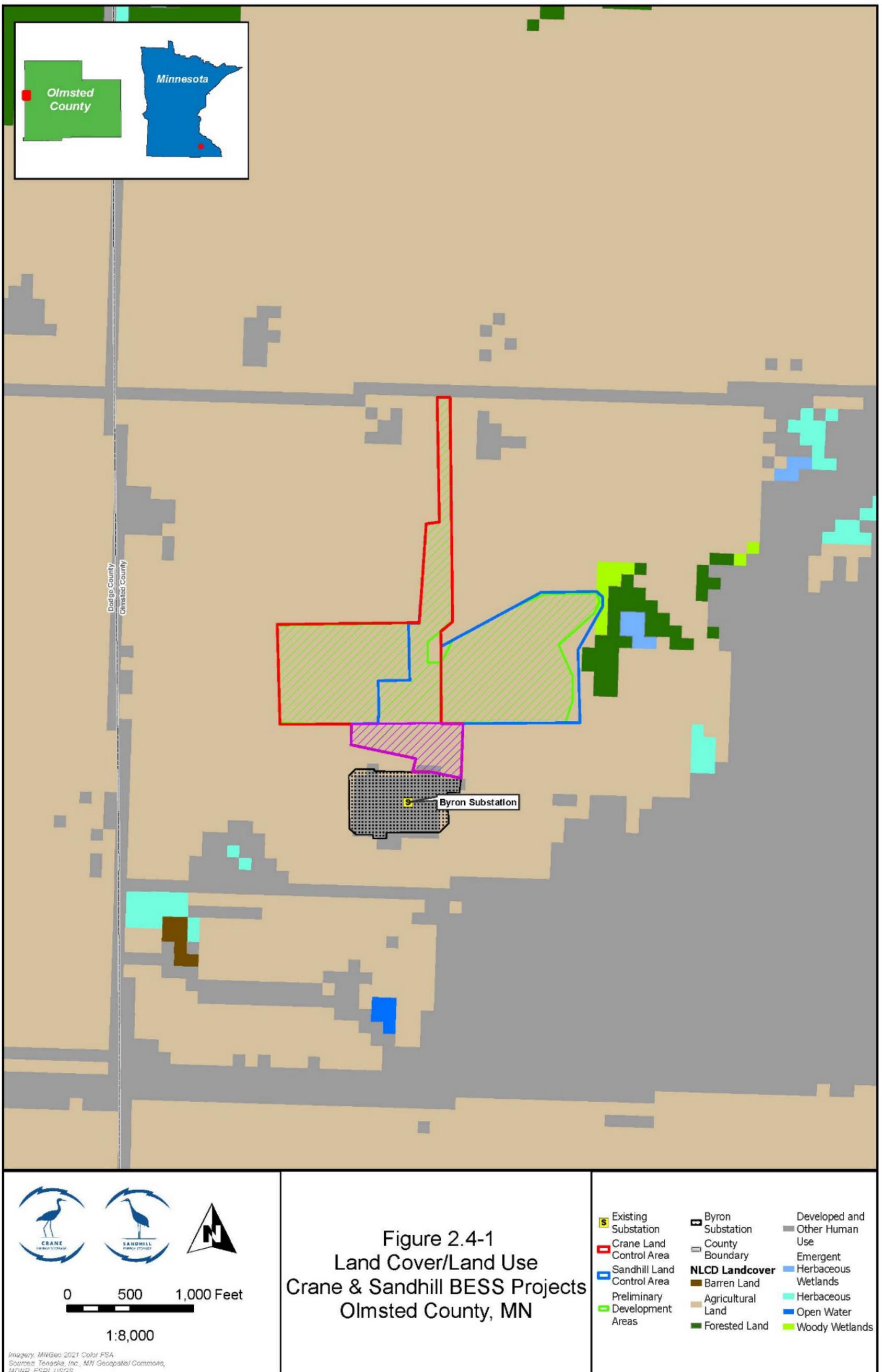
Prior to Euro-American settlement, vegetation in this area was dominated by oak savanna. Smaller areas of tallgrass prairie and maple-basswood forest restricted to the level to gently rolling areas of the landscape near the center of the ecological subsection. Land in this area is currently used for agricultural activity and there are few remnants of pre-settlement vegetation left (Minnesota Department of Natural Resources [MNDNR], 2024).

Based on the U.S. Geological Survey (USGS) National Land Cover Database (NLCD) land use/cover data as presented in Table 2.4-1 and on Figure 2.4-1, the Crane Project Land Control Area would affect predominantly agricultural land (36.0 acres / 99.3 percent). Developed lands make up approximately 0.3 acres / 0.7 percent. The Sandhill Project Land Control Area would affect predominantly agricultural land (42.2 acres / 99.0 percent). Developed lands make up approximately 0.3 acres / 0.6 percent and woody wetlands make up 0.2 acres / 0.4 percent. The USGS NLCD identified woody wetland areas are located along the eastern margin of the Sandhill Land Control Area; these wetland areas are avoided by the Sandhill Preliminary Development Area. In addition, the NLCD data indicate potential wetland impacts; these impacts are further discussed in Section 2.7.

Land Use Type	Crane Land Control Area		Sandhill Land Control Area	
	acres	percent	acres	percent
Agricultural ^a	36.0	99.3%	42.2	99.0%
Developed	0.3	0.7%	0.3	0.6%
Woody Wetlands	--	--	2.0	0.4%
PROJECT TOTAL	36.3	100%	42.7	100%

^a Agricultural land consists of the NLCD categories cultivated cropland and hay/pasture.
Source: Dewitz and U.S. Geological Survey, 2021.
Note: A double dash indicates that this land use/cover category is not present in the Land Control Area.

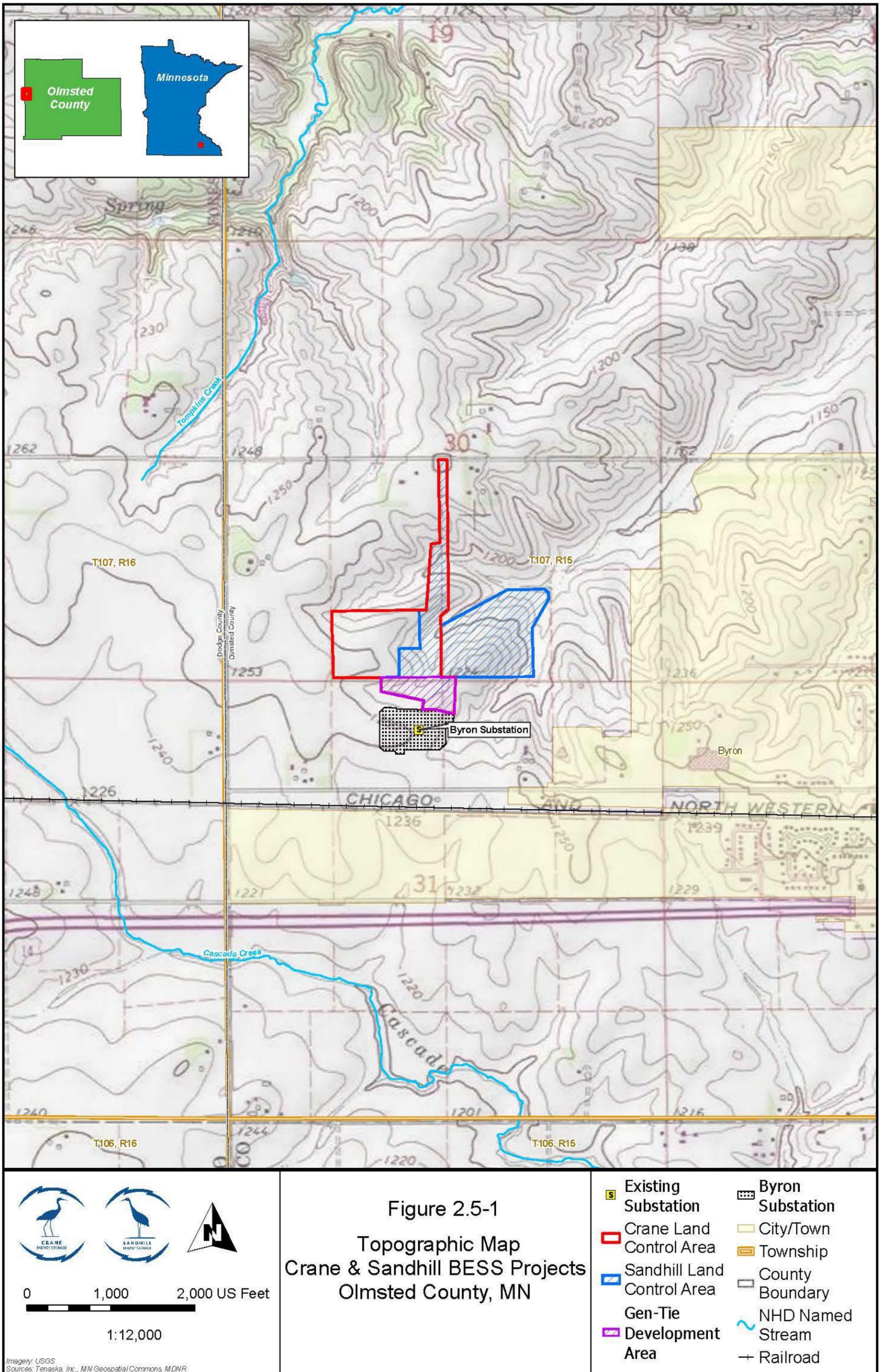
In the NLCD data used for Crane and Sandhill’s environmental analysis, agricultural land is used for row-crop production of predominantly corn and soybeans. Developed land in the Crane and Sandhill Land Control Areas is located where the gen-tie line overlaps with the existing footprint of the Byron Substation.



2.5 Topography

The Projects are in the Oak Savanna subsection of the Minnesota and Northeast Iowa Morainal Section as classified by the MNDNR Ecological Classification System. This subsection consists of loess plain over bedrock or till and might include Late Wisconsin end moraines, stagnation moraines, and outwash. The depth to bedrock is 600 to 800 feet through most of the Land Control Areas. Soils are loamy and well-drained with thick dark surface horizons (MDNR, 2024a).

The Land Control Areas are relatively flat to gently rolling (refer to Figure 2.5-1) due to the overall historic topographical range and grading operations to facilitate current agricultural practices. The mean annual precipitation of the Land Control Areas average 30 to 39 inches and hosts a frost-free period of 120 to 205 days per year (MDNR, 2024b). Refer to Appendix B to reference historical climate data (EPA 2021).



2.6 Soil Characteristics

An important factor that influences revegetation is soil characteristics. A full understanding of the affected soil profiles on a project provides insight into vegetative growth, compaction, erosion, and the types of equipment required to implement seeding requirements. A soil analysis determines the ground's slope, hydric and flooding capabilities, and overall vegetative parameters for seed root penetration.

Soil characteristics within the Land Control Areas (inclusive of the Sites) were assessed using the Soil Survey Geographic Database (SSURGO) (Soil Survey Staff, 2024). The SSURGO database is a digital version of the original county soil surveys developed by Natural Resources Conservation Service (NRCS) for use with geographic information systems (GIS). It provides the most detailed level of soils information for natural resource planning and management available. Soil maps are linked in the SSURGO database to information about the component soils and their properties (U.S. Department of Agriculture [USDA], NRCS, 2024). Table 2.6-1 lists the soil types located within the Land Control Area, which are also shown on Figure 2.6-1.

Approximately 2.75 percent of the Crane Land Control Area is underlain by hydric soils or soils containing hydric inclusions, indicating some wetlands are likely to be present as one of many wetland characteristics is hydric soil (refer to Section 2.7). Approximately 26.4 percent of the Sandhill Land Control Area is underlain by hydric soils or soils containing hydric inclusions, indicating a relative greater likelihood that wetlands are likely to be present as one of many wetland characteristics is hydric soil (refer to Section 2.1.7). There are no stony/rocky soils or soils prone to wind erosion within the Crane Preliminary Development Area. Additionally, the Sandhill Project is expected to reduce the potential for erosion by water by establishing perennial vegetation outside the fence line of the BESS facility.

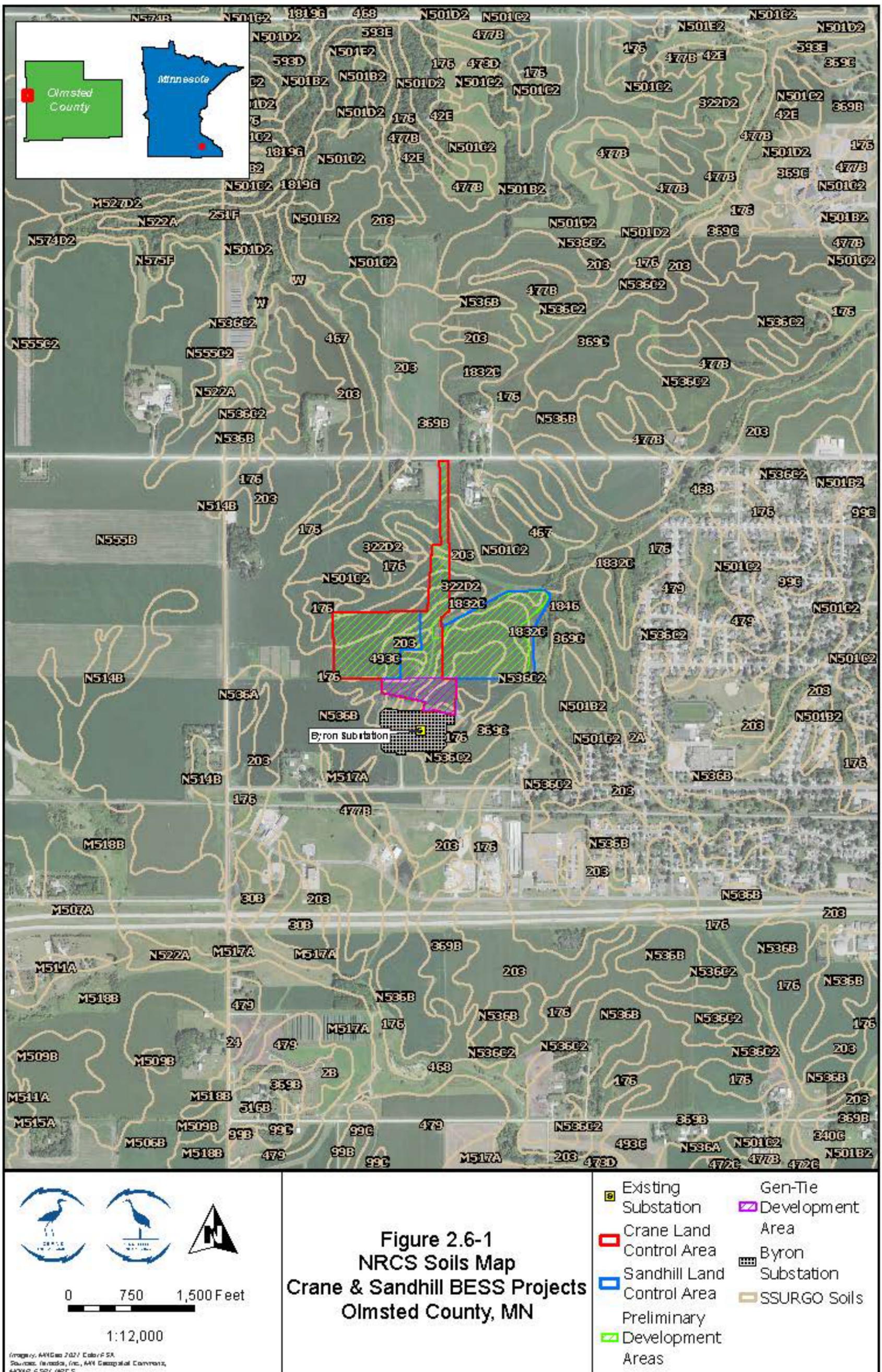
Soils vulnerable to compaction and rutting often undergo major and damaging changes to their structure and pore space because of the pressure and from construction equipment. Compaction and rutting are related to moisture content and texture and are worse when medium and fine textured soils are subject to heavy equipment traffic when wet. Soils in the Land Control Areas are prone to compaction and rutting.

Map Unit Symbol	Map Unit Name	Farmland Classification	Hydric Rating	Crane Project (acres)	Sandhill Project (acres)
176	Garwin silty clay loam	Prime farmland if drained	Yes	5.3	5.6
1832C	Ostrander-Dowagiac loams, 6 to 12 percent slopes	Farmland of statewide importance	No	1.7	6.4
1846	Kato silty clay loam, depressional	Prime farmland if drained	Yes	--	3.1
203	Joy silt loam, 1 to 4 percent slopes	All areas are prime farmland	No	3.6	1.5
322D2	Timula silt loam, 12 to 20 percent slopes, moderately eroded	Not prime farmland	No	1.0	1.0
369B	Waubeek silt loam, 1 to 6 percent slopes	All areas are prime farmland	No	1.0	1.0
468	Otter silt loam, channeled	Not prime farmland	Yes	1.1	2.6
493C	Oronoco loam, 6 to 12 percent slopes	Farmland of statewide importance	No	2.5	1.5

Map Unit Symbol	Map Unit Name	Farmland Classification	Hydric Rating	Crane Project (acres)	Sandhill Project (acres)
N501C2	Downs silt loam, 6 to 12 percent slopes, moderately eroded	Farmland of statewide importance	No	6.4	1.5
N536B	Tama silt loam, driftless, 2 to 6 percent slopes	All areas are prime farmland	No	11.8	8.0
N536C2	Tama silt loam, driftless, 6 to 12 percent slopes, moderately eroded	Farmland of statewide importance	No	1.9	10.5
Total ^a				36.3	42.7
^a	The total acres may be off by up to 0.1 acre due to rounding.				
Note:	A double dash indicates this soil map unit would not be impacted.				
Source:	Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. 2025. Web Soil Survey. Available online at the following link: http://websoilsurvey.sc.egov.usda.gov/ . Accessed March 2025.				

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pasture, woodland, or other lands). Urbanized land and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods and is not subject to frequent or prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating) (USDA NRCS, 2024).

The NRCS also recognizes farmlands of statewide importance, which are defined as lands other than prime farmland that are used for production of specific high-value food and fiber crops (e.g., citrus, tree nuts, olives, fruits, and vegetables). Farmlands of statewide importance have the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Farmland of statewide importance is similar to prime farmland but with minor shortcomings such as greater slopes or less ability to store soil moisture. The methods for defining and listing farmland of statewide importance are determined by the appropriate state agencies, typically in association with local soil conservation districts or other local agencies.



