

Milk and Marias and St Mary Rivers Wetland Assessment

In 2008, the MTNHP was awarded an EPA Wetland Program Development Grant to develop a long term rotating basin wetland monitoring and assessment program. The pilot project for the rotating basin assessment program took place in the Milk and the Marias watersheds located in north central Montana. Through this project a three-tiered assessment approach was developed and refined following the EPA's recommended framework for designing an effective monitoring strategy. This includes a Level 1 landscape scale assessment to determine the condition of the watershed, the integrity of the landscape in the wetland buffer, and the distribution and abundance of wetland types in a watershed. The approach also includes a Level 2 rapid assessment that evaluates the general condition of individual wetlands using field indicators and identifies specific stressors that correlate with wetland condition. Also, a Level 3 intensive soil and vegetation assessment is conducted that provides quantitative data that can be used to validate rapid wetland assessments, characterize wetland condition, and diagnose causes of degradation. Examples of intensive assessments include floristic quality assessment indices (FQI).

Attribute Definitions:

Owner: State or Federally owned public land

Site ID: Wetland assessment site identification.

Assessment Date: Date of wetland assessment

Ecological System: Wetland ecological system defined by the Montana Natural Heritage Program

Landscape Context Score:

The overall landscape context attribute score reflects the condition and the connectivity of the buffer within 500 meters of the wetland assessment area. This score is calculated using the buffer condition, buffer length, buffer width and landscape connectivity metrics. The following equation was used to calculate the raw landscape context score: $[\text{SQRT}(\text{buffer condition} * \text{SQRT}(\text{buffer length} * \text{buffer width}) + \text{landscape connectivity})]$. The final attribute score was calculated by dividing the raw attribute score by the total possible points (24 points) and then multiplying by 100 for a percent.

Higher scores indicate wetlands in better condition.

Relative Size Score: The relative patch size score describes the patch size of the entire wetland calculated as the current size of the wetland divided by the historic size of the wetland. The final attribute score was calculated by dividing the relative patch score by the total possible points (12) and then multiplying by 100 for a percent. Higher scores indicate wetlands that are 80% to 95% of their original size.

Biotic Score: The biotic attribute score reflects the cover of native, invasive exotic, invasive or highly tolerant natives as well as the amount of organic matter accumulation and patch interspersions in the wetland assessment area. The following equation was used to calculate the raw biotic score:

$$\left(\frac{\text{Relative cover of native plant species} + \text{invasive exotic species cover} + \text{highly tolerant native plant species cover}}{3} \right) + \text{organic matter accumulation} + \text{patch interspersions score}$$

The final biotic attribute score was calculated by dividing the raw biotic attribute score by the total possible points (36) and then multiplying by 100 for a percent.

Higher scores indicate wetlands in better condition.

Hydrology Score: The hydrology attribute score is based on water source, hydroperiod, and hydrologic connectivity metrics. The final attribute score is calculated by taking an average of the three metric scores $\left[\frac{(\text{water source} + \text{hydroperiod} + \text{hydrologic connectivity})}{3} \right]$. The raw hydrology score was divided by the total possible points (36) and then multiplied by 100 for a percent. Higher scores indicate wetlands in better condition.

Physicochemical Score: The physicochemical attribute score reflects the amount of soil disturbance and water quality within the assessment area. The final attribute score is calculated by adding the soil surface integrity and water quality metrics and then dividing by the total possible points (24) and then multiplying by 100 for a percent. Higher scores indicate wetlands in better condition.

Overall Condition Score: The overall assessment score is an average of the landscape context, relative patch size, biotic, hydrologic and physicochemical attribute scores. Higher scores indicate wetlands in better condition.

Floristic Quality Index: The Floristic Quality Index (FQI) is a vegetation based index that is used to assess ecological integrity. This attribute is calculated by multiplying the mean coefficient of conservatism by the square root of the number of all plants. A lower FQI score indicates a more degraded system while a high FQI score indicates a healthier wetland. Level 3 assessments were not performed at every site. A blank value indicates that no Level 3 assessment was performed at that site.

Adjusted cover-weighted FQI for Natives (AdjCovFQI): The Adjusted cover-weighted FQI for Natives is an adjusted FQI that takes into account the cover of both native and nonnative plant species. Emphasis on just native species richness can be misleading since some sites may have greater species richness but lower average coefficient of conservatism (mean C) values and still receive higher FQI scores. Since wetland systems in the Montana Glaciated Plains tend to be naturally species poor, we used the adjusted cover-weighted FQI that uses the mean C-value and incorporates both native and non-native species. Level 3 assessments were not performed at every site. A

blank value indicates that no Level 3 assessment was performed at that site. This Index is calculated as the following:

Cover-weighted mean

$$C = \frac{\text{(Sum of each species mean C-value * each species cover value)}}{\text{The sum of cover values for all species}}$$

$$\text{AdjCovFQI} = \frac{\text{Cover-weighted mean C for native plants}}{10} * \frac{\text{SQRT(\# Native plants)}}{\text{SQRT (\# all plants)}} * 100$$