

**Smart Wetlands** are a custom solution that can address multiple challenges on your farm.

If you have farm tile drainage or are considering installing a tile drainage system, or if you have a tile line passing through your property to a nearby creek, ditch or river, then a Smart Wetland may be right for you.

Though designed to support biological and chemical processes to break down nitrogen in ag tile drainage water, Smart Wetlands have numerous side benefits that are just as attractive. They include:

- turning unprofitable acres into profitable ones through USDA Farm Bill conservation funds
- not having to change current in-field cropping systems
- attracting wildlife for recreational purposes
- doing little annual maintenance for decades of nitrate removal
- receiving funding from USDA Farm Bill for construction cost-share and land rental payments
- increasing native habitat for pollinators
- developing a natural habitat area on the farm that can be used for recreation or hunting.



Please contact us to schedule a conversation about our program or to schedule a preliminary field visit.

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# SMART WETLANDS

A Program of the Wetlands Initiative



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**Installing a Smart Wetland in an existing or new tile drainage system can provide a variety of advantages to your farmland and farm operation.**



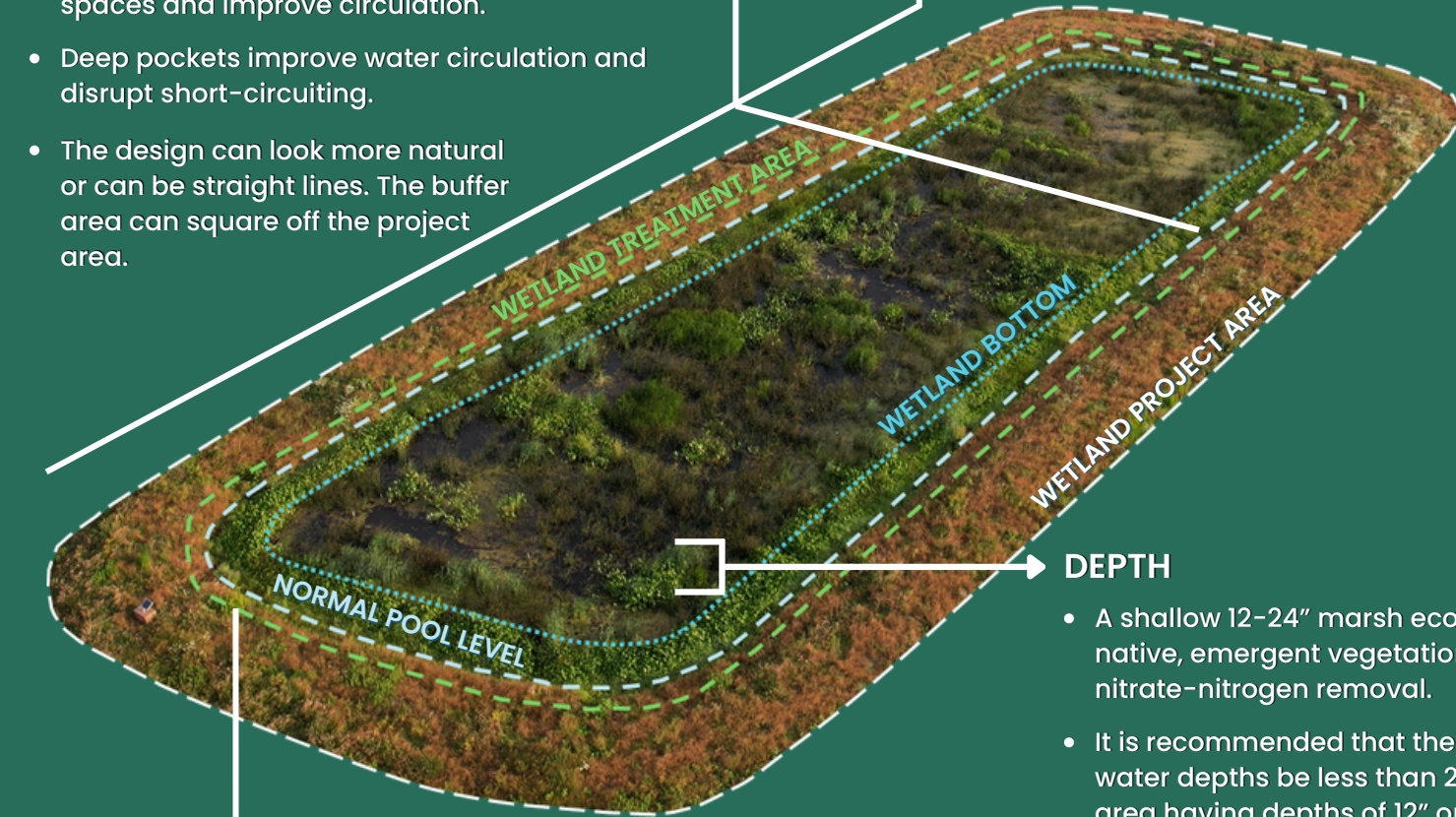
# SMART WETLANDS ARE DESIGNED FOR NUTRIENT REMOVAL

## LAYOUT

- Prefer 3:1 length to width as longer distances mean increased contact time with sediment and plants.
- Berms/islands can achieve "length" in small spaces and improve circulation.
- Deep pockets improve water circulation and disrupt short-circuiting.
- The design can look more natural or can be straight lines. The buffer area can square off the project area.

## SIZE

- The wetland treatment area is 1–5% of the contributing tile drainage area; however, a size ratio of 2.5–5% will provide >50% nitrate removal.
- Typically, the wetland treatment area is the area 3–feet above the bottom of the wetland or 1-foot above normal pool (see DEPTH).
- The wetland treatment area doesn't include any embankments or surrounding buffer area.



## SOILS

- At least 12" of compacted clay to line the bottom and sides. The clay liner keeps the water in the wetland and minimizes seepage.
- Loamy soils serve as the growth media for the wetland plants. This top layer is typically the 6–12" of topsoil that is scraped off and stockpiled prior to excavation.

## DEPTH

- A shallow 12–24" marsh ecosystem with native, emergent vegetation works best for nitrate–nitrogen removal.
- It is recommended that the normal pool water depths be less than 24" with 50% of the area having depths of 12" or less.
- Water levels are managed and maintained with a water control structure and an auxiliary spillway.
- The shallow water depth is not appropriate for permanent fish habitat.

## BEST SMART WETLAND LOCATION

- Near a tile main that can be intercepted
- Near a ditch, stream, or grassed waterway for auxiliary spillway overflow
- In a field with some slope (grade) for gravity flow in and out of the wetland
- In a field with a clay layer 2–5 feet below ground
- In an area of a field that is hard-to-farm or is not profitable

## FACTORS THAT AFFECT NUTRIENT REMOVAL

- The tile water flow rate
- The concentration of nutrient in the tile water
- The amount of time the water spends moving through the wetland
- The temperature of the water and the soil
- The amount of carbon available to the microbes that break down the nitrate
- The physical and chemical properties of the soil