As shown in Table 2.6-2, all of the soils within the Crane Preliminary Development Area are classified as prime farmland, prime farmland if a limiting factor is mitigated, or farmland of statewide importance (USDA NRCS, 2025). The Crane Project will temporarily impact approximately 21.2 acres of soil classified as prime farmland soils. Approximately 9.6 acres of prime farmland soil will be permanently impacted.

TABLE 2.6-2				
Selected Soil Characteristics Within the Crane Preliminary Development Area				
Soil Characteristic	Temporary Impacts (acres / percent)		Permanent Impacts (acres / percent ^a)	
PRELIMINARY DEVELOPMENT AREA	35.6		14.8	
Prime Farmland ^b	21.2	59.4%	9.6	27.0%
Farmland of Statewide Importance ^c	12.4	34.9%	5.0	14.0%
Water Erodible ^d	9.2	25.9%	2.5	7.0%
Wind Erodible ^e	--	0.0%	--	0.0%
Hydric ^f	5.8	16.2%	1.1	3.1%
Compaction Prone ^g	9.4	26.4%	3.9	11.0%
Stony/Rocky ^h	--	0.0%	--	0.0%
^a	Percentages for permanent impacts are shown in relation to the total temporary Crane Project impacts.			
^b	Includes prime farmland, and prime farmland if limiting factor is mitigated, as designated by the Natural Resource Conservation Service.			
^c	Includes soils that are classified as farmland of statewide importance.			
^d	Includes soils with a slope less than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent.			
^e	Soils with a wind erodibility group classification of 1 or 2.			
^f	Includes soils that are classified as hydric by SSURGO.			
^g	Soils with somewhat poor to very poor drainage classes and surface textures of sandy clay loam or finer.			
^h	Soils with one or more horizons with cobbly, stony, bouldery, channery, flaggy, very gravelly, or extremely gravelly in their textural class and/or contain greater than 5 percent by weight of rocks larger than 3 inches.			
Note:	A double dash indicates this soil characteristic is not present.			
Source:	Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at the following link: http://websoilsurvey.sc.egov.usda.gov/ . Accessed March 2025.			

As shown in Table 2.6-3, all of the soils within the Sandhill Preliminary Development Area are classified as prime farmland, prime farmland if a limiting factor is mitigated, or farmland of statewide importance; however, prime farmland designation is independent of current land use (USDA NRCS, 2024). The Sandhill Project will temporarily impact approximately 16.9 acres of soil classified as prime farmland soils. Approximately 6.2 acres of prime farmland soil will be permanently impacted.

TABLE 2.6-3				
Selected Soil Characteristics Within the Sandhill Preliminary Development Area				
Soil Characteristic	Temporary Impacts (acres / percent)		Permanent Impacts (acres / percent ^a)	
PRELIMINARY DEVELOPMENT AREA	39.9		13.4	
Prime Farmland ^b	16.9	42.4%	6.2	15.5%
Farmland of Statewide Importance ^c	19.6	49.2%	7.0	17.5%
Water Erodible ^d	13.1	32.8%	5.5	13.8%
Wind Erodible ^e	--	0.0%	--	0.0%
Hydric ^f	8.8	22.1%	1.0	2.5%
Compaction Prone ^g	10.3	25.9%	1.7	4.3%
Stony/Rocky ^h	--	0.0%	--	0.0%

TABLE 2.6-3 Selected Soil Characteristics Within the Sandhill Preliminary Development Area		
Soil Characteristic	Temporary Impacts (acres / percent)	Permanent Impacts (acres / percent ^a)
a	Percentages for permanent impacts are shown in relation to the total temporary Sandhill Project impacts.	
b	Includes prime farmland, and prime farmland if limiting factor is mitigated, as designated by the Natural Resource Conservation Service.	
c	Includes soils that are classified as farmland of statewide importance.	
d	Includes soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent.	
e	Soils with a wind erodibility group classification of 1 or 2.	
f	Includes soils that are classified as hydric by SSURGO.	
g	Soils with somewhat poor to very poor drainage classes and surface textures of sandy clay loam or finer.	
h	Soils with one or more horizons with cobbly, stony, bouldery, channery, flaggy, very gravelly, or extremely gravelly in their textural class and/or contain greater than 5 percent by weight of rocks larger than 3 inches.	
Note:	A double dash indicates this soil characteristic is not present.	
Source:	Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at the following link: http://websoilsurvey.sc.egov.usda.gov/ . Accessed March 2025.	

2.7 Hydrological Characteristics

The hydrology of a site informs the locations where specific seed mixes might need to be developed, along with the parameters for implementation. Upland and lowland/wetland/riparian seed mixes can greatly differ in seeding species, rates, application techniques, and timing due to how much water, saturation, or inundation a vegetation species can tolerate.

An on-site wetland and waterway delineation was conducted from July 20 to July 23, 2024, to identify and characterize wetlands and waterways per U.S. Army Corps of Engineers methodology. The field delineation covered 168 acres that included the Crane and Sandhill Land Control Areas. The temporary workspace associated with the gen-tie line was not field delineated during this field effort, however, additional field delineations were conducted in fall of 2024 to cover the temporary workspace associated with the gen-tie line. As such, all areas covered by this VMP have been field delineated.

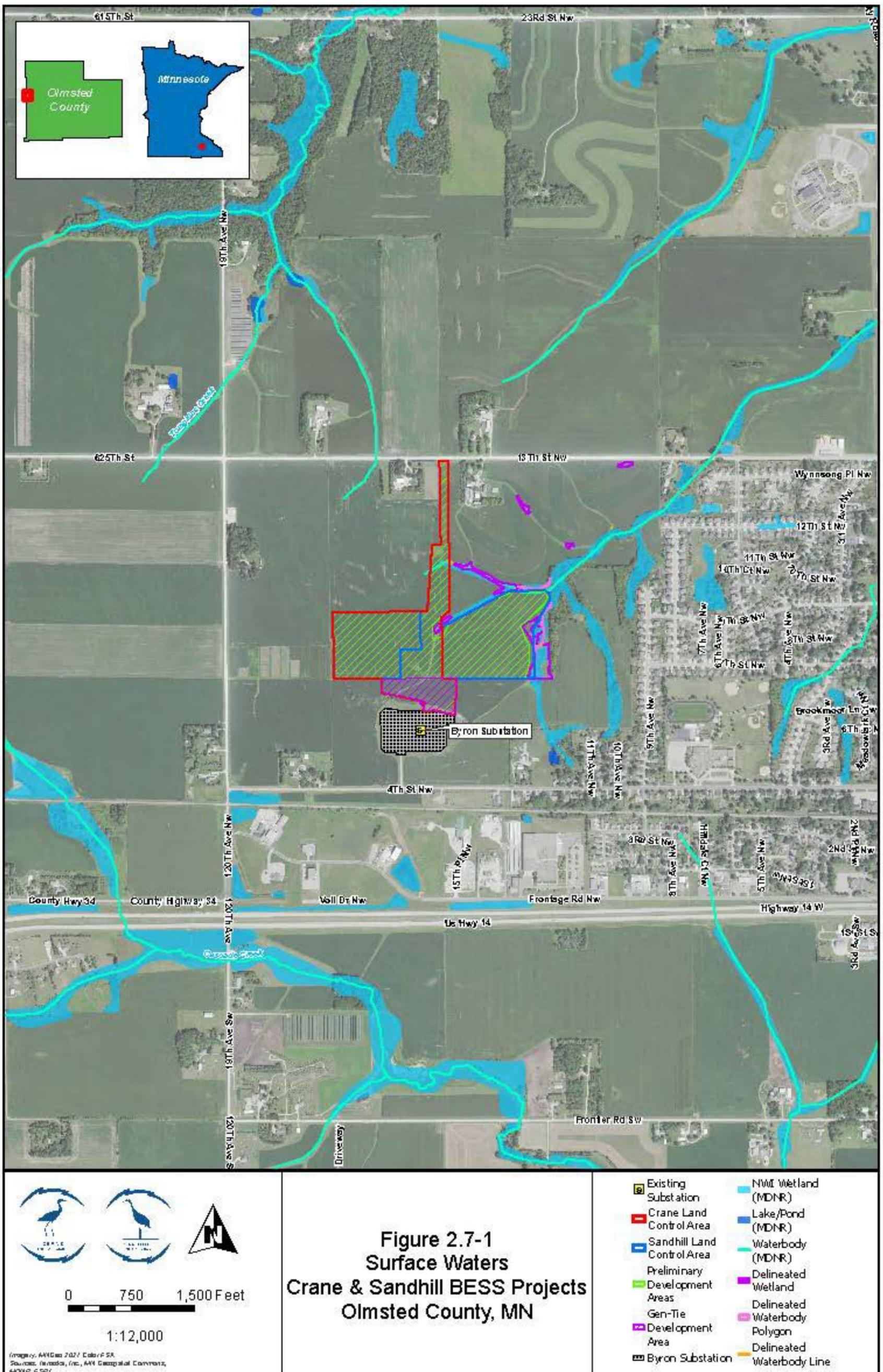
The wetland and waterway delineation identified five streams totaling 1,235 feet in combined length, including, two perennial streams (1,150 feet), one intermittent stream (10 feet), and two ephemeral streams (75 feet). The intermittent stream—identified as such by the MNDNR Hydrography Dataset—was confirmed and delineated as an ephemeral stream that is within the eastern edge of the temporary construction workspace that includes the primary access road that will be shared by the Crane and Sandhill Projects. This stream flows 62 feet then transitions into a wetland feature. The wetland and waterway delineation did not identify any other lakes, rivers, streams or ditches within the Crane and Sandhill Land Control Areas. The mapped stream that crosses the Crane and Sandhill Land Control Areas does not intersect the Crane and Sandhill Preliminary Development Areas and is located approximately 35 feet to the west (refer to Figure 2.7-1).

The Crane Project has been designed to minimize impacts to surface waters to the extent practicable. The Crane Project components are not sited within surface waters and all wetlands are avoided. Approximately 14 feet of an ephemeral stream is located within the eastern edge of the primary access road temporary construction workspace. A Stormwater Pollution Prevention Plan (SWPPP) will be developed for the Crane Project prior to construction that will include best management practices such as silt fencing (or other erosion control devices), revegetation plans,

and management of exposed soils to prevent sediment from entering into adjacent surface waters. A stormwater basin will be constructed to help control runoff during rain events. The will be submitted to the MPCA for review and approval prior to construction and obtaining coverage under the General Construction Stormwater Permit.

Due to the proximity of the Crane and Sandhill Projects and the similarities in their proposed preliminary designs, the discussion of potential impacts to surface waters and the proposed mitigation measures provided for the Crane Project also apply to the Sandhill Project. No additional or different impacts to surface waters are anticipated from the Sandhill Project and no additional mitigation measures specific to surface waters are proposed.

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map does not identify FEMA floodplains within the Crane or Sandhill Land Control Areas (FEMA Firm Panel 27109C0125E) (FEMA, 2023). The closest FEMA floodplain is Zone A (100-year) located approximately 2,560 feet to the southwest of the Crane Land Control Area and 3,100 feet to the southwest of the Sandhill Land Control Area and is associated with Cascade Creek.



3.0 VEGETATION INSTALLATION

The purpose of site preparation is to create optimal growing conditions for seeding while controlling invasive species and erosion, while preserving undisturbed areas. All preparation activities must comply with the SWPPPs and other permit conditions. Flagging and signage will be installed prior to construction to clearly mark any identified wetlands or waterbodies. The permanent seed mixes are tailored to the conditions in the Crane and Sandhill Sites, with the seeding plan detailed on Figure 3.0-1.

3.1 Sites and Seedbed Preparation

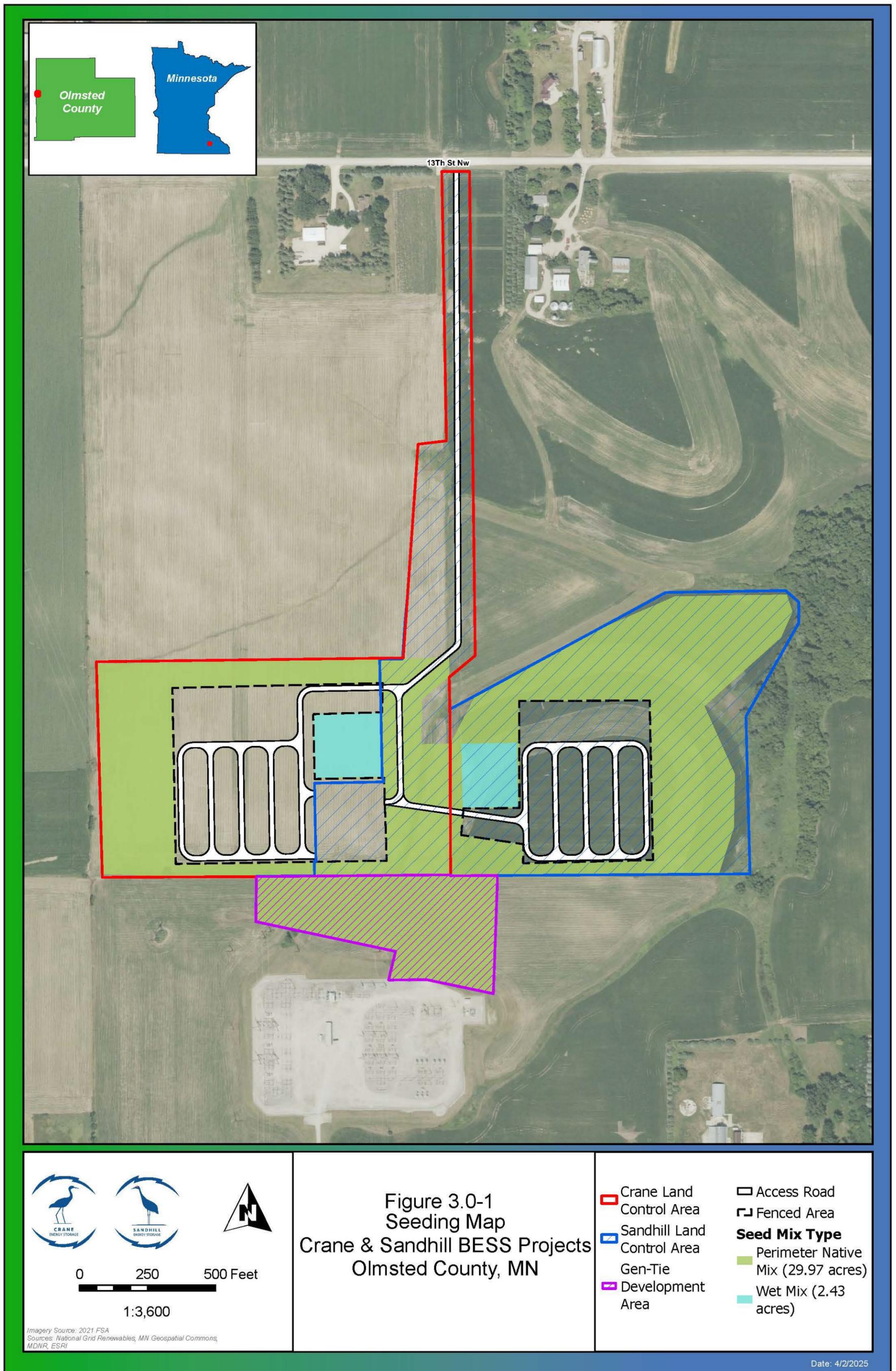
Prior to vegetation installation, management techniques can be used that will lead to more successful vegetation establishment to meet the Projects' short- and long-term goals. Most of the soil and vegetation disturbances will occur during the first phase of construction when the grading activities take place. The construction contractor will follow best practices during construction and to prepare the Sites for final stabilization. To stabilize soils, existing vegetation or plant material will be retained on the surface in areas that do not need to be graded. Ahead of the initial grading of the Projects' Sites, invasive species (refer to Section 4.4.1) will be treated with an approved herbicide (refer to Section 4.2.2). Any topsoil that is stripped will be spread prior to seed bed preparation activities. Any additional topsoil will be stockpiled. During the period of construction, and following topsoil grading, the Crane and Sandhill Sites will be used for parking, equipment storage, and active construction movement.

If necessary, herbicide treatment will be applied to control noxious or invasive weeds and any undesired plant species that might have established after the initial grading and during construction. After the herbicide treatment is complete, the seedbed will be prepared. After construction is complete, as part of seed bed preparation, any compacted areas, such as laydown areas, heavily travelled corridors, or portions of the access road corridors that were used as temporary roadbeds, will be decompacted. Soil decompaction will be done using chisel plows, rippers, or tillers, followed by disking for a smooth, moist, and even soil surface. Rock removal may be required for stones equal to or larger than four inches in diameter to ensure a suitable seedbed.

Seeding methods may include Brillion, Trillion, broadcast, or drill seeding, with the final approach determined based on-site conditions, weather, and time of year. Due to required decompaction and soil disturbance, the Brillion or Trillion method is expected to be the most effective for achieving uniform seed distribution and soil contact. A description of seed installation is provided in Section 3.6 below.

3.2 Seeding Contractors Qualifications:

Seeding contractors must possess a minimum of five years of experience in native seed installation, with specific expertise in utility-scale projects in Minnesota or the Upper Midwest preferred. Contractors are required to provide references that demonstrate their capability to successfully execute similar projects, including native vegetation establishment.



3.3 Seeding Timing

An optimal planting time for native species is in the fall (October to November). A fall planting allows seeds to naturally go through the cold stratification process, which many native species need to break dormancy (University of Minnesota Extension, 2025). Spring planting can also occur in early spring (April to mid-June). In their *Native Vegetation Establishment and Enhancement Guidelines*, BWSR encourages monitoring soil temperatures and adjusting planting schedules based on local conditions (2022).

Below is breakdown of seeding recommendations based on time of year:

- Spring Seeding: April 1 to June 15 when soil temperatures are at least 60 degrees Fahrenheit or higher.
- Fall Seeding: Should occur when soil temperatures fall below 50 degrees Fahrenheit for a consistent period of time (usually around November 1).
 - Fall dormant seedings can help reduce weed pressure during the first year of growth because cool-season grasses and forbs germinate earlier and start competing with weed species right away. Frost seedings are also an option if the snow cover is not too deep.
 - For a frost seeding, seeding rates may need to be increased by 25 percent due to lower germination rates and loss of seed that is consumed by wildlife over the winter months.

If final construction is completed between the summer and early fall, dry soils may pose a challenge and require deeper soil tilling to create a good seed bed. If delaying seeding until late fall occurs, a temporary cover crop will be planted after construction is complete (refer to Section 3.3.1). Installation of a temporary cover crop will help mitigate erosion, reduce the requirement for sediment control structures, and suppress weed growth. Recommended applications of temporary cover crops vary by season, as described in Table 3.3-1.

