

Farmers and landowners look to you for advice on how to manage their farming systems. **Smart Wetlands** are a **custom solution** that can address multiple challenges.

For those clients who have agricultural tile drainage or are considering installing a tile drainage system, ask them to consider installing a **Smart Wetland** as part of their system.

While primarily designed to break down nitrogen in ag tile drainage water, Smart Wetlands can help improve profitability, bring conservation funding into the farm operation, and add resilience in handling the effects of extreme weather.

Additional advantages include:

- An effective nature-driven nitrate removal system that can operate effectively for decades with little annual maintenance
- Converts non-profitable or hard-to-farm areas to a multi-benefit conservation practice
- Funding available from USDA Farm Bill for construction cost-share and land rental payments
- Requires no changes to current farming systems
- Develops a natural habitat area on the farm that can be used for recreation or hunting



Please contact us to schedule a conversation with you and your client about our program or to schedule a preliminary field visit.

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SMART WETLANDS

A Program of the Wetlands Initiative

Do you have clients with ag tile drainage systems who want to adopt a practice to improve water quality?

Or maybe they have a few acres of unprofitable or hard-to-farm land?

If so, a SMART Wetland may be the solution.



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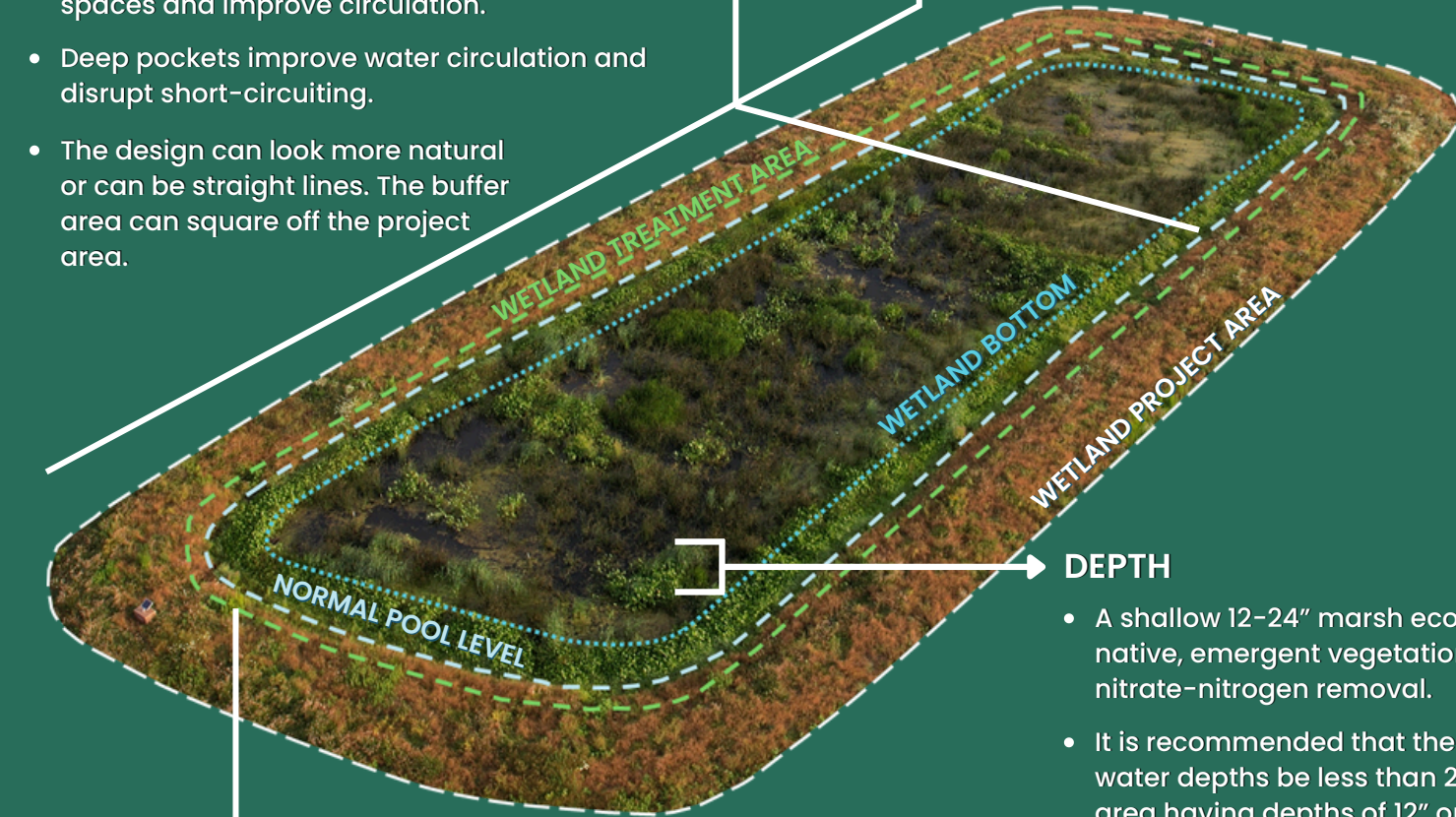
SMART WETLANDS ARE DESIGNED FOR NUTRIENT REMOVAL

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