memo

Project Name |	Mendel Wetland Groundwater Monitoring	**Date** |	12/12/2022
To / Contact info |	BCWD Board of Managers		
Cc / Contact info |	Karen Kill, BCWD Administrator		
From / Contact info |	Stu Grubb, PG and Matthew Hegland, GIT		
Regarding |	2022 Data Summary		

Background

Mendel wetland is a large wetland complex located between Manning Ave and Mendel Ave north of Highway 96. The wetland is partially drained to the south by a ditch that runs north-south through the east side of the wetland. The BCWD has assessed this wetland and explored options for improving wetland function & value, while gaining water quality and volume control returns – which is articulated in the *11/25/2020 DRAFT MEMO - Floristic Inventory & Site Survey Findings*

/https://bcwd.org/vertical/sites/%7B64FB1BEC-A43C-4118-B98E-92A5C0551F17%7D/uploads/Dec2020_MendelWetland_Board_Memo.pdf]

One approach to garnering water quality and habitat returns is to restore wetland hydrology by reducing or eliminating artificial drainage via a full or partial blockage of the existing ditch. Adjacent land use includes pasture and row cropping. To date a single landowner has raised concerns that the pasture would be less usable under a restored condition due to the perception of an increase in soil moisture.

To determine offsite impacts and project feasibility, EOR is investigating the effect of the Mendel wetland ditch on groundwater levels. The goal is to determine whether there will be impacts to the pasture if the ditch is blocked. The impact of the ditch on groundwater levels is known as the "lateral effect" and is illustrated in Figure 1. The lateral effect distance of a ditch is the distance away from the ditch where the groundwater hydrology is no longer affected.

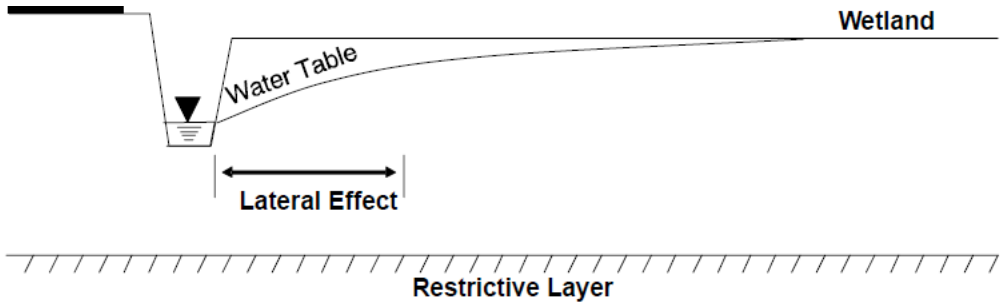

Figure 1. Lateral effect of a ditch (Skaggs, 2005)

Data Collection

Three piezometers were installed near the ditch in May 2021. The piezometer locations are shown on Figure 2. The locations were selected to measure the lateral effect of the ditch on groundwater elevations at different distances away from the ditch.

The piezometers were pounded into the ground by hand to a depth of approximately 6 feet. Water level loggers installed in the piezometers measured water levels every 15 minutes. The water level loggers were in place from May 5 to October 12, 2022.

Monitoring Results

Both 2021 and 2022 have been unusually dry years, so opportunities to monitor the ditch have been very limited. The ditch only held water during the 2022 monitoring season until around June 30 and a few days in late August.

Water level data are shown on Figure 3. The data show a decrease in elevation through the spring, and the ditch goes dry in late June. The ditch level stays constant on the graph because the water drops below the level of the water level logger after this point.

Piezometer 2 produced data that were clearly incorrect and therefore were not used. Either the inlet holes in the piezometer became clogged or the data logger did not operate properly.

Piezometer 1 responds to the elevation of water in the ditch quite closely. Piezometer 3 was consistently higher than the other piezometers and does not display a short-term response to water level changes in the ditch. The extent of lateral effect of the ditch lies somewhere between these points, 23.2-47.2 feet from the centerline of the ditch.

Conclusions

The monitoring data indicate that the ditch only lowers groundwater levels within an area less than 50 feet away from the ditch. These findings indicate that the Mendel Wetland Restoration project (partial or full ditch blockage) would not cause groundwater flooding nor adverse impact on the adjoining or adjacent active pasture of row crop field(s).