A late fall or winter seeding is referred to as dormant seeding. When seeding in late fall the seeding is timed to avoid germination. To prevent seed germination, seeding should occur after soil temperatures fall below 50 degrees Fahrenheit for a consistent period. Seeding that occurs before the soil is frozen is planted with a shallow-seeding drill. When seeding after soils have frozen, a broadcast seeder is used since the freeze-thaw cycle in winter causes soil cracks to open and draw seed into the soil (BWSR, 2022).

3.3.1 Temporary Seed Mixes (Cover Crops)

A temporary cover crop will help mitigate erosion, decrease the need for erosion control devices, increase soil moisture, and suppress weed growth. Cover crops assist in Site stabilization during construction activities and are especially helpful in areas that do not require grading activities. Early season cover crop installation is typically seed oats (*Avena sativa*), but Crane Storage and Sandhill Storage will work with the Project Contractor(s) to select the best option. A cover crop will not be planted prior to construction unless there is adequate time between the start of the growing season and the start of construction for the cover crop to grow to a sufficient height to provide soil surface protection during construction. Cover crop recommendations vary by season (Table 3.3-1)..

TABLE 3.3--1			
Temporary Cover Crops			
Season	Seed	Seeding Rate as Nurse Crop ^a (pounds per acre)	Seeding Rate as Cover Crop ^a (pounds per acre)
Spring and Summer	Oats (<i>Avena sativa</i>)	16-32	96
Fall	Winter Wheat (<i>Triticum aestivum</i>)	10-60	90-120
Fall	Cereal Rye (<i>Secale cereale</i> L.)	10-60	90-120

^a Seed rates are based on drill seed application and will vary based on site-specific conditions, final seed mix, and seasonal considerations.

3.4 Permanent Seed Mixes

A mixture of native grasses that includes forbs will establish more successfully and produce a diverse native plant community that is more resilient to drought, weeds, pests, and disease than monoculture grasslands or low diversity vegetation stands.

Specific species were selected that align with local climate and particular soil conditions found throughout the Sites, as identified in Appendix C and on the seeding plan (refer to Figure 3.0-1). The seed mixes were tailored to the regional soil conditions, each incorporating a unique selection of low-growing, low-maintenance prairie grasses and forbs adapted to the region. The genetic source origin of all native seed must be local, preferably sourced within a 150-mile radius of the Sites. Plant species will be native to Olmsted County (BWSR, 2019), although considerations of range shifts due to climate change may necessitate adjustments to this guidance. Species shall be true to their scientific name as specified in Appendix C. Seed tags or nursery confirmation of the order must be provided to Crane Storage and Sandhill Storage prior to installation. Any species eliminations, substitutions, or source origin exceptions must be approved by Crane Storage and Sandhill Storage prior to installation. If necessary, seeds shall be properly stratified or scarified to break seed dormancy. If applicable, all legumes shall be inoculated with proper rhizobia at the appropriate time prior to planting.

Outside the facility fencelines, including the area within the right-of-way of the gen-tie line, a **Native Short Seed Mix** will be used to establish vegetation, as shown on Figure 3.0-1. This seed mix will consist of short-statured (less than 24 inches) grasses, sedges, and forbs adapted to full sun and partial shade and include flowering species that bloom in spring and summer. A **Wetland Mix** will be used in moist soil conditions and selected species will tolerate damp soil environments (refer to Figure 3.0-1). This seed mix will consist of medium length grasses, sedges, and forbs that are flowering and adapted to full sun and partial shade. The Wetland Mix is proposed for the stormwater ponds that will be installed within each Crane and Sandhill Site. Detailed information about the seed mixes proposed for the Crane and Sandhill Projects is provided in Appendix C.

Seeding of other disturbed areas, if included in final Contractor design, may require additional seed mixes suitable to those applications to ensure appropriate vegetation coverage and viability.

3.5 Seed Mix Substitutions

Sourcing of proposed seed mixes will be done as soon as practicable. Substitutions to seed mixes will be completed by a qualified professional with sufficient botanical experience in identifying native plants, native plant communities, invasive species, and non-native species typical of

Minnesota. Any substitution will be approved by Crane Storage and Sandhill Storage prior to implementation, and substitutions will have no effect on the short- and long-term goals of this Plan.

For consistency in management across the Sites, it is desired that the uniform seed mix recommended in the plan be used. However, should sourcing issues arise, Crane and Sandhill Projects have developed alternative species to use should procurement be problematic. Seed mix substitutions are listed beneath each seed mix shown in Appendix C.

3.6 Seed Installation

Native seeds require special considerations related to planting depth and application method. Many native grasses and larger-seeded forbs require a shallow planting depth of 0.125 inch to a maximum depth of 0.25 inch. For small seeds, 0.125 inch is the maximum depth and surface sowing is the ideal method. Equipment may require modification so the small seed is not drilled at all, but dropped on the surface, as some seeds planted too deep may never be able to emerge. Depending on site conditions and timing of seeding, a variety of specialized seeding methods will be considered on a site-by-site basis; the Contractor shall evaluate the Sites and determine which technique will produce the best results. Seeding options include drill, Brillion, Trillion, and broadcast seeding. Equipment capable of handling seeds of varying sizes is required. Drill seeding typically produces higher observed plant density, so broadcast seeding might require an increased seeding rate or overseeding during the establishment period to achieve performance standards. Seed installed into a previous cover crop or other vegetation must be installed with a seed drill. Prior to installation, seed shall be divided into two equal parts. The first half shall be installed in one pass, and the second half installed in a second pass (perpendicular to the first pass, where possible). In areas where broadcast seeding is employed, raking, harrowing, or culti-packing of seeded areas shall be used to ensure good seed-to-soil contact. After seeding, an application of mulch will be required to prevent erosion and promote seed germination.

If a cover crop has been installed at any time during the calendar year, native seed mixes will be installed the same year with a late fall dormant seeding, unless Crane Storage and Sandhill Storage give permission to the Contractor for a spring seeding. Prior to seeding into a cover crop, the Contractor shall evaluate the planting area and determine if any preparation is required prior to installation. Mowing may be required if the cover crop is too dense/robust. Soil Amendments

A preliminary desktop evaluation of the soil substrates within the Sites determined it was unlikely that lime or fertilized implementation will be required to adequately restore soils and achieve vegetation goals.

The Contractor will conduct soil sampling to confirm soil profiles and determine if soil amendments are warranted.

3.7 Wet Weather Considerations

During seed installation, certain activities may be suspended in saturated soil conditions. Rainfalls between 0.25 and 0.5 inch could have the potential to cause soil rutting. If rutting occurs, the contractor will cease work in rutting-prone areas until site conditions improve. Weather forecasts will be monitored daily to help determine if above rainfall amount is anticipated during seed installation. Construction site managers will ultimately decide if wet weather shutdown is necessary. Incidental damage, such as tire ruts, should be repaired in accordance with the General Permit.

3.8 Pesticide Drift

During the Establishment Phase, Crane Storage and Sandhill Storage will contact each owner of land surrounding the Sites to inform them of the native plants planted pursuant to this Plan, the likely use of the vegetation by pollinators, and the need to avoid and minimize pesticide drift from land that is adjacent to the Land Control Area. The installation of access roads on the periphery of the entire Project Area will operate as a buffer from potential pesticide spraying adjacent to the Land Control Area.

3.9 Landscape Screening

The Project might involve landscape screening as a requirement through the regulatory process or landowner requests, which could include a combination of planted trees and shrubs to block the view from roads or nearby landowners. This Plan will be updated to include landscape screening species, installation, and maintenance if applicable.

4.0 VEGETATION MANAGEMENT

Vegetation management generally falls into three phases: establishment, transition, and long-term maintenance. Sections 4.1, 4.2 and 4.3 describe the management activities that will be implemented during these three phases, respectively. Section 4.4 describes undesirable species management.

4.1 Establishment Phase

Within the Establishment Phase, the first three years of vegetation management will be a concerted effort to remove any undesired species, while helping to establish planted seeds. Native perennial plantings will require several years to establish and will involve frequent site management to limit undesirable species, which could impact the growth of planted native seeds. Site management will focus on achieving the required Site goals and performance standards. An adaptive management approach will be used to respond to construction site conditions, challenges, and successes over time. As time progresses, the temporary cover crop will begin to subside, and the native species will start to germinate gradually.

Establishment Years one to five will require the most maintenance and monitoring to control any undesired species. Management activities in the first three years strongly determine the success of planting. Once the native seeds are fully established, the Sites will require less yearly maintenance. Recommendations for Establishment Years one to five are outlined below.

4.1.1 General Tasks for Managing Vegetation

4.1.1.1 Establishment Year 1

Primary Focus: Weed suppression, soil stabilization, and early native species growth.

The first year of establishment is focused on consistent invasive plant control on a site-wide basis. Mowing the grassland areas during the first year should prevent invasive plants from adding new seeds to the soil and begin to exhaust the soil seed bank (a process that often requires several years to complete). From June 1 of the first establishment year, site-wide mowing to a height of 6 to 9 inches shall occur whenever vegetation reaches a height of 18 to 24 inches. The landscaped/screening area shall be spot sprayed during the Establishment Phase to control invasive plants. Attempting to mow between the landscaping plants could lead to unanticipated damages to the new plants and will be avoided. Mowing in wet areas will also be limited to those periods of time when the wet areas are not susceptible to rutting or compaction (i.e. frozen or dry conditions). Spot-spraying or use of a swing arm, brush saws, weed whips, or similar equipment will be used in wet areas as necessary to prevent soil damage when the soils are wet.

Monthly evaluations of the plantings shall be conducted by a botanist employed by the Contractor during the growing season (May to September) to determine the appropriate treatment techniques to use and the timing of those treatments based on the presence and development stage of both invasive plants and the native plantings. Invasive species should be treated prior to such plants flowering or seeding, with the goal of preventing seed set by noxious and invasive species.

Repeated mowing could produce a buildup of organic thatch, which discourages the development and persistence of diverse native vegetation. To help prevent thatch buildup onsite, mowing shall be conducted with a flail-type mower to mulch the cut vegetation. Any other techniques will be approved by Crane Storage and Sandhill Storage prior to the start of work. Mowing equipment shall be cleaned prior to use onsite to prevent the introduction and spread of invasive and non-native species. This mowing regime will prevent annual and perennial weeds from flowering and setting seed, prevent weeds from shading out infrastructure, and help control woody plant growth onsite. Additionally, noxious and perennial weeds shall be treated by spot-herbicide treatment, as described below, to prevent roots from resprouting.

4.1.1.2 Establishment Year 2

Primary Focus: Weed suppression, soil stabilization, and early native species growth.

The second year of establishment continues invasive plant control but generally employs more targeted techniques. Site-wide mowing to a height of 6 to 9 inches shall occur when vegetation height reaches 18 to 24 inches.

Spot-mowing will be employed to treat specific problem areas as needed. Noxious and perennial weeds shall be treated with spot-herbicide during the growing season, typically in late May/early June and late July/early August, with the focus on preventing seed set and achieving the required performance standards (described in Section 5.2.2).

Mowing in wet areas will also be limited to those periods of time when the areas are not susceptible to rutting or compaction. Spot-spraying or use of brush saws, weed whips, or similar equipment may be employed in wet areas as necessary to prevent soil damage when the soils are wet.

Monthly evaluations of the plantings shall be conducted by a qualified botanist, during the growing season (May to September) to determine the appropriate treatment techniques to use and the timing of those treatments based on the presence and development stage of both invasive plants and the native plantings. Invasive species will be treated prior to such plants flowering or seeding, with the goal of preventing seed set by noxious and invasive species.

4.1.1.3 Establishment Years 3-5

Primary Focus: Native species dominance and reduced mowing frequency.

In the third, fourth, and fifth years of the Establishment Phase, invasive plant control will consist of spot-herbicide treatment to control the remaining small patches of persistent weeds. Efforts will be focused on achieving the required performance standards (described in Section 5.2.2).

Site-wide mowing to a height of 6 to 9 inches shall occur when vegetation height reaches 18 to 24 inches. Spot-mowing should be employed as needed to prevent vegetation interference with energy generation and infrastructure. Additional onsite treatment with spot-mowing or hand weeding may be employed at the discretion of the Contractor.

4.1.2 Reseeding Bare Soil

Areas of bare soil are detrimental to successful establishment of native vegetation. Bare soil provides opportunities for the common invasive and weed species described above to colonize and spread. Bare soil is also likely to contribute to soil loss by erosion.

If bare soil is identified during monitoring, such areas will be reseeded according to Section 3 and managed according to Section 4.

4.2 Transition Phase

Primary Focus: Native species dominance and reduced mowing frequency.

The above Establishment Phases are dynamic, and the site may require a Transition Phase before reaching the long-term management stage. After the Establishment Phase of vegetation management, yearly management is required to control the spread of invasive species and combat the establishment of undesirable and invading trees and shrubs. Two trips during the growing season will occur for weed whipping, spot-mowing, or spot herbicide treatment to maintain vegetation quality and achieve the Site goals and performance standards.

4.3 Long-term Maintenance Phase (Years 6+)

Primary Focus: Self-sustaining vegetation with minimal intervention.

The Long-Term Maintenance Phase follows the end of the Transition Phase of vegetation management. The phase includes yearly management to promote and maintain the desired vegetation community, control the reestablishment and spread of invasive species, combat the establishment of undesirable and invading trees and shrubs, and reduce biomass/fuel load onsite. The primary tools for this management are weed whipping, spot-mowing, and spot-herbicide treatment, which may be warranted once every one to three years thereafter to maintain vegetation quality and achieve the Projects goals. It's likely that these activities could occur every other year depending on soil moisture and vegetation growth.

4.4 Undesirable Species

Following permanent seeding, a variety of undesired species might germinate in the Sites as native species are establishing. Crane Storage and Sandhill Storage will manage undesirable species defined as follows:

1. Noxious Weeds according to Section 18.78 of the 2023 Minnesota Statutes;
2. Invasive Species according to Part 6216.0250 of the Minnesota Administrative Rules; and
3. Project-designated "weeds" or undesired plants.

Tables 4.4.1-1, 4.4.1-2 and 4.4.1-3 provide lists of invasive and weed species of concern for the Sites. An adaptive management approach to control invasive and weedy populations will be used.

Site management actions will be conducted, as needed, to reduce the spread of invasive and weedy species, and improve the establishment and success of permanent seed mixes. This will

include cleaning and inspecting equipment prior to use at the Sites and following the control methods described below in this section.

4.4.1 Prescribed Treatment for Common Invasive Species and Weeds

This Plan describes common techniques to manage a variety of invasive plants and common weeds growing in Southeast Minnesota and Olmsted County, although actual techniques required are dependent on Project conditions. During each site visit as outlined in Section 5, the Sites will be photo-documented and general notes collected regarding site conditions, species present, and areas of bare soil to ensure site goals are being accomplished. Management techniques for five categories of weeds are described in the following sections.

4.4.1.1 Annual Weeds

Annual weeds include all unwanted species that grow for a single year, set seed, and die. A list of problematic and common annual weeds that may be encountered on the Sites are shown in Table 4.4.1-1 below.

Species	Growth Form
Common cocklebur (<i>Xanthium strumarium</i>)	Annual Forb
Common lamb's-quarters (<i>Chenopodium album</i>)	Annual Forb
Common ragweed (<i>Ambrosia artemisiifolia</i>)	Annual Forb
Common sunflower (<i>Helianthus annuus</i>)	Annual Forb
Eastern black nightshade (<i>Solanum ptychanthum</i>)	Annual Forb
Field pennycress (<i>Thlaspi arvense</i>)	Annual Forb
Giant ragweed (<i>Ambrosia trifida</i>)	Annual Forb
Green foxtail (<i>Setaria viridis</i>)	Annual Grass
Horseweed (<i>Conyza canadensis</i>)	Annual Forb
Kochia (<i>Bassia scoparia</i>)	Annual Forb
Large barnyard grass (<i>Echinochloa crus-galli</i>)	Annual Grass
Redroot pigweed (<i>Amaranthus retroflexus</i>)	Annual Forb
Shepherd's purse (<i>Capsella bursa-pastoris</i>)	Annual Forb
Velvetleaf (<i>Abutilon theophrasti</i>)	Annual Forb
Woolly cupgrass (<i>Eriochloa villosa</i>)	Annual Grass
Yellow foxtail (<i>Setaria pumila</i>)	Annual Grass

^a University of Minnesota Extension, n.d.b

The goal of treating annual weeds is to prevent seed production. Beginning in spring, inspections will take place to evaluate the need for treating annual weeds (refer to Section 5.0 for discussion of monitoring protocols). It is recommended sites be mowed as described in Section 4.2.1 to prevent annual weeds from flowering and setting seed.

4.4.1.2 Perennial Weeds

Perennial weeds include all unwanted species that persist for two or more years after germination. Many of these weeds greatly diminish during the Establishment Phase with proper maintenance, but several require special attention when establishing native vegetation due to their highly

competitive behavior. A list of common Minnesota perennial weeds that colonize and compete with native vegetation is provided in Table 4.4.1-2 below.

Species	Growth Form
Blackseed plantain (<i>Plantago rugelii</i>)	Perennial Forb
Common yarrow (<i>Achillea millefolium</i>)	Perennial Forb
Curly dock (<i>Rumex crispus</i>)	Perennial Forb
Dandelion (<i>Taraxacum officinale</i>)	Perennial Forb
Field bindweed (<i>Convolvulus arvensis</i>)	Perennial Forb
Ground ivy (<i>Glechoma hederacea</i>)	Perennial Forb
Horsenettle (<i>Solanum carolinense</i>)	Perennial Forb
Perennial sow thistle (<i>Sonchus arvensis</i>)	Perennial Forb
Quackgrass (<i>Agropyron repens</i>)	Perennial Grass
White clover (<i>Trifolium repens</i>)	Perennial Forb
Yellow nutsedge (<i>Cyperus esculentus</i>)	Perennial Sedge
Yellow wood sorrel (<i>Oxalis stricta</i>)	Perennial Forb
Yellow rocket (<i>Barbarea vulgaris</i>)	Perennial Forb

^a University of Minnesota Extension (n.d.b), the Minnesota Department of Agriculture (MDA), 2024

Mowing is important to prevent seed production, but herbicide is generally required to prevent the spread of perennial weeds. Perennial grasses will be treated by spot-spraying or boom spraying, as warranted, with glyphosate or an appropriate grass-selective herbicide. Perennial broadleaf weeds will be treated by spot-spraying or boom spraying, as warranted, with glyphosate, triclopyr, clopyralid, or comparably effective herbicides. All herbicides will be applied by a licensed applicator, following instructions and prohibitions provided by the herbicide label.

