USING INLINE WATER LEVEL CONTROL DEVICES FOR IMPROVED DRAINAGE WATER MANAGEMENT

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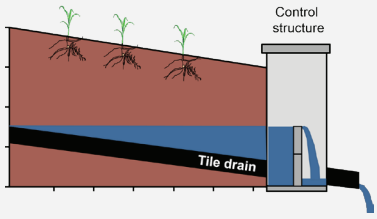
OVERVIEW

Phosphorus (P) and Nitrogen (N) loadings to surface waters have been identified as a major water quality issue in Ohio.

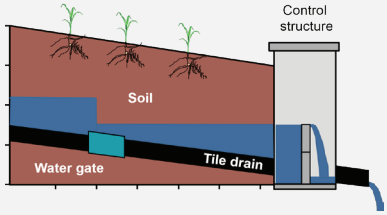
Drainage water management (DWM) has shown to substantially decrease N and P loadings in artificially drained landscapes.

DWM has generally been limited to flat fields (<0.5% slope) due to small effective areas on fields with steeper slopes.

Drainage Water Management with an Outlet Elevation Control Structure



Drainage Water Management with an Outlet Elevation Control Structure + Inline Water Gate Device

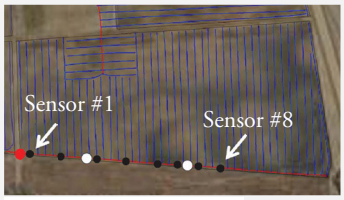


Water level control devices "stair-step" water up through the soil profile.

OBJECTIVE

Demonstrate the use of an outlet elevation control structure + inline Water Gate device for improved water table management.

DEMONSTRATION SITE



Tile Lateral
Tile Main
Outlet Elevation Control Structure
Water Gate Device
Water Level Sensor

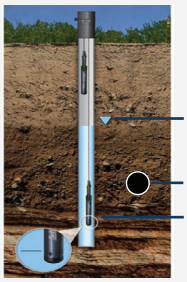
Located at Farm Science Review

The Water Gate ™

Agri Drain CORPORATION

www.agridrain.com

Water Elevation Measurements



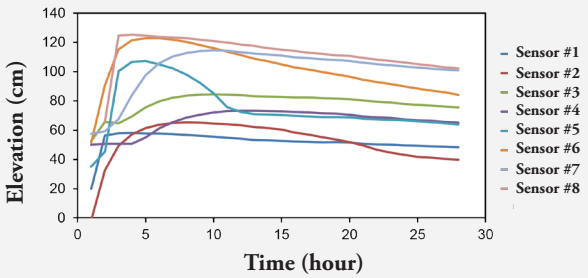
Fully automatic, completely buried, and can be used in series.

Maintains a 1-ft. increase in water elevation between the downstream and upstream side of the valves.

Water elevation was measured using a Solinst Levelogger, hourly, at 8 locations along the tile drain.

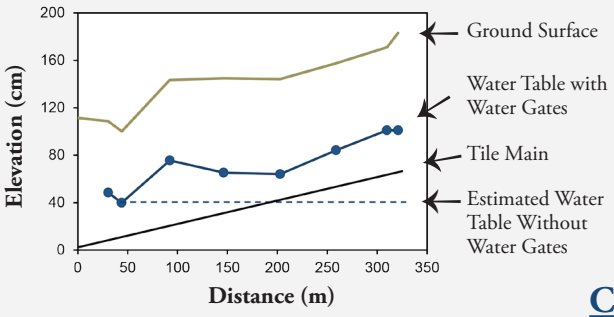
RESULTS

Water Table Dynamics During a Rainfall Event on 6/14/2015

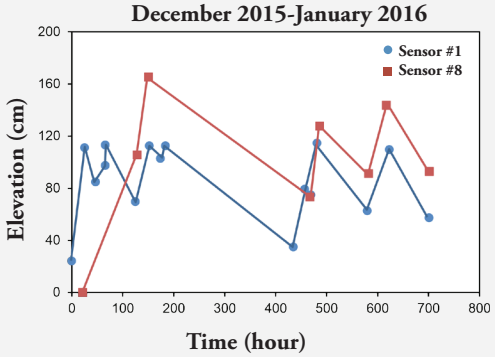


RESULTS

Water table at 10 am on 6/14/2015



Water Table Dynamics From December 2015-January 2016



CONCLUSIONS

Water Gates effectively "stair-step" water up through the soil profile, which increases the effective area of DWM.

Using an outlet elevation control structure + inline Water Gate device increases the amount of acres suitable for DWM across the Midwestern U.S.

Future research is needed to determine if using an outlet elevation control structure + Water Gate device decreases the amount of nutrient loading compared to only using an outlet elevation control structure.