Next Steps

The piezometers have provided the information we need to evaluate the effect of the ditch on groundwater. Further monitoring during more normal or wet years would likely not yield different results. Therefore, we recommend removing the piezometers sometime shortly after the ground thaws (spring 2023).

Should the District Board desire to carry a project forward the following next steps are prudent:

1. Refresh the Board on the probable project(s) and desired outcomes.
2. Determine what if any potential projects are favored by the Board. For example, is the District's interest limited to floristic enhancement, which would presumably require less engineering, permitting and landowner negotiation and/or is the District interested in restoring hydrology to this drained wetland?
3. Re-engage landowners to
    a. Communicate desired potential project goals

   b. Survey landowner/stakeholder interest, concerns, or objection
   c. Quantify any land easement or acquisitions likely necessary to implement project(s)
4. Authorize the completion of ~30% Construction Documents and related modeling and cost estimation to more accurately depict project returns and costs.

References

Skaggs, 2005. Methods To Determine Lateral Effect of a Drainage Ditch on Wetland Hydrology. Transactions of the ASAE. Vol. 48(2): 577–584.

Figure 2. Piezometer locations

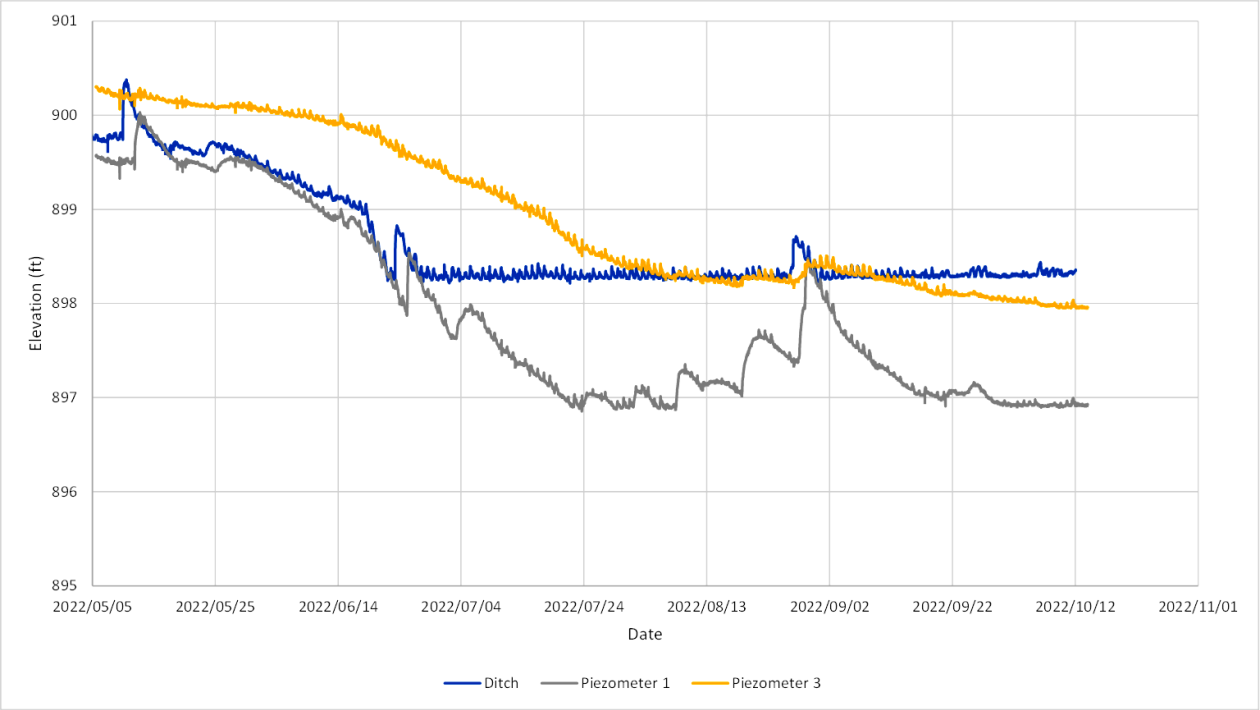

Figure 3. Water levels in piezometers and the Mendel Wetland ditch