4.4.1.3 Problematic Native Plants

Native species present in the soil seed bank or entering the Sites from neighboring properties might interfere with ecological goals. Knotweed colonies can grow in dense clusters that crowd out any native species and Giant ragweed (*Ambrosia trifida*) grows tall to shade out desired species. Several native vines have the potential to overgrow, including wild grape (*Vitis riparia*), wild cucumber (*Echinocystis lobata*), and Virginia creeper (*Parthenocissus* spp.). Giant ragweed and Phragmites or any other species that shade desired vegetation will be controlled by mowing or herbicide. If found, wild cucumber and bur cucumber will be pulled and removed manually, but woody vines such as wild grape and Virginia creeper will be cut to within one inch of the ground and the stump will be treated with glyphosate, triclopyr, or a comparable herbicide by a licensed applicator (BWSR. 2022) following instructions provided on the herbicide label. Other native plants with weedy tendencies will be controlled with the same methods as non-native weeds and invasive plants.

4.4.1.4 Woody Species

Woody species can shade and interfere with ecological goals. Native tree seedlings of concern are box elder (*Acer negundo*), sugar maple (*Acer saccharum*), and green ash (*Fraxinus pennsylvanica*). During the Establishment Phase, all woody plants require removal. This can be accomplished by mowing, herbicide application, or a combination of both methods. All woody plants over 0.5 inch in diameter at breast height will be cut to within one inch of the ground and

the stump will be treated with triclopyr or a comparable herbicide by a licensed applicator and following instructions provided by the herbicide label. Cut brush will be removed from the Sites.

4.4.1.5 State-Listed Noxious Weeds

Minnesota maintains a list of prohibited noxious plants that must be eradicated and controlled. All state-listed species be treated by manual removal, mowing, herbicide application, or a combination of these methods, with the intention of preventing the weeds from setting seed. If using herbicide, a licensed applicator with knowledge of the herbicide treatments should apply herbicide at appropriately timed windows depending on target species. Table 4.4.1-3 below provides an abbreviated list of prohibited noxious plants in Minnesota.

Species	Growth Form	Regulatory Category ^a
Amur maple (<i>Acer ginnala</i>)	Tree	SR
Bell's honeysuckle (<i>Lonicera X bella</i>)	Shrub	RN
Black locust (<i>Robinia pseudoacacia</i>)	Tree	RN
Canada thistle (<i>Cirsium arvense</i>)	Perennial Forb	PN
Common barberry (<i>Berberis vulgaris</i>)	Shrub	PN
Common or European buckthorn (<i>Rhamnus cathartica</i>)	Shrub/Tree	RN
Common reed – non-native subspecies (<i>Phragmites australis</i> subsp. <i>australis</i>)	Grass	PN, PPI
Common tansy (<i>Tanacetum vulgare</i>)	Perennial Forb	PN
Crown vetch (<i>Securigera varia</i>)	Perennial Forb	RN
Garlic mustard (<i>Alliaria petiolata</i>)	Biennial Forb	RN
Glossy buckthorn (<i>Frangula alnus</i>)	Shrub	RN
Japanese barberry (<i>Berberis thunbergii</i>)	Shrub	RN
Leafy spurge (<i>Euphorbia esula</i>)	Perennial Forb	PN
Morrow's honeysuckle (<i>Lonicera morrowii</i>)	Shrub	RN
Norway maple (<i>Acer platanoides</i>)	Tree	SR
Plumeless thistle (<i>Carduus acanthoides</i>)	Biennial Forb	PN
Poison hemlock (<i>Conium maculatum</i>)	Perennial Forb	PN
Purple loosestrife (<i>Lythrum salicaria</i>)	Perennial Forb	PN, PI
Siberian peashrub (<i>Caragana arborescens</i>)	Shrub	RN
Spotted knapweed (<i>Centaurea stoebe</i>)	Biennial Forb	PN
Tatarian honeysuckle (<i>Lonicera tatarica</i>)	Shrub	RN
Wild carrot/Queen Anne's Lace (<i>Daucus carota</i>)	Biennial Forb	RN
Wild parsnip (<i>Pastinaca sativa</i>)	Biennial Forb	PN
Winged burning bush (<i>Euonymus alatus</i>)	Shrub	RN

^a SR = Minnesota Department of Agriculture (MDA) Specially Regulated Plant; RN = MDA Restricted Noxious Weed; PN = MDA Prohibited Noxious Weed; PPI = Minnesota Department of Natural Resources (MNDNR) Proposed Prohibited Invasive Species; PI = MNDNR Prohibited Invasive Species

4.4.2 Herbicide Specifications

All herbicide treatments shall be restricted to those pesticides and methods of application approved by the Minnesota Department of Agriculture, MNDNR, and U.S. Environmental Protection Agency. Spraying should be conducted by certified applicators holding all necessary permits and licenses. All herbicides shall be applied in accordance with the applicable regulations and the label requirements and in a safe and cautious manner to avoid

damaging adjacent properties. Herbicide shall be applied selectively where applicable to avoid damaging existing native vegetation.

Approved pre-emergent herbicides include indaziflam (trade name Esplanade) and aminopyralid/metsulfuron-methyl (trade name Opensight) or equivalent. Additionally, pre-emergent formulations are recommended to include an adjuvant such as trade name Grounded or equivalent. Approved foliar herbicides include glyphosate (trade name Aquaneat), triclopyr (trade name Garlon), and aminopyralid (trade name Milestone) or equivalent. The Contractor shall submit a list of all herbicides to be used on the Project to Crane Storage and Sandhill Storage for written approval prior to the start of work.

Pre-emergent herbicides are recommended to be applied in the spring once the temperature is above 55 degrees Fahrenheit. Foliar herbicides shall be applied during the growing season as a control measure to prevent noxious weeds and invasive species from flowering or setting seed. The Contractor shall have knowledge of the phenology of species to treat on site to conduct herbicide treatments at the appropriate time and shall submit a schedule of planned visits each year prior to May 1.

The landowner shall be contacted at least 14 days prior to any application of herbicide on their property. Apiaries known by Crane Storage and Sandhill Storage to be present within three miles of the Projects should be notified of any herbicide spraying at least 14 days prior to such application. The herbicide applicator must keep documentation of location and timing of herbicide use, weather conditions on site during application, type of herbicide used, volume of herbicide used, number of acres treated, and species of plants treated, and submit a copy of all herbicide records to Crane Storage and Sandhill Storage to be included in an annual report.

5.0 MONITORING

Monitoring methods include quantitative and qualitative measures to assess how well the Project goals and performance standards are being achieved.

- Quantitative techniques allow for comparisons of subsequent reporting to understand the progression of vegetation establishment over time. Vegetation is sampled using standardized techniques with fixed sample locations and photo points and includes percent vegetation cover and estimated species richness.
- Qualitative monitoring consists of documentation of onsite vegetation through visual inspections.

Monitoring will evaluate seeded areas and associated planting areas for establishment including the number of species present and percent cover; presence of invasive species, and subsequent management activities needed, to include both species on site and early detection of new invasions. Three monitoring visits will generally occur in the spring, summer, and fall. Monitoring informs the adaptive management strategy employed by Crane Storage and Sandhill Storage.

5.1 Monitoring Protocol

Vegetation monitoring shall occur three times per year during the Establishment Phase (Years 1 to 5) and annually thereafter over the lifetime of the Project. During the Establishment Phase, inspections shall occur three times in the growing season to accurately document the presence of installed native species: late May/early June, mid-July, and late August/early September. After the Establishment Phase has concluded, inspections shall occur once per year, in mid-July. Once every five years during the long-term maintenance Phase, inspections shall occur three times during the year, on the same schedule as the Establishment Phase, to record the continued presence of native species across the growing season.

The monitoring protocol shall include a meander survey to provide a broad assessment of vegetation across the Sites. While on the Sites and during the meander survey, the assessment shall record and photograph the location of noxious weeds/invasive species, areas of bare soil or significant erosion 0.05 acre or larger, and damage to the vegetative screening area. Any observed significant erosion or damage to the vegetative screening area will be reported to Crane Storage and Sandhill Storage immediately. The remaining hazards will be compiled in an annual report (refer to Section 5.3). Hazard assessments should also be conducted by the Contractor any time they are on the Sites performing vegetation management. The Contractor hazard assessments should be submitted to the Monitor for review and inclusion in the annual report.

Monitoring activities will be conducted by individuals qualified biologist that are able identify a broad range of native and non-native plant species which occur in Minnesota.

5.2 Targets and Projected Outcomes

5.2.1 Native Vegetation Targets

A typical best practice for achieving soil stabilization and water quality is to include a minimum of 15 native species (graminoids and forbs) when using native vegetation (BWSR, 2019). Vegetation management should result in a diverse plant community dominated by native species and lack noxious and prohibited species, as outlined in this Plan. Construction stormwater permits, local

requirements, and regulations may impose additional requirements on the final quality and performance of native plantings.

The following are typical goals for native revegetation and will be revised when targets for the Project are identified. Short-term goals are goals applicable to the post-construction Establishment Phase of the proposed Crane and Sandhill Projects in Years 1 to 5. Long-term goals are defined as goals beyond Year 5, following implementation of the short-term goals.

Short-term goals:

- **Permit compliance.** Comply with permit conditions for site revegetation, per the Minnesota Pollution Control Agency (MPCA) Construction Stormwater General Permit (General Permit).
- **Stabilize soils and close out the stormwater permit.** After the first growing season, achieve at least 70 percent vegetative cover at the Crane and Sandhill Sites to allow for stormwater permit closure
- **By Year 3:** Achieve at least 85 percent vegetative cover at the Crane and Sandhill Sites and establish native, pollinator-friendly vegetation, with a composition of at least 80 percent native species.
- **By Year 5:** Achieve at least 95 percent vegetative cover and ensure that 95 percent of the site is established with native, pollinator-friendly vegetation.
- **Invasive Species Management and Soil Improvement:** By the end of Year 5, maintain invasive and noxious weed cover at less than 10 percent. Improve soil quality as needed by decompacting and amending soils to support the establishment of native, pollinator-friendly vegetation.

Long-term goals:

- **Vegetation establishment.** Maintain 95 percent of the Crane and Sandhill Sites in a vegetated state, and at least 90 percent of the cover comprised of native species.
- **Increase biodiversity of vegetation.** Establish six or more species of planted native graminoids and 12 or more species of planted native forbs across the Crane and Sandhill Sites.
- **Control invasive species and noxious weeds.** Prioritize the implementation of all required vegetation management activities for safe and efficient operations support, including woody species control, height control of herbaceous species, wet area management, and natural vegetation landscape/screening management.
- **Meet or exceed BWSR habitat friendly vegetation goals.** The Project meets or exceeds the minimum standards for the BWSR Habitat Friendly Solar Program when scored using the Habitat Friendly Solar Site Assessment Form (refer to Appendix A).

5.2.2 Noxious Weeds and Problem Plants

All prohibited noxious weeds and other plants previously identified in Tables 4.4.1-1, 4.4.1-2, and 4.4.1-3 will be treated repeatedly with herbicide and/or mowed, where appropriate, at a frequency sufficient to prevent seed set and to remove target weeds over time. The following are goals for controlling weeds and problem plants:

- After year 5, less than 5 percent total cover of invasive or noxious species.
- Each treatment will show evidence of at least 90 percent of the target vegetation having been affected by herbicide or removed.
- Two weeks after treatment, at least 95 percent of all plants treated with herbicide will be removed, dead, or dying within any 100 square foot area.

5.3 Reporting

An independent third-party inspector, qualified to conduct native plant inspections and assessments and retained by Crane Storage and Sandhill Storage shall prepare a report documenting the status of the established vegetation and hazards encountered during such year (i.e., a report every year for years 1 to 5 and a report for every year thereafter). The report shall include the results of inspection and monitoring activities during the prior year and shall report how the vegetation on the Project Sites has achieved or is achieving the goals and objectives set forth in this Plan. The report shall be submitted by January 15 to provide sufficient time to review the recommended actions for the upcoming growing season.

In addition to the above report content requirements, the reports shall also include descriptions of adaptive management actions to be completed in the upcoming year to meet management objectives and management challenges encountered during the reporting period. These recommended actions may include, but are not limited to, mowing, spot-mowing, targeted herbicide application, or overseeding bare soil.

5.4 Adaptive Management

Every year during years 1 to 5 and every year thereafter, a third-party independent monitor will be retained by the Project and produce a report summarizing the status of the vegetation established on site and identifying hazards encountered during the reporting period. This report will address any areas of noncompliance and plan targeted remediation efforts for the upcoming reporting period, including altering the timing or extent of mowing or herbicide application, adjusting the rate or formulation of herbicide applied, or conducting targeted overseeding of appropriate seed mixes. The report will also record the presence and location of any noxious or invasive weeds to be treated, which will both guide the Contractor and document changes in the vegetation establishment and management approach over time. This protocol will ensure that timely management activities reflect reporting from the previous monitoring observations.

6.0 REFERENCES

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- University of Minnesota Extension. 2025 Minnesota Noxious Weed List. Available online at: [Minnesota Noxious Weed List | Minnesota Department of Agriculture](#) Accessed March 2025.
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ATTACHMENT A

HABITAT FRIENDLY SOLAR SITE ASSESSMENT FORMS



Habitat Friendly Solar Site Assessment Form for Project Planning

For Solar Companies, Local Governments and Other Partners to Meet Habitat Friendly Solar Standards

Updated 12-22-23

Note: The use of state developed [solar seed mixes](#) over 70% of the plantable area of a site will result in automatically meeting the standard.

1) **PLANNED PERCENT OF PLANTABLE AREAS WITHIN PROJCT FOOTPRINT DOMINATED BY NATIVE SPECIES COVER (forbs, grasses, sedges, rushes, ferns). PROJECTS MUST HAVE A GOAL OF AT LEAST 70% COVER OF NATIVE VEGETATION TO MEET HABITAT FRIENDLY SOLAR STANDARDS**

<input type="checkbox"/> 70-84%	+15 points		
<input checked="" type="checkbox"/> 85% and above	+20 points	Total Points	<input type="text" value="20"/>

2) **PERCENT OF PROPOSED SITE VEGETATION COVER TO BE DOMINATED BY FORBS (not grasses, sedges and rushes)**

<input checked="" type="checkbox"/> 10-19%	+5 points		
<input type="checkbox"/> 20-29%	+10 points		
<input type="checkbox"/> 30-39%	+15 points		
<input type="checkbox"/> 40 and above	+15 points	Total Points	<input type="text" value="5"/>

Note: Projects may have "array" mixes and diverse border mixes; forb dominance should be averaged across the entire site. The dominance should be calculated from total numbers of forb seeds vs. grass seeds based on seeds per square foot (from all seed mixes to be planted).

3) **PLANNED COVER DIVERSITY (# of species in seed mixes; numbers from upland and moist soil mixes can be combined)**

<input type="checkbox"/> 10-19 species	+5 points		
<input type="checkbox"/> 20-25 species	+10 points		
<input checked="" type="checkbox"/> 26-39 species	+15 points		
<input type="checkbox"/> 40 and above	+20	Total Points	<input type="text" value="15"/>

4) **PLANNED SEASONS WITH AT LEAST THREE BLOOMING SPECIES (check all that apply)**

<input checked="" type="checkbox"/> Spring (April-May)	+4 points		
<input checked="" type="checkbox"/> Summer (June-August)	+3 points		
<input type="checkbox"/> Fall (September-October)	+3 points	Total Points	<input type="text" value="7"/>

See BWSR [pollinator toolbox](#) about bloom season

5) **SITE PLANNING**

<input checked="" type="checkbox"/> Detailed establishment and management plan (see notes)	+20 points		
<input checked="" type="checkbox"/> Seed Mixes are composed of at least 40 seeds per square foot	+5 points		
<input type="checkbox"/> All seed genetic origin is within 200 miles of site (see notes)	+5 points		
<input checked="" type="checkbox"/> At least .5% milkweed cover within each seed mix	+5 points		
<input checked="" type="checkbox"/> Plant species with more than 3 flower colors in mixes (see notes)	+5 points	Total Points	<input type="text" value="35"/>

6) **INSECTICIDE RISK**

<input type="checkbox"/> Planned on-site insecticide use (excluding buildings/electrical boxes, etc.)	-30 points		
<input checked="" type="checkbox"/> Communication with local chemical applicators/neighbors about need to prevent drift from adjacent areas.	+10 points	Total Points	<input type="text" value="10"/>

GRAND TOTAL

Gold Standard 85+ points
Meets Standard 70 points

Project Name: Crane and Sandhill BESS Solar [Array Native Seed Mix]
Project County: Olmsted County
Project Size:
Evaluation Date: 03/24/2025

See notes related to the questions on the back side of this form

Notes:

Estimates of percent “cover” should be based on “absolute cover” (the percent of the ground surface that is covered by a vertical projection of foliage as viewed from above).

All project plans must include detailed vegetation establishment and management specifications to ensure the success of projects (see sample specifications on [BWSR’s Habitat Friendly Solar Webpage](#)).

Seed mixes provided for projects need to show seeds per square foot for each species in the mix.

Question 1 - *Native plant species provide benefits to a wide range of pollinators and other wildlife species. The [Minnesota DNR List](#) should be used to determine if a species is native. Native species include wildflowers, graminoids (grasses, sedges, rushes), shrubs and trees. The percent areal cover of native vs. non-native species should be estimated based on the seeds per square foot of all species to be used across all seed mixes. As non-native fescues tend to have a high seeding rate, but also small seeds with a lower germination success the number of fescue seeds per square foot in mixes can be decreased by half when calculating native species dominance of mixes. This should result in a more accurate representation of native dominance.*

Question 2 - *There is a focus on native forbs on this assessment form to maximize benefits to the approximately 500 species of native bees in Minnesota, honeybees and other pollinators. Forbs are (flowering plants that are not woody or graminoids such as grasses and sedges) and can include introduced clovers and other non-native species beneficial to pollinators. No noxious weeds or invasive plants can be included in the total.*

Question 3 - *Plant diversity adds to wildlife benefits, as well as the resiliency of projects. For this question, planned native and non-native species from all seed mixes can be combined for the total.*

Question 4 - *Having blooming species throughout the season helps support pollinator species. See BWSR’s [Pollinator Toolbox](#) for a listing of bloom seasons for species.*

Question 5 - *To meet requirements for a long-term management plan projects must provide information about:*

-Timing of yearly inspections,

-A detailed native vegetation establishment plan with detailed instructions for contractors.

-A detailed maintenance schedule for the first three years of the project (establishment period) listing timing of establishment mowing/ trimming, spot herbicide application, prescribed grazing or other management actions.

-Proposed maintenance schedule for year four and beyond.

-List of weed species that may become problematic at the site and how they will be managed if needed.

All mixes being used for the project must include at least 40 seeds per square foot to receive points for the first category. Using seed with a genetic origin within 200 miles helps ensure that species will be adapted to site conditions and decrease the risk of introducing invasive species in seed mixes. Please refer to pages 7-8 of [BWSR’s Native Vegetation Establishment and Enhancement Guidelines](#) for more information about appropriate seed sources. To obtain points for including milkweed in projects mixes must contain at least .5% milkweed seed based on seeds per square foot, or a combination of seed and containerized plugs could be used with a plan to cover .5% of the ground surface with milkweed. Flower colors can include blue, pink, purple, yellow, white, orange, red, green and brown. The Minnesota Wildflowers website allows for searching species based on flower color [Minnesota Wildflowers Categorized by Color](#).

Question 6 - *It is important that seeds treated with insecticides are not used at project sites and that insecticides are not being sprayed at the site. To meet requirements for communication/registration with local landowners/applicators about the need to prevent drift from adjacent areas, information provided can be in the form of email communication or copies of letters. Communication must be provided to all landowners adjacent to the property including municipalities.*

Send completed forms, project plans, seed mixes (showing seeds per square foot for each species) and any communications with pesticide applicators to BWSR at Dan.Shaw@state.mn.us as well as any local government staff involved in reviewing the project.



Habitat Friendly Solar Site Assessment Form for Project Planning

For Solar Companies, Local Governments and Other Partners to Meet Habitat Friendly Solar Standards

Updated 12-22-23

Note: The use of state developed [solar seed mixes](#) over 70% of the plantable area of a site will result in automatically meeting the standard.

- 1) **PLANNED PERCENT OF PLANTABLE AREAS WITHIN PROJCT FOOTPRINT DOMINATED BY NATIVE SPECIES COVER (forbs, grasses, sedges, rushes, ferns). PROJECTS MUST HAVE A GOAL OF AT LEAST 70% COVER OF NATIVE VEGETATION TO MEET HABITAT FRIENDLY SOLAR STANDARDS**
- | | | | |
|---|------------|---------------------|---------------------------------|
| <input type="checkbox"/> 70-84% | +15 points | | |
| <input checked="" type="checkbox"/> 85% and above | +20 points | Total Points | <input type="text" value="20"/> |

- 2) **PERCENT OF PROPOSED SITE VEGETATION COVER TO BE DOMINATED BY FORBS (not grasses, sedges and rushes)**
- | | | | |
|--|------------|---------------------|---------------------------------|
| <input type="checkbox"/> 10-19% | +5 points | | |
| <input type="checkbox"/> 20-29% | +10 points | | |
| <input type="checkbox"/> 30-39% | +15 points | | |
| <input checked="" type="checkbox"/> 40 and above | +15 points | Total Points | <input type="text" value="15"/> |

Note: Projects may have "array" mixes and diverse border mixes; forb dominance should be averaged across the entire site. The dominance should be calculated from total numbers of forb seeds vs. grass seeds based on seeds per square foot (from all seed mixes to be planted).

- 3) **PLANNED COVER DIVERSITY (# of species in seed mixes; numbers from upland and moist soil mixes can be combined)**
- | | | | |
|--|------------|---------------------|---------------------------------|
| <input type="checkbox"/> 10-19 species | +5 points | | |
| <input type="checkbox"/> 20-25 species | +10 points | | |
| <input type="checkbox"/> 26-39 species | +15 points | | |
| <input checked="" type="checkbox"/> 40 and above | +20 | Total Points | <input type="text" value="20"/> |

- 4) **PLANNED SEASONS WITH AT LEAST THREE BLOOMING SPECIES (check all that apply)**
- | | | | |
|--|-----------|---------------------|---------------------------------|
| <input checked="" type="checkbox"/> Spring (April-May) | +4 points | | |
| <input checked="" type="checkbox"/> Summer (June-August) | +3 points | | |
| <input checked="" type="checkbox"/> Fall (September-October) | +3 points | Total Points | <input type="text" value="10"/> |
- See BWSR [pollinator toolbox](#) about bloom season

- 5) **SITE PLANNING**
- | | | | |
|---|------------|---------------------|---------------------------------|
| <input checked="" type="checkbox"/> Detailed establishment and management plan (see notes) | +20 points | | |
| <input checked="" type="checkbox"/> Seed Mixes are composed of at least 40 seeds per square foot | +5 points | | |
| <input type="checkbox"/> All seed genetic origin is within 200 miles of site (see notes) | +5 points | | |
| <input type="checkbox"/> At least .5% milkweed cover within each seed mix | +5 points | | |
| <input checked="" type="checkbox"/> Plant species with more than 3 flower colors in mixes (see notes) | +5 points | Total Points | <input type="text" value="30"/> |

- 6) **INSECTICIDE RISK**
- | | | | |
|--|------------|---------------------|---------------------------------|
| <input type="checkbox"/> Planned on-site insecticide use (excluding buildings/electrical boxes, etc.) | -30 points | | |
| <input checked="" type="checkbox"/> Communication with local chemical applicators/neighbors about need to prevent drift from adjacent areas. | +10 points | Total Points | <input type="text" value="10"/> |

GRAND TOTAL

Gold Standard 85+ points
Meets Standard 70 points

Project Name: Crane and Sandhill BESS Solar [Wetland Native Seed Mix]
Project County: Olmsted County
Project Size:
Evaluation Date: 03/24/2025

See notes related to the questions on the back side of this form

Notes:

Estimates of percent “cover” should be based on “absolute cover” (the percent of the ground surface that is covered by a vertical projection of foliage as viewed from above).

All project plans must include detailed vegetation establishment and management specifications to ensure the success of projects (see sample specifications on [BWSR’s Habitat Friendly Solar Webpage](#)).

Seed mixes provided for projects need to show seeds per square foot for each species in the mix.

Question 1 - *Native plant species provide benefits to a wide range of pollinators and other wildlife species. The [Minnesota DNR List](#) should be used to determine if a species is native. Native species include wildflowers, graminoids (grasses, sedges rushes), shrubs and trees. The percent areal cover of native vs. non-native species should be estimated based on the seeds per square foot of all species to be used across all seed mixes. As non-native fescues tend to have a high seeding rate, but also small seeds with a lower germination success the number of fescue seeds per square foot in mixes can be decreased by half when calculating native species dominance of mixes. This should result in a more accurate representation of native dominance.*

Question 2 - *There is a focus on native forbs on this assessment form to maximize benefits to the approximately 500 species of native bees in Minnesota, honeybees and other pollinators. Forbs are (flowering plants that are not woody or graminoids such as grasses and sedges) and can include introduced clovers and other non-native species beneficial to pollinators. No noxious weeds or invasive plants can be included in the total.*

Question 3 - *Plant diversity adds to wildlife benefits, as well as the resiliency of projects. For this question, planned native and non-native species from all seed mixes can be combined for the total.*

Question 4 - *Having blooming species throughout the season helps support pollinator species. See BWSR’s [Pollinator Toolbox](#) for a listing of bloom seasons for species.*

Question 5 - *To meet requirements for a long-term management plan projects must provide information about:*

-Timing of yearly inspections,

-A detailed native vegetation establishment plan with detailed instructions for contractors.

-A detailed maintenance schedule for the first three years of the project (establishment period) listing timing of establishment mowing/ trimming, spot herbicide application, prescribed grazing or other management actions.

-Proposed maintenance schedule for year four and beyond.

-List of weed species that may become problematic at the site and how they will be managed if needed.

All mixes being used for the project must include at least 40 seeds per square foot to receive points for the first category. Using seed with a genetic origin within 200 miles helps ensure that species will be adapted to site conditions and decrease the risk of introducing invasive species in seed mixes. Please refer to pages 7-8 of [BWSR’s Native Vegetation Establishment and Enhancement Guidelines](#) for more information about appropriate seed sources. To obtain points for including milkweed in projects mixes must contain at least .5% milkweed seed based on seeds per square foot, or a combination of seed and containerized plugs could be used with a plan to cover .5% of the ground surface with milkweed. Flower colors can include blue, pink, purple, yellow, white, orange, red, green and brown. The Minnesota Wildflowers website allows for searching species based on flower color [Minnesota Wildflowers Categorized by Color](#).

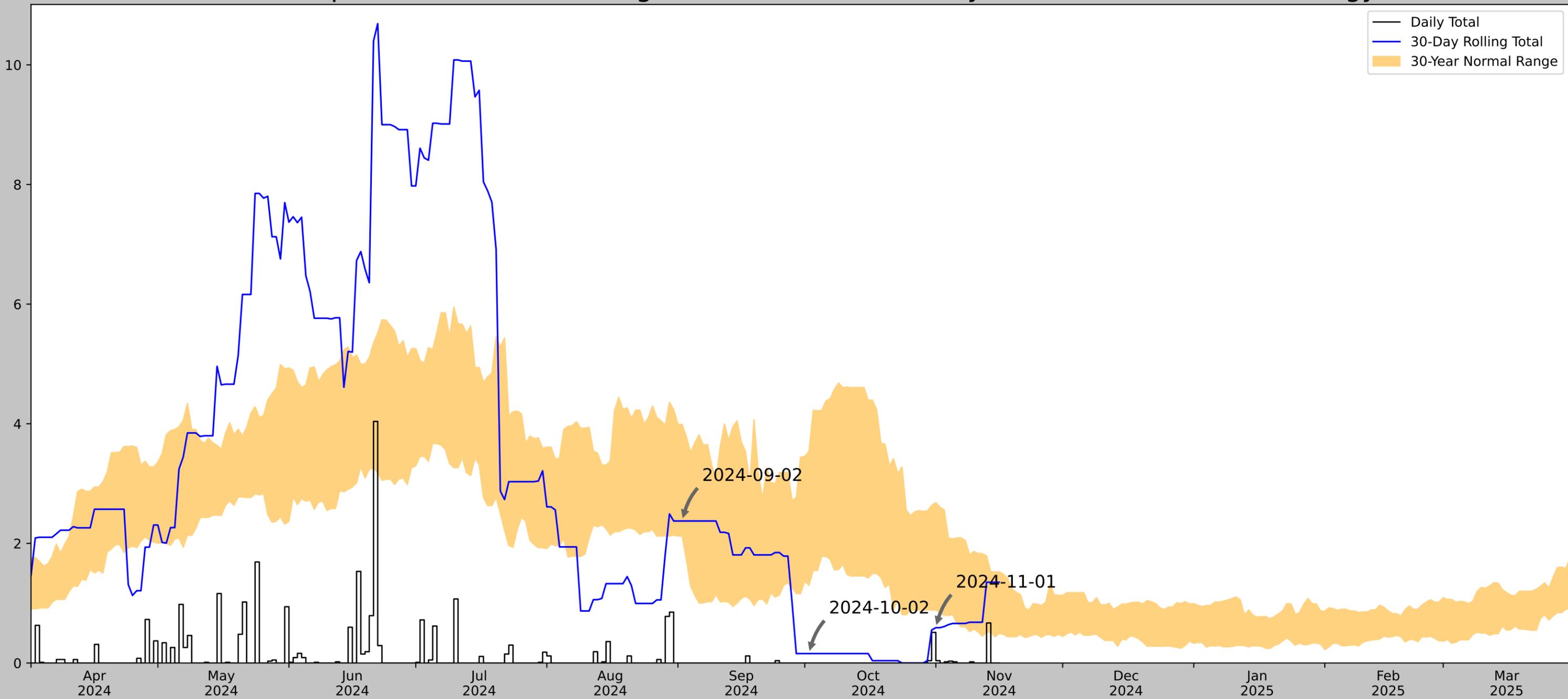
Question 6 - *It is important that seeds treated with insecticides are not used at project sites and that insecticides are not being sprayed at the site. To meet requirements for communication/registration with local landowners/applicators about the need to prevent drift from adjacent areas, information provided can be in the form of email communication or copies of letters. Communication must be provided to all landowners adjacent to the property including municipalities.*

Send completed forms, project plans, seed mixes (showing seeds per square foot for each species) and any communications with pesticide applicators to BWSR at Dan.Shaw@state.mn.us as well as any local government staff involved in reviewing the project.

ATTACHMENT B
PROJECT HISTORICAL CLIMATE DATA

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Rainfall (Inches)



Coordinates	43.725195, -95.713136
Observation Date	2024-11-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness (2024-10)
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-11-01	0.885039	2.680709	0.590551	Dry	1	3	3
2024-10-02	1.300787	3.536614	0.15748	Dry	1	2	2
2024-09-02	2.12126	3.988583	2.374016	Normal	2	1	2
Result							Drier than Normal - 7



Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

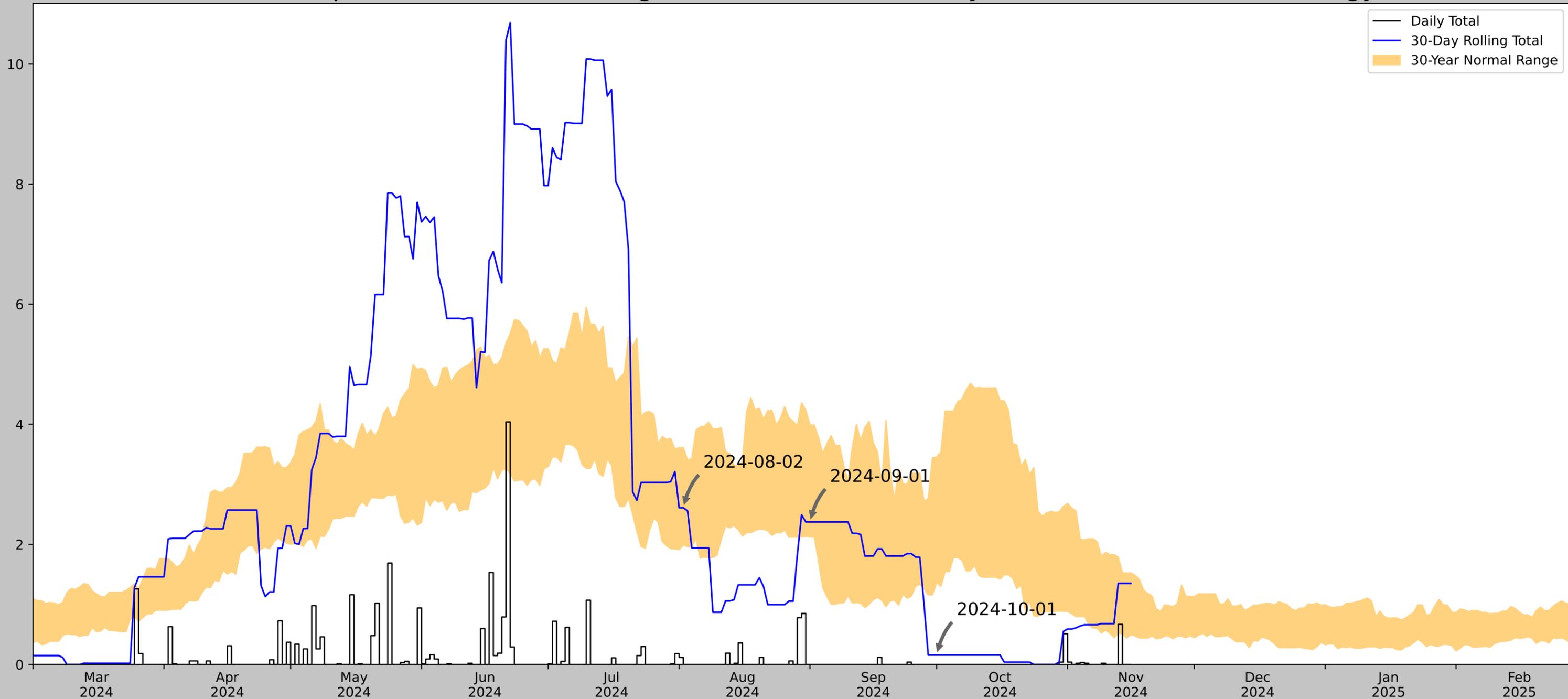
Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center



Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11193	86
WORTHINGTON 1.9 SW	43.6081, -95.625	1598.097	3.406	30.184	1.636	0	4
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Rainfall (Inches)



Coordinates	43.725195, -95.713136
Observation Date	2024-10-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-10-01	1.367717	3.453937	0.15748	Dry	1	3	3
2024-09-01	2.124803	3.988583	2.374016	Normal	2	2	4
2024-08-02	1.991339	3.609843	2.610236	Normal	2	1	2
Result							Drier than Normal - 9



Figures and tables made by the
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Version 2.0

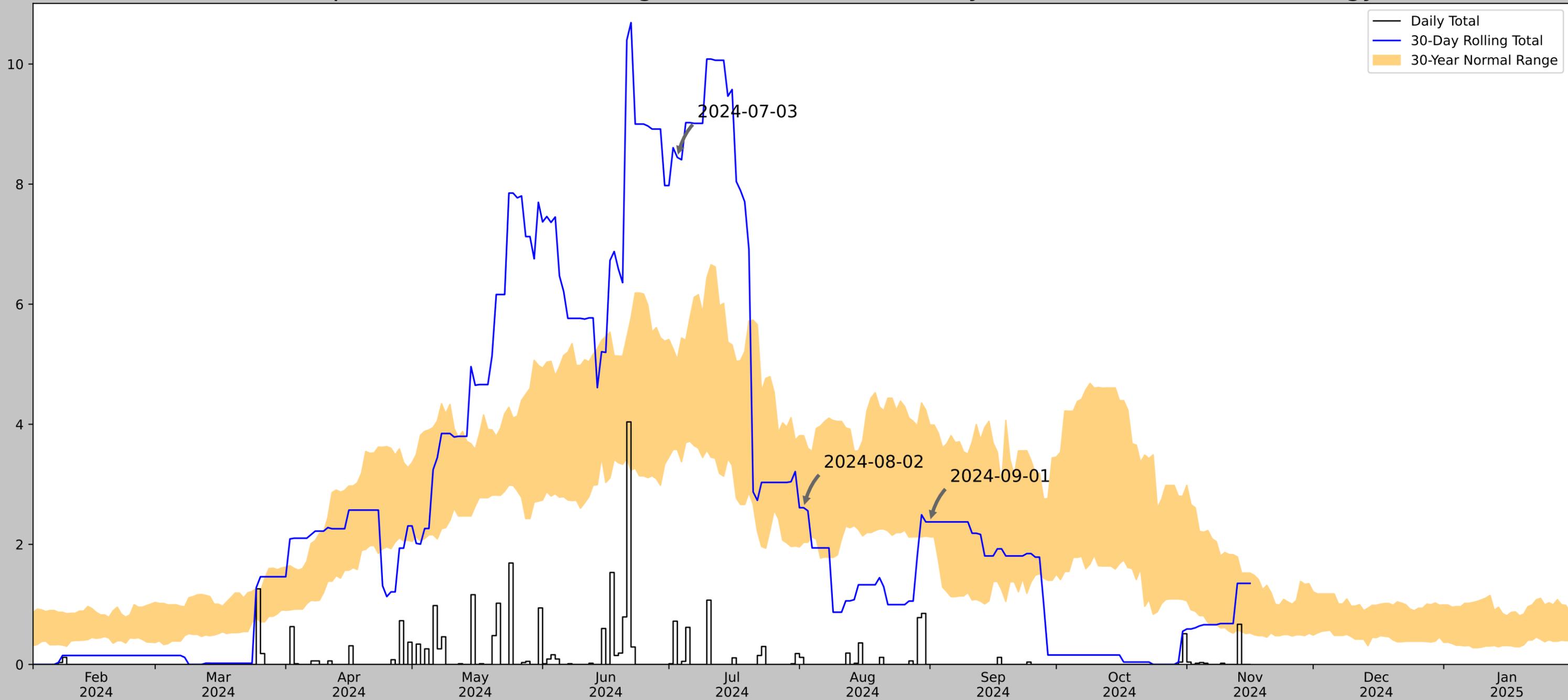
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11193	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Rainfall (Inches)



Coordinates	43.725195, -95.713136
Observation Date	2024-09-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Moderate wetness
WebWIMP H ₂ O Balance	Dry Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-09-01	2.124803	3.988583	2.374016	Normal	2	3	6
2024-08-02	2.033465	3.81063	2.610236	Normal	2	2	4
2024-07-03	3.579134	5.080709	8.444882	Wet	3	1	3
Result							Normal Conditions - 13



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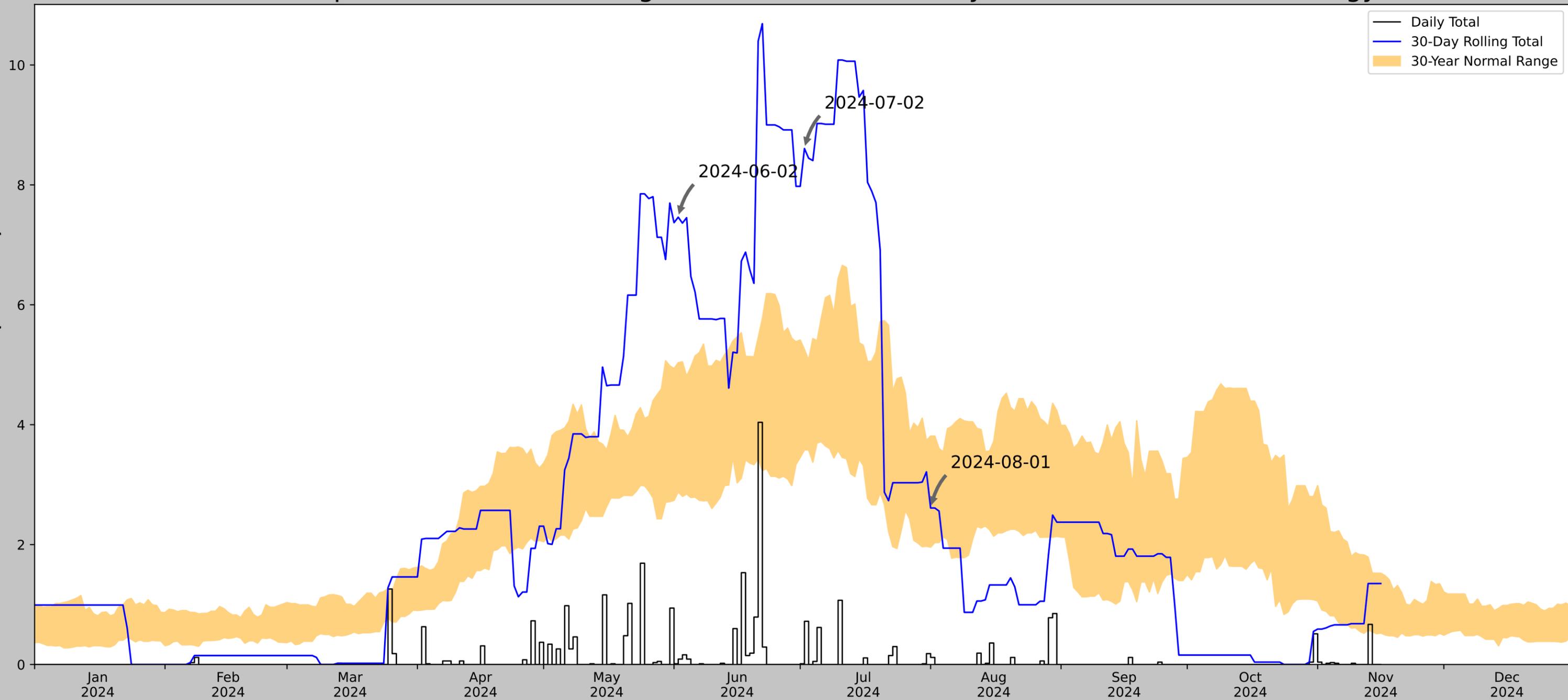
Developed by:
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Rainfall (Inches)



Coordinates	43.725195, -95.713136
Observation Date	2024-08-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Severe wetness
WebWIMP H ₂ O Balance	Dry Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-08-01	1.957087	3.81063	2.610236	Normal	2	3	6
2024-07-02	3.579134	5.255512	8.606299	Wet	3	2	6
2024-06-02	2.877559	5.033858	7.46063	Wet	3	1	3
Result							Wetter than Normal - 15



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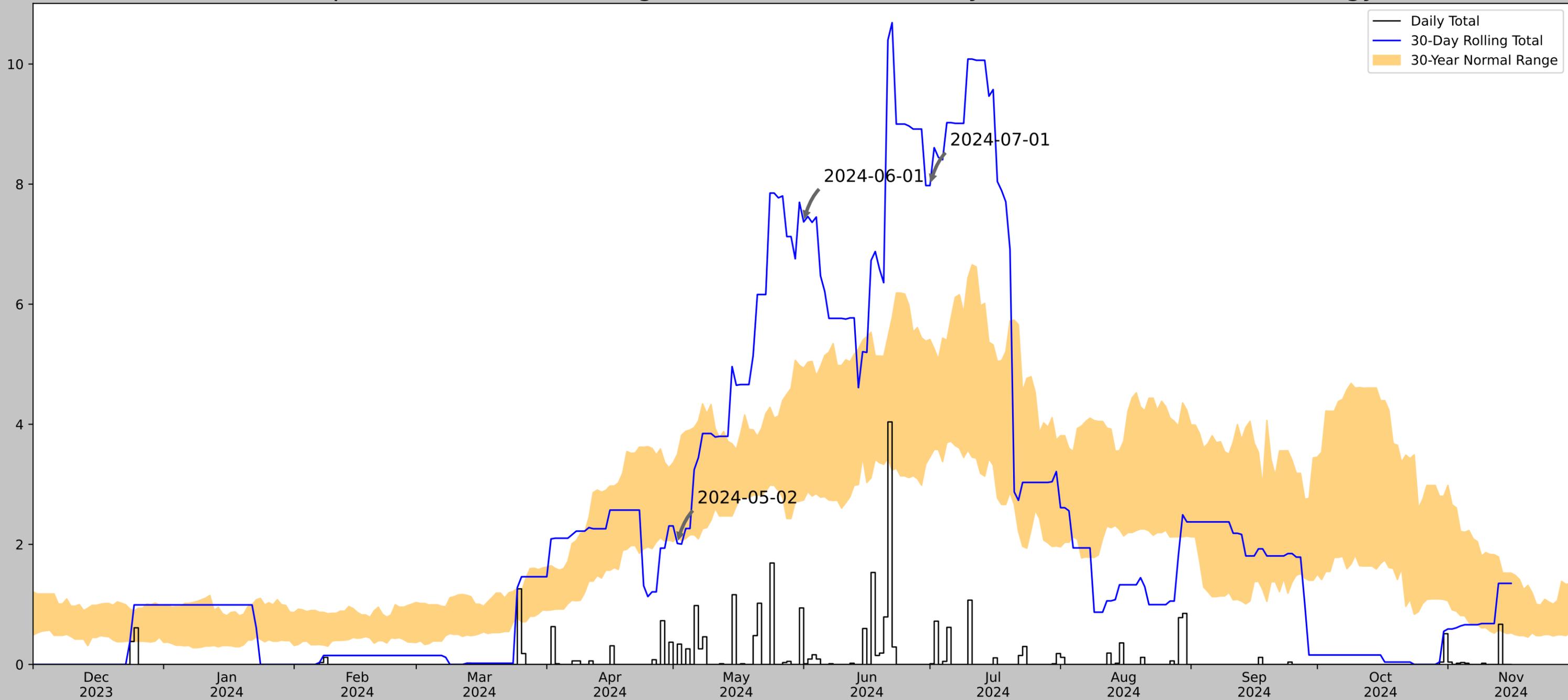
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Rainfall (Inches)



Coordinates	43.725195, -95.713136
Observation Date	2024-07-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Extreme wetness
WebWIMP H ₂ O Balance	Dry Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-07-01	3.454331	5.412992	7.976378	Wet	3	3	9
2024-06-01	2.737402	4.93504	7.370079	Wet	3	2	6
2024-05-02	2.122835	3.497638	2.015748	Dry	1	1	1
Result							Wetter than Normal - 16



Figures and tables made by the
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Version 2.0

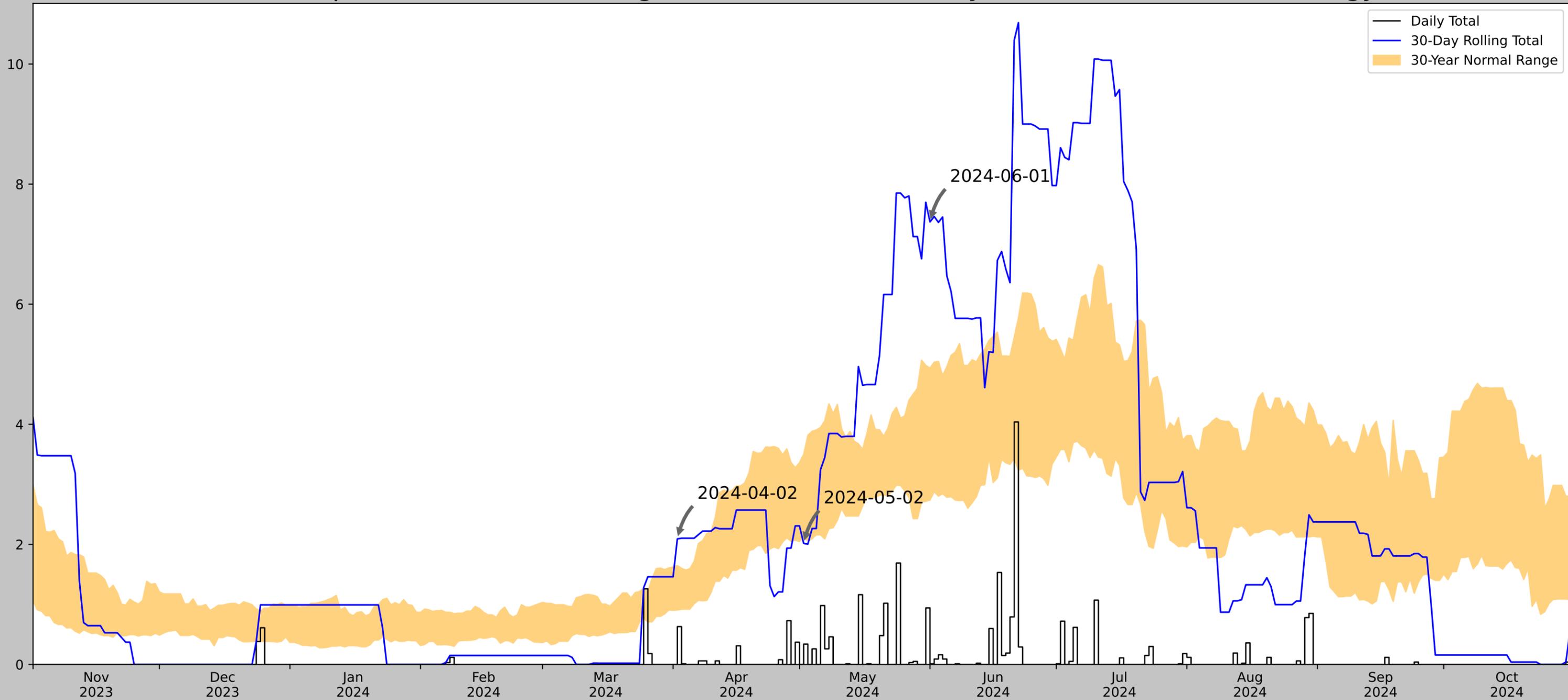
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Rainfall (Inches)



Coordinates	43.725195, -95.713136
Observation Date	2024-06-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Extreme wetness
WebWIMP H ₂ O Balance	Dry Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-06-01	2.737402	4.93504	7.370079	Wet	3	3	9
2024-05-02	2.122835	3.497638	2.015748	Dry	1	2	2
2024-04-02	0.907087	1.646063	2.090551	Wet	3	1	3
Result							Normal Conditions - 14



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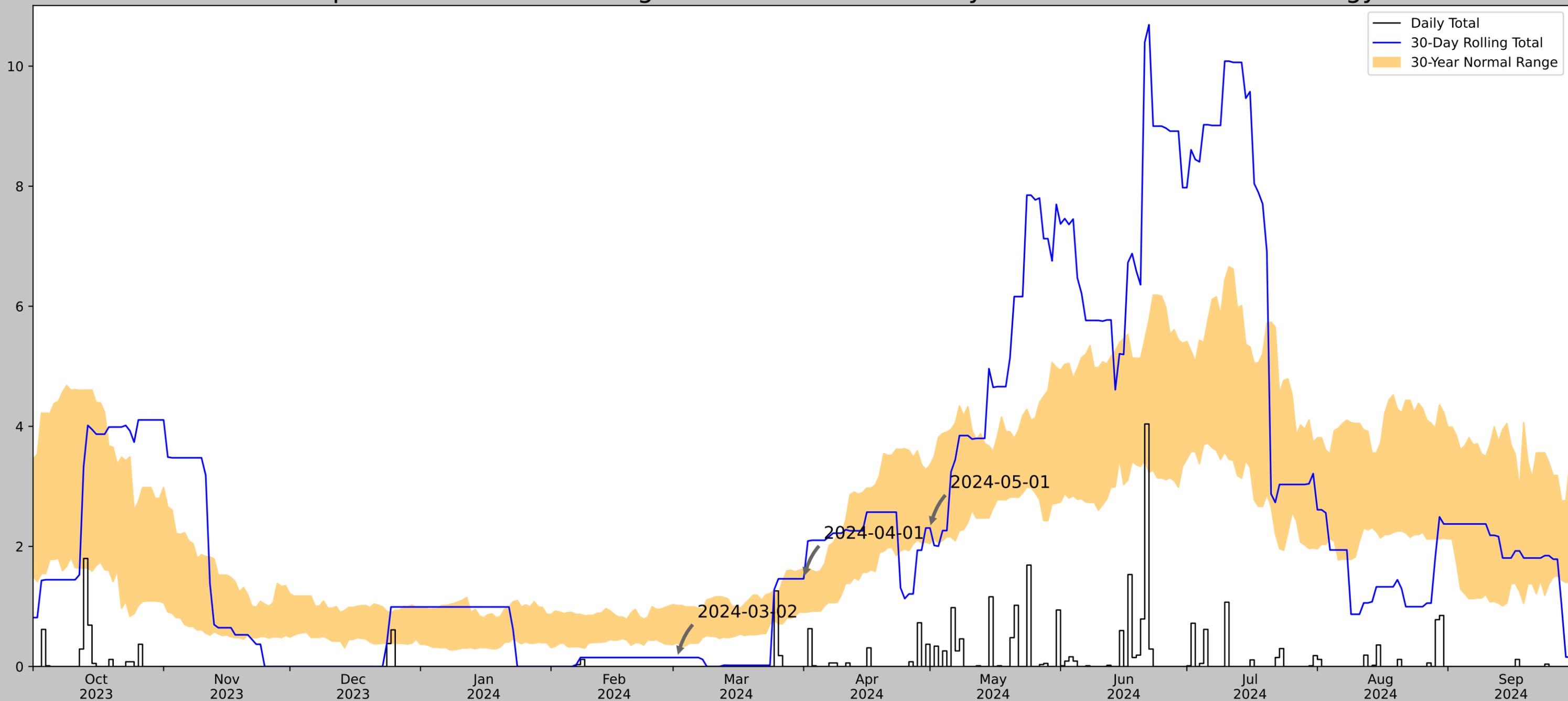
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Rainfall (Inches)



Coordinates	43.725195, -95.713136
Observation Date	2024-05-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Moderate wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-05-01	2.047638	3.358662	2.307087	Normal	2	3	6
2024-04-01	0.901575	1.62126	1.46063	Normal	2	2	4
2024-03-02	0.393307	1.016929	0.149606	Dry	1	1	1
Result							Normal Conditions - 11



Figures and tables made by the
Antecedent Precipitation Tool
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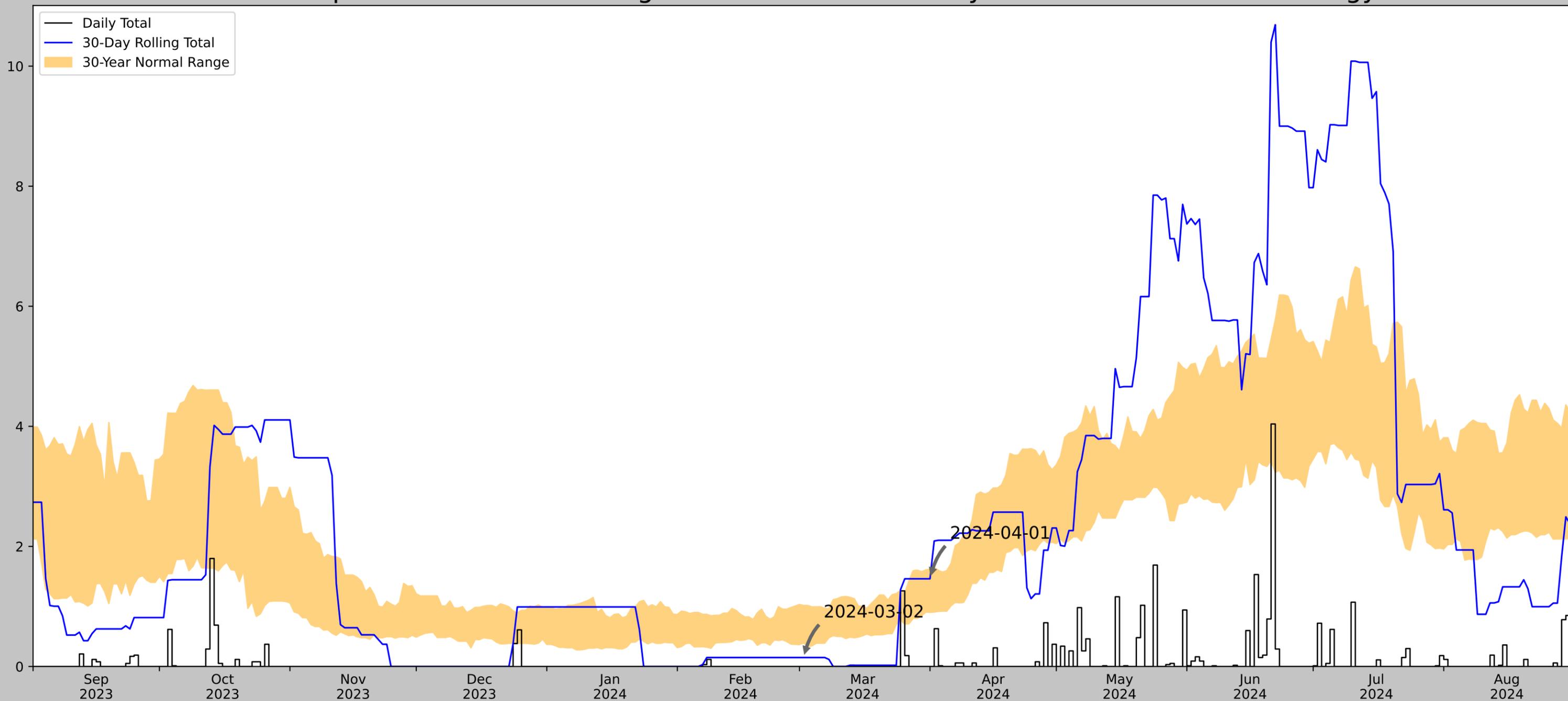
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Rainfall (Inches)



Coordinates	43.725195, -95.713136
Observation Date	2024-04-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Moderate wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-04-01	0.901575	1.62126	1.46063	Normal	2	3	6
2024-03-02	0.393307	1.016929	0.149606	Dry	1	2	2
2024-02-01	0.31378	0.866929	0.0	Dry	1	1	1
Result							Drier than Normal - 9



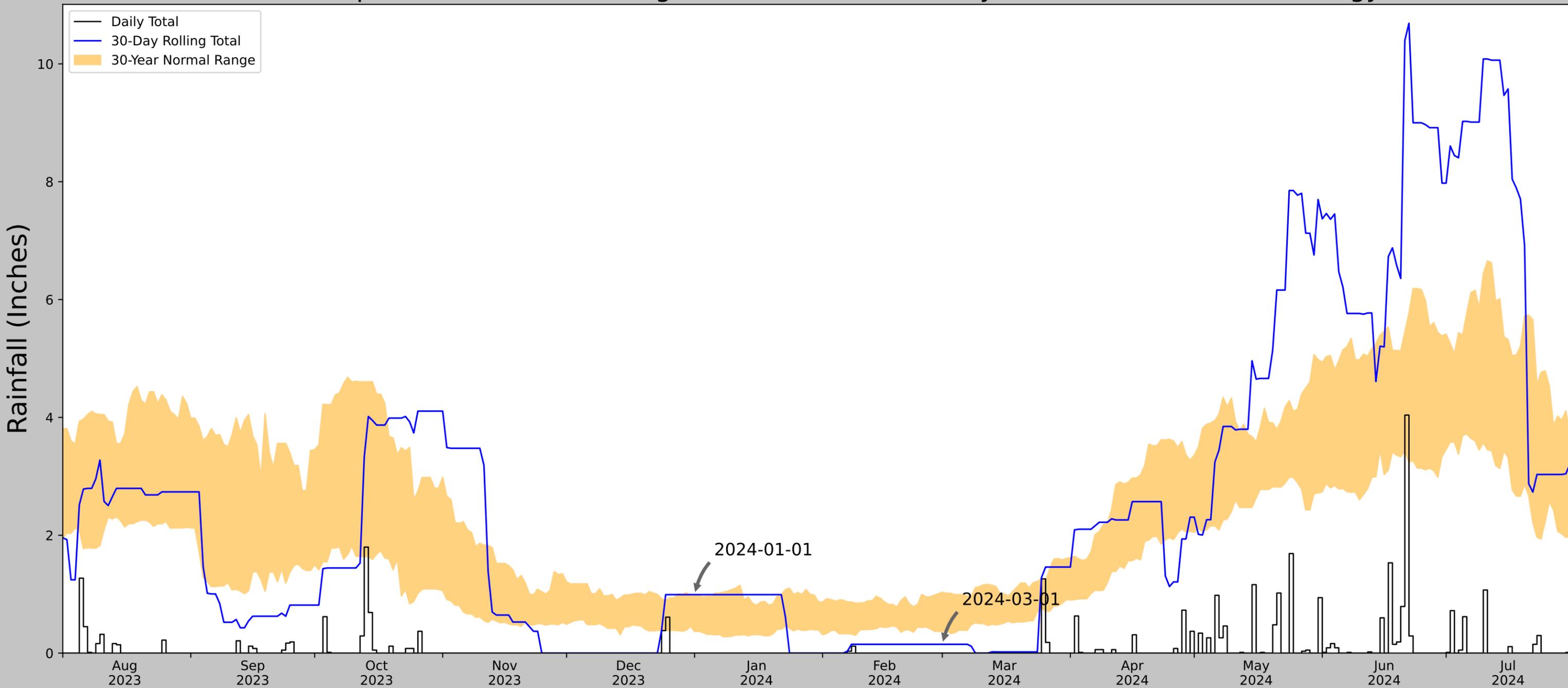
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-03-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-03-01	0.364567	1.032677	0.149606	Dry	1	3	3
2024-01-31	0.394488	0.870472	0.0	Dry	1	2	2
2024-01-01	0.366535	0.99252	0.992126	Normal	2	1	2
Result							Drier than Normal - 7



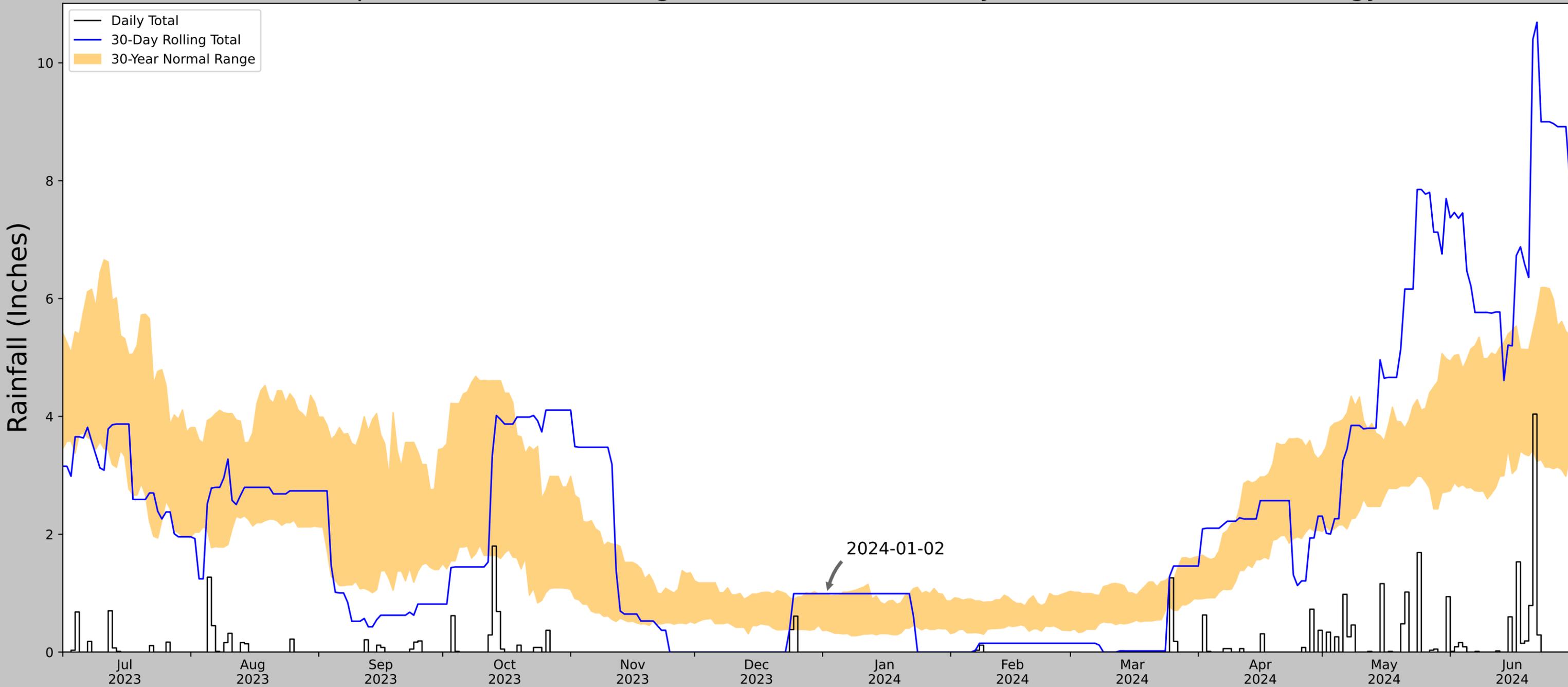
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Development Center



Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-02-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-02-01	0.31378	0.866929	0.0	Dry	1	3	3
2024-01-02	0.369685	0.991339	0.992126	Wet	3	2	6
2023-12-03	0.551181	1.175984	0.0	Dry	1	1	1
Result							Normal Conditions - 10



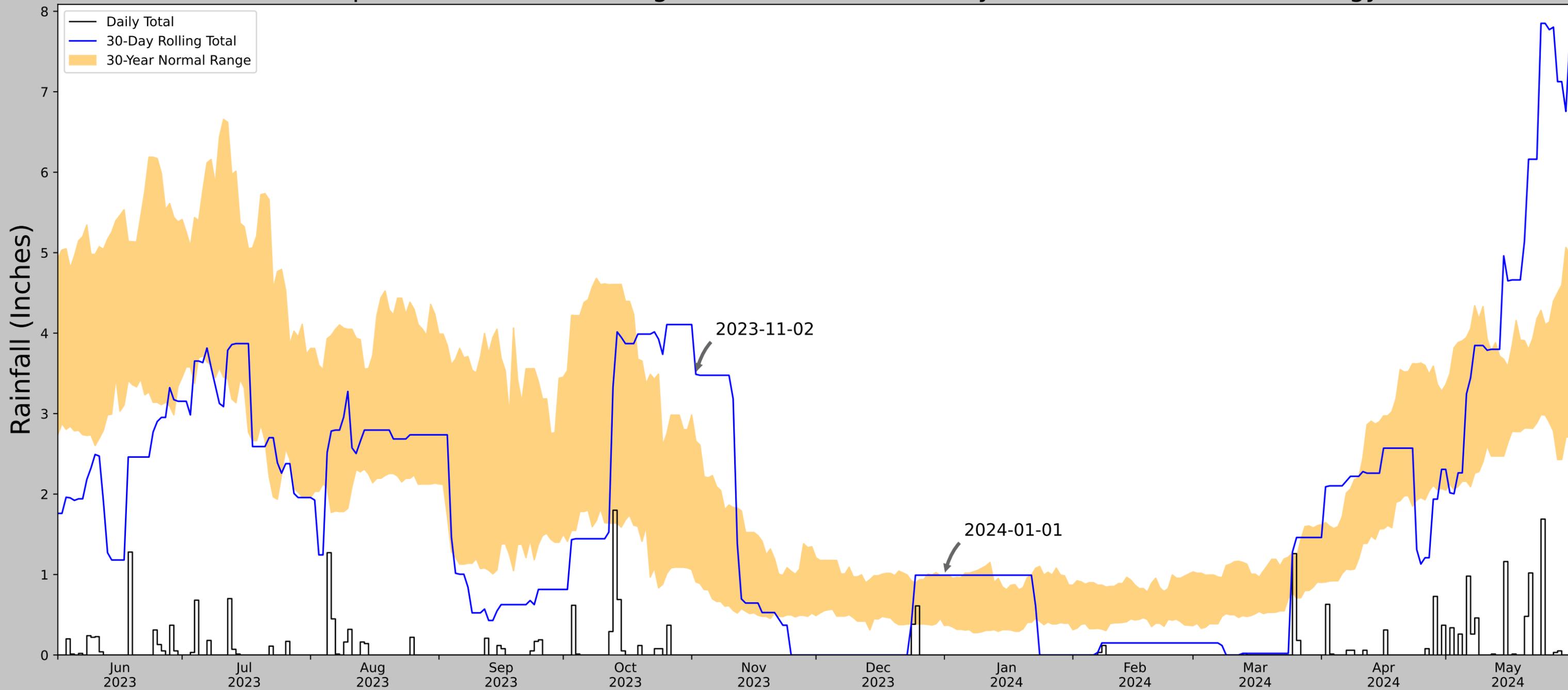
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2024-01-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-01-01	0.366535	0.99252	0.992126	Normal	2	3	6
2023-12-02	0.523228	1.175984	0.0	Dry	1	2	2
2023-11-02	0.908661	2.659449	3.488189	Wet	3	1	3
Result							Normal Conditions - 11



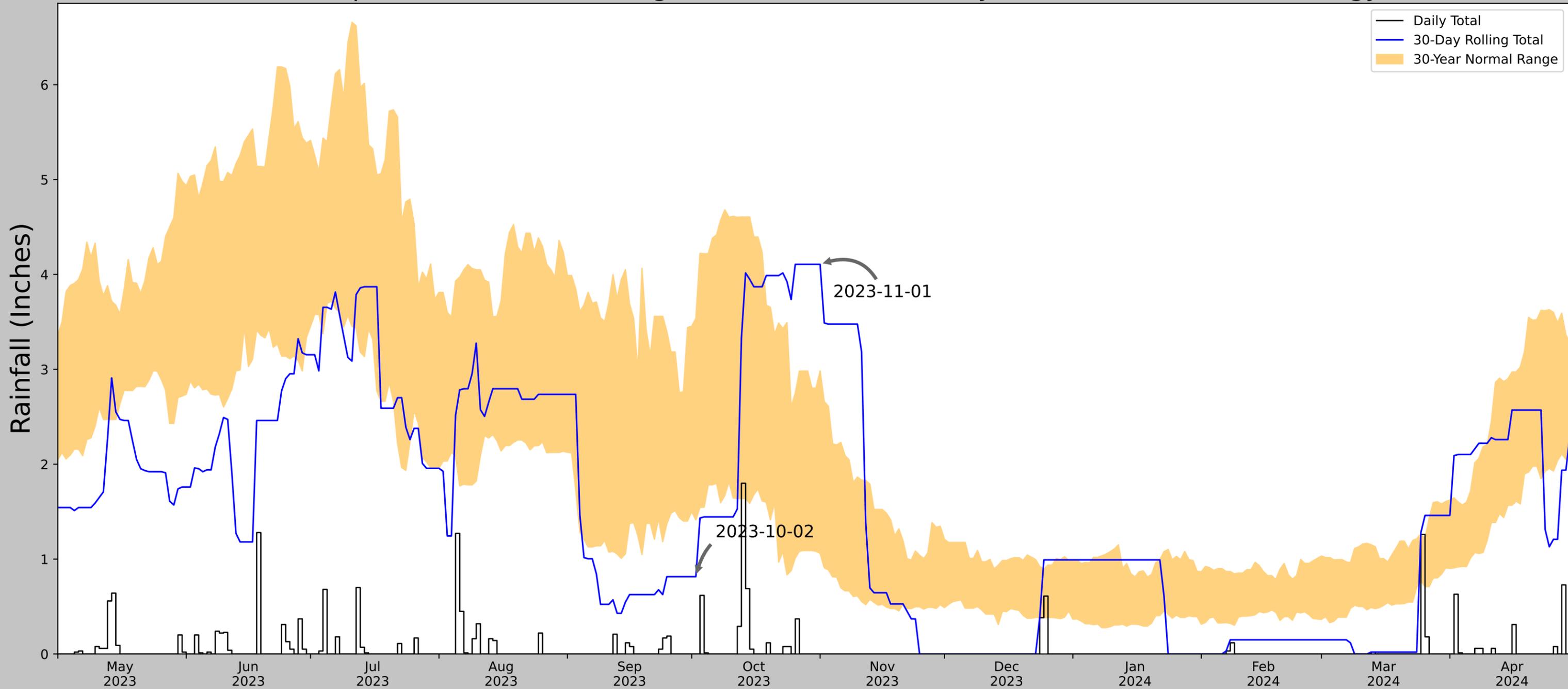
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2023-12-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-12-01	0.488583	1.209055	0.0	Dry	1	3	3
2023-11-01	1.060236	2.983858	4.106299	Wet	3	2	6
2023-10-02	1.412205	3.536614	0.814961	Dry	1	1	1
Result							Normal Conditions - 10



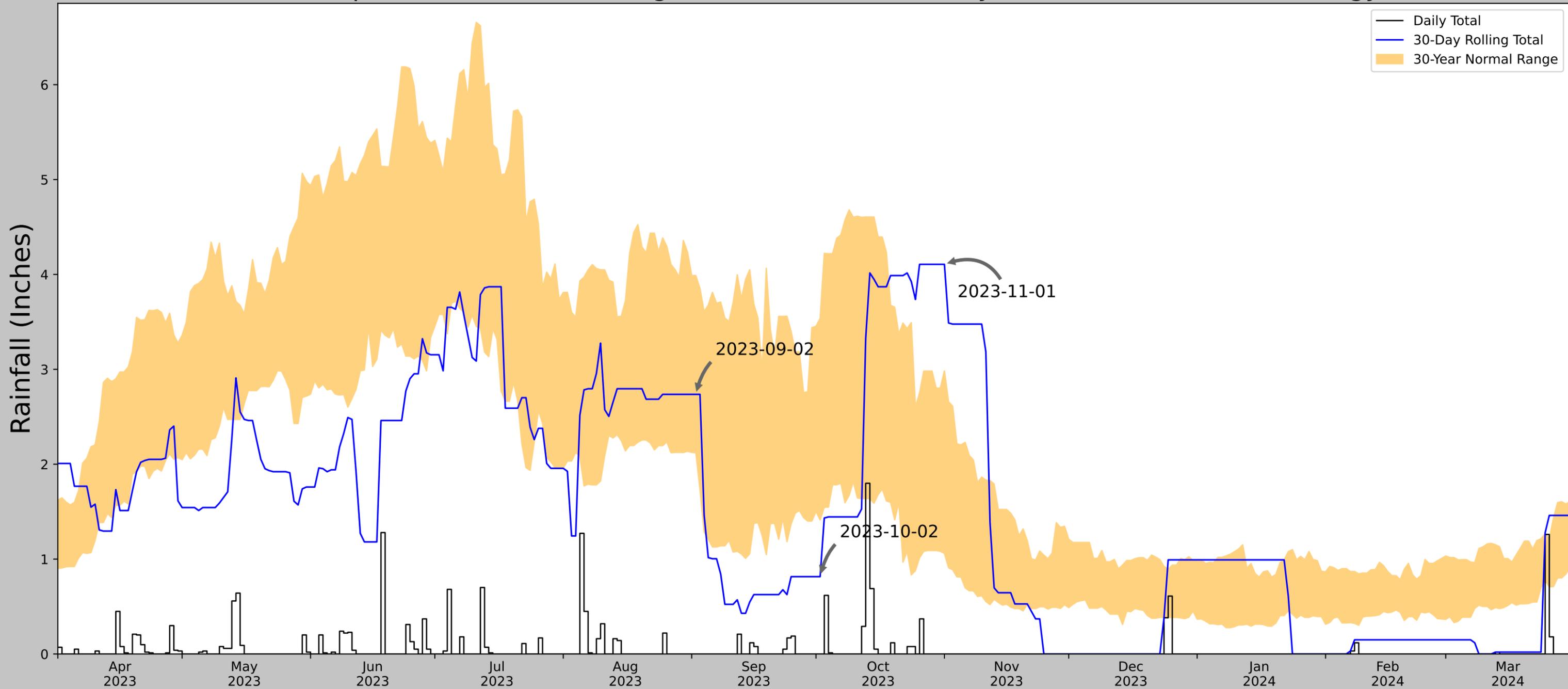
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2023-11-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Incipient wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-11-01	1.060236	2.983858	4.106299	Wet	3	3	9
2023-10-02	1.412205	3.536614	0.814961	Dry	1	2	2
2023-09-02	2.12126	3.988583	2.736221	Normal	2	1	2
Result							Normal Conditions - 13



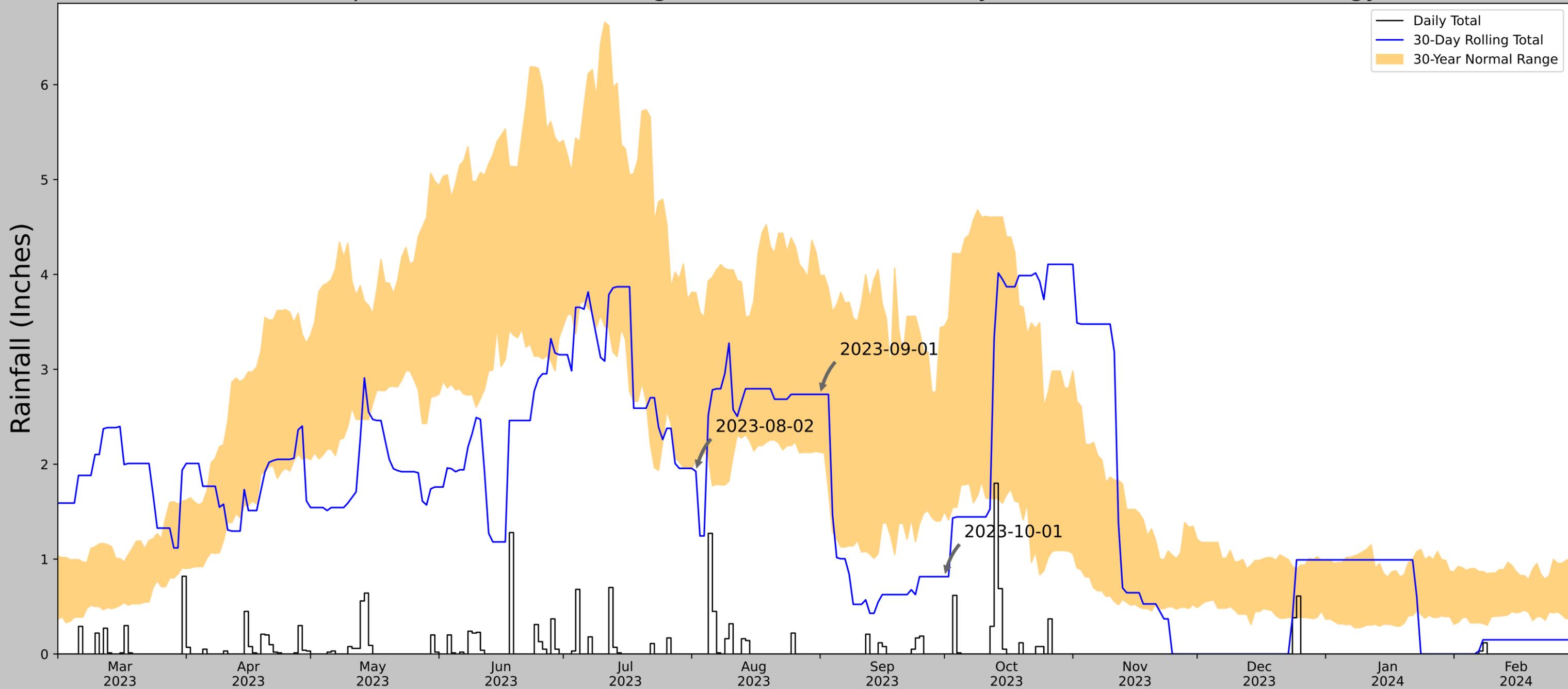
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.725195, -95.713136
Observation Date	2023-10-01
Elevation (ft)	1727.821
Drought Index (PDSI)	Mild wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-10-01	1.501969	3.453937	0.814961	Dry	1	3	3
2023-09-01	2.124803	3.988583	2.736221	Normal	2	2	4
2023-08-02	2.033465	3.81063	1.925197	Dry	1	1	1
Result							Drier than Normal - 8



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Development Center



Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WORTHINGTON 2 NNE	43.6453, -95.5803	1567.913	8.633	159.908	5.265	11192	90
HARRIS 0.1 NNE	43.4473, -95.4328	1558.071	15.547	9.842	7.149	24	0
SIBLEY	43.4022, -95.7497	1532.152	18.819	35.761	9.142	43	0
LAKEFIELD 2NE	43.7022, -95.1519	1529.856	21.767	38.057	10.624	62	0
OCHEYEDAN	43.4144, -95.5314	1250.0	16.141	317.913	12.395	31	0

ATTACHMENT C

SEED MIXES

Crane and Sandhill BESS Short Native Seed Mix — Moderately Well to Well Drained Soils

Olmsted County, Minnesota

Scientific Name	Common Name	Height in	Bloom Season Apr – Oct	Drill Rate (PLS)		Broadcast Rate (PLS)	
				lb/ac	seeds/sq ft	lb/ac	seeds/sq ft
Grasses, Sedges & Rushes							
<i>Agrostis perennans</i>	Upland Bentgrass	8-24	A S	0.500	67.11	0.650	87.24
<i>Bouteloua curtipendula</i>	Sideoats Grama	12-24	A S	1.651	10.62	2.146	13.81
<i>Bouteloua gracilis</i>	Blue Grama	8-18	J A S	1.800	35.17	2.340	45.72
<i>Carex blanda</i>	Eastern Woodland Sedge	6-18	M J	0.138	0.73	0.180	0.95
<i>Carex cephalophora</i>	Oval-leaf Sedge	8-24	M J	0.100	2.18	0.131	2.83
<i>Carex grisea</i>	Inflated Narrow-leaf Sedge	6-24	M J	1.444	6.24	1.878	8.11
<i>Carex radiata</i>	Eastern Star Sedge	8-24	J	0.109	1.64	0.142	2.14
<i>Danthonia spicata</i>	Poverty Oatgrass	8-24	M J J	0.113	1.46	0.147	1.90
<i>Hordeum jubatum</i>	Foxtail Barley	8-24	J J A S	0.135	0.79	0.175	1.03
<i>Juncus tenuis</i>	Poverty Rush	6-18	J J A S	0.214	206.98	0.278	269.07
<i>Koeleria macrantha</i>	Prairie Junegrass	10-18	J J	0.203	11.43	0.263	14.86
<i>Sporobolus heterolepis</i>	Prairie Dropseed	12-24	A S O	0.333	2.06	0.433	2.68
Substitutions (may exceed 24" height)							
<i>Carex annectens</i>	Yellowfruit Sedge	18-30	J A	0.000	0.00	0.000	0.00
<i>Carex sprengeii</i>	Sprengel's Sedge	12-30	M J J	0.000	0.00	0.000	0.00
<i>Eragrostis spectabilis</i>	Purple Lovegrass	12-30	J A	0.000	0.00	0.000	0.00
<i>Muhlenbergia mexicana</i>	Mexican Muhly	12-30	A S	0.000	0.00	0.000	0.00
<i>Sporobolus cryptandrus</i>	Sand Dropseed	12-40	J A S O	0.000	0.00	0.000	0.00
Grass, Sedge & Rush Total				6.740	346	8.762	450
Forbs							
<i>Asclepias verticillata</i>	Whorled Milkweed	8-24	J A S	0.002	0.01	0.003	0.02
<i>Chamaecrista fasciculata</i>	Partridge Pea	6-24	J A S	0.412	0.51	0.536	0.66
<i>Echinacea angustifolia</i>	Narrowleaf Purple Coneflower	12-24	J J	0.028	0.07	0.036	0.09
<i>Galium concinnum</i>	Shining Bedstraw	6-24	A M J J	0.011	0.09	0.014	0.11
<i>Heuchera richardsonii</i>	Richardson's Alumroot	18-24	M J J	0.005	1.01	0.007	1.31
<i>Lobelia inflata</i>	Indian-tobacco	6-24	J A S O	0.062	35.15	0.081	45.69
<i>Lobelia spicata</i>	Palespike Lobelia	12-24	M J J A	0.002	0.74	0.003	0.96
<i>Monarda punctata</i>	Spotted Beebalm	12-24	J A S	0.016	0.53	0.020	0.69
<i>Oligoneuron album</i>	Prairie Goldenrod	12-18	J J A S	0.363	6.37	0.472	8.28
<i>Osmorhiza claytonii</i>	Clayton's Sweetroot	12-24	M J	0.101	0.11	0.131	0.15
<i>Pedicularis canadensis</i>	Canadian Lousewort	4-16	A M	0.005	0.06	0.007	0.07
<i>Penstemon gracilis</i>	Lilac Penstemon	8-18	M J J	0.006	0.89	0.007	1.16
<i>Penstemon pallidus</i>	Pale Beardtongue	12-24	M J J	0.128	10.56	0.167	13.73
<i>Potentilla arguta</i> ssp. <i>arguta</i>	Tall Cinquefoil	12-24	J J A S	0.159	13.47	0.207	17.51
<i>Rosa arkansana</i>	Prairie Rose	6-24	J J A	0.018	0.01	0.024	0.02
<i>Ruellia humilis</i>	Fringeleaf Wild Petunia	8-18	J J A	0.014	0.03	0.019	0.04
<i>Tradescantia bracteata</i>	Longbract Spiderwort	6-18	M J J	0.003	0.01	0.003	0.01
<i>Tradescantia occidentalis</i>	Prairie Spiderwort	10-24	M J J	0.013	0.04	0.017	0.05
<i>Zizia aurea</i>	Golden Zizia	12-24	A M J	0.304	1.46	0.395	1.90
Substitutions (may exceed 24" height)							
<i>Asclepias tuberosa</i>	Butterfly Milkweed	6-30	J J A	0.000	0.00	0.000	0.00
<i>Dalea candida</i>	White Prairie Clover	12-30	J J A S	0.000	0.00	0.000	0.00
<i>Dalea purpurea</i>	Purple Prairie Clover	9-30	J A S	0.000	0.00	0.000	0.00
<i>Hypericum punctatum</i>	Spotted St. Johnswort	12-30	J A S	0.000	0.00	0.000	0.00
<i>Solidago nemoralis</i>	Gray Goldenrod	8-30	A S	0.000	0.00	0.000	0.00
Forb Total				1.655	71	2.151	92
SEED MIX TOTAL				8.395	418	10.913	543

Crane and Sandhill BESS Wetland Native Seed Mix — Seasonally Flooded

Olmsted County, Minnesota

Scientific Name	Common Name	Height in	Bloom Season Apr – Oct	Drill Rate (PLS)		Broadcast Rate (PLS)	
				lb/ac	seeds/sq ft	lb/ac	seeds/sq ft
Grasses, Sedges & Rushes							
<i>Andropogon gerardii</i>	Big Bluestem	24–78	J J A S	0.785	3.63	1.020	4.72
<i>Beckmannia syzigachne</i>	American Sloughgrass	8–42	J J A	0.575	10.57	0.748	13.74
<i>Bolboschoenus fluviatilis</i>	River Bulrush	72	J J	0.099	0.16	0.129	0.21
<i>Bromus ciliatus</i>	Fringed Brome	20–40	J A S	0.413	1.52	0.537	1.97
<i>Bromus kalmii</i>	Arctic Brome	20–36	J A S	0.103	0.38	0.134	0.49
<i>Calamagrostis canadensis</i>	Bluejoint	24–48	J J A	0.039	4.02	0.051	5.22
<i>Carex annectens</i>	Yellowfruit Sedge	18–30	J A	0.027	0.65	0.035	0.85
<i>Carex bebbii</i>	Bebb's Sedge	8–36	J J	0.008	0.17	0.011	0.22
<i>Carex comosa</i>	Longhair Sedge	24–42	J	0.032	0.37	0.042	0.48
<i>Carex haydenii</i>	Hayden's Sedge	48	J J A	0.009	0.13	0.012	0.17
<i>Carex hystericina</i>	Bottlebrush Sedge	10–36	J	0.069	1.51	0.090	1.97
<i>Carex lacustris</i>	Hairy Sedge	36	M J J	0.018	0.12	0.024	0.15
<i>Carex pellita</i>	Woolly Sedge	6–36	J	0.011	0.06	0.015	0.08
<i>Carex scoparia</i>	Broom Sedge	12–30	J J	0.026	0.71	0.034	0.92
<i>Carex stricta</i>	Upright Sedge	24–48	J J	0.014	0.28	0.018	0.36
<i>Carex tribuloides</i>	Blunt Broom Sedge	12–36	J	0.057	2.86	0.075	3.71
<i>Carex utriculata</i>	Northwest Territory Sedge	36	J J	0.077	0.40	0.100	0.51
<i>Carex vulpinoidea</i>	Fox Sedge	12–36	J J	0.258	7.68	0.336	9.99
<i>Deschampsia cespitosa</i>	Tufted Hairgrass	12–54	J	0.025	0.84	0.033	1.10
<i>Eleocharis acicularis</i>	Needle Spikerush	1–12	J J A S	0.024	0.96	0.031	1.25
<i>Eleocharis obtusa</i>	Blunt Spikerush	2–10	J J A S O	0.021	1.44	0.028	1.88
<i>Eleocharis palustris</i>	Common Spikerush	12	M J J A	0.058	1.03	0.075	1.34
<i>Glyceria canadensis</i>	Rattlesnake Mannagrass	36	J J A	0.032	0.36	0.042	0.46
<i>Glyceria grandis</i>	American Mannagrass	36–54	J J A S	0.065	1.90	0.084	2.47
<i>Juncus arcticus ssp. littoralis</i>	Mountain Rush	36	M J J A	0.017	3.01	0.023	3.92
<i>Juncus dudleyi</i>	Dudley's Rush	8–24	J J A S	0.029	31.60	0.037	41.08
<i>Juncus effusus</i>	Common Rush	16–36	J A S	0.033	18.63	0.043	24.22
<i>Juncus tenuis</i>	Poverty Rush	6–18	J J A S	0.029	28.55	0.038	37.11
<i>Juncus torreyi</i>	Torrey's Rush	12–36	J A S O	0.012	10.49	0.016	13.63
<i>Leersia oryzoides</i>	Rice Cutgrass	24–54	J J A S O	0.083	0.81	0.108	1.05
<i>Muhlenbergia racemosa</i>	Marsh Muhly	10–42	A S	0.025	0.83	0.033	1.07
<i>Panicum virgatum</i>	Switchgrass	36–66	J A S	0.345	2.82	0.449	3.67
<i>Schoenoplectus tabernaemontani</i>	Softstem Bulrush	72	J J A	0.080	0.91	0.104	1.19
<i>Scirpus atrovirens</i>	Green Bulrush	36–60	J J A	0.349	59.01	0.454	76.71
<i>Scirpus cyperinus</i>	Woolgrass	36–66	A S O	0.140	63.34	0.182	82.34
<i>Scirpus pendulus</i>	Rufous Bulrush	48	M J J	0.183	24.90	0.238	32.37
<i>Spartina pectinata</i>	Prairie Cordgrass	36–84	J A S	0.772	3.84	1.004	4.99
<i>Sphenopholis obtusata</i>	Prairie Wedgescale	36	J J A	0.065	1.85	0.085	2.40
Grass, Sedge & Rush Total				5.013	292	6.516	380
Forbs							
<i>Angelica atropurpurea</i>	Purplestem Angelica	84	M J	0.109	0.24	0.141	0.31
<i>Apocynum cannabinum</i>	Indianhemp	48	M J J A	0.009	0.10	0.012	0.13
<i>Asclepias incarnata</i>	Swamp Milkweed	12–48	J J A	0.109	0.24	0.141	0.31
<i>Asclepias speciosa</i>	Showy Milkweed	48	J J A	0.116	0.19	0.151	0.25
<i>Bidens aristosa</i>	Bearded Beggarticks	12–42	A S O	0.097	0.35	0.126	0.46
<i>Bidens cernua</i>	Nodding Beggartick	6–42	J J A S	0.036	0.18	0.047	0.24
<i>Bidens coronata</i>	Crowned Beggarticks	48	A S O	0.012	0.04	0.016	0.05
<i>Boltonia asteroides</i>	White Doll's Daisy	36–54	A S O	0.218	10.32	0.283	13.42

