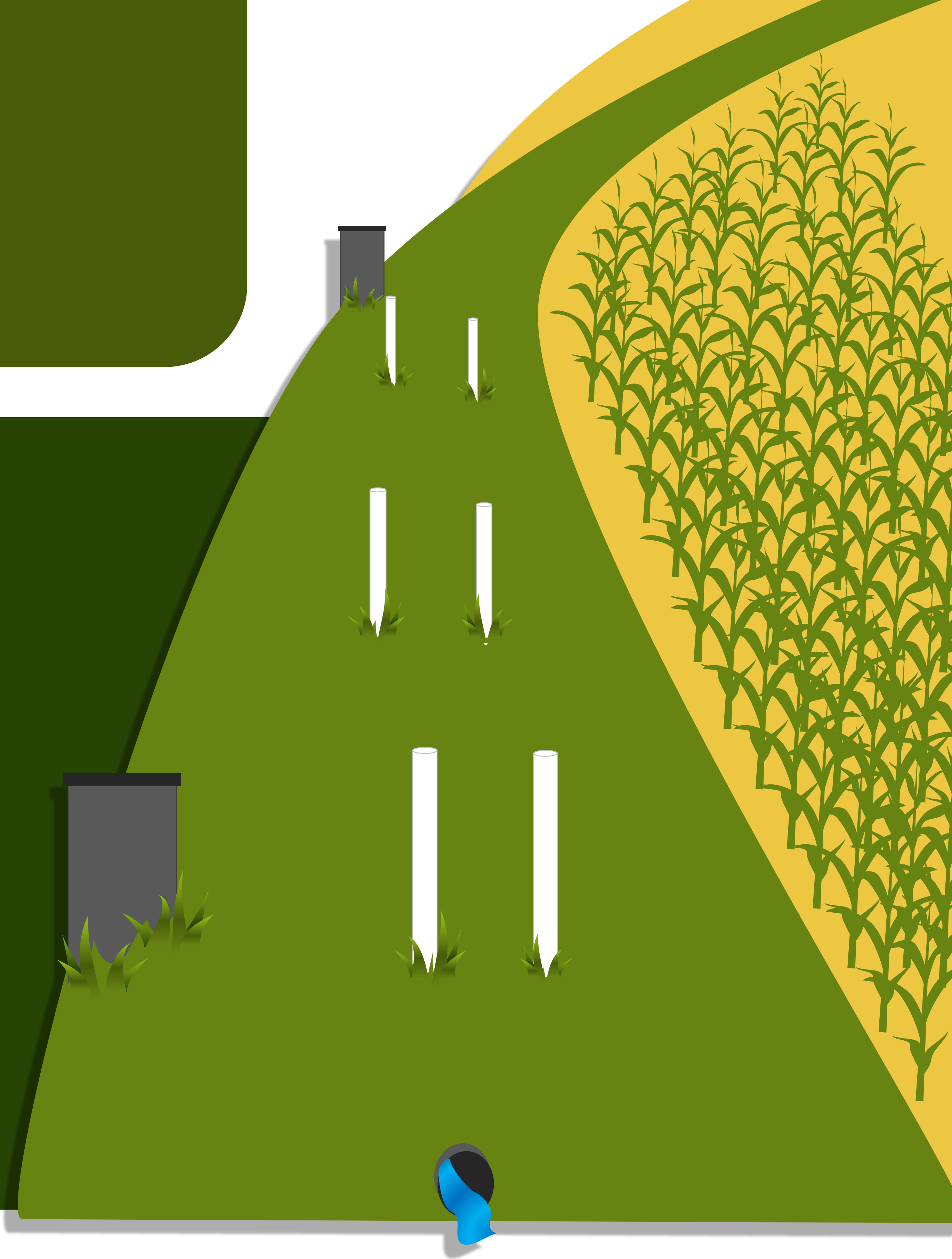


# Extending Saturated Buffers to Additional Landscape Positions

Jen Merryman<sup>1</sup>, Thomas Isenhardt<sup>1</sup>, Keith Schilling<sup>2</sup>

<sup>1</sup>Iowa State University, <sup>2</sup>Iowa Geological Survey and University of Iowa

Saturated grassed waterways have the potential to reduce nitrate concentration by up to **98%** from tile to groundwater wells.

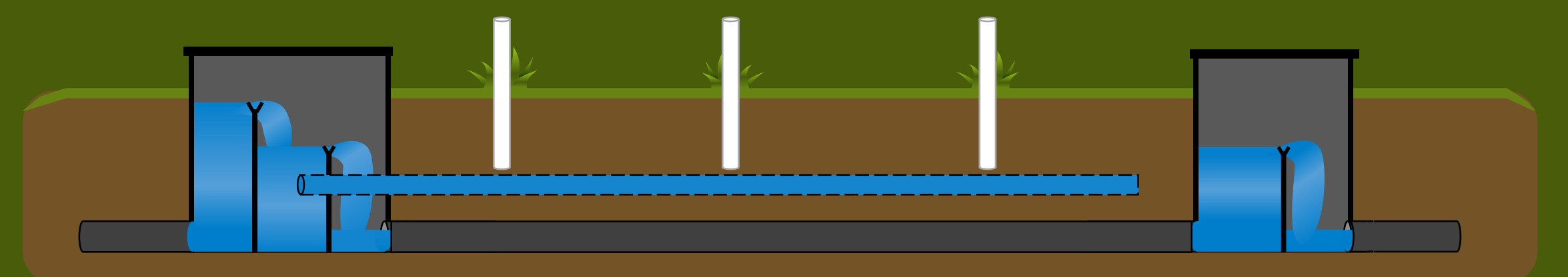


## Background

- **Nutrient Loss Challenge:** Elevated nitrate levels stemming from nutrient loss threaten water quality and ecosystems.
- **Landscape Constraints:** Traditional edge-of-field nitrate reduction practices face limitations due to landscape factors, necessitating alternative solutions.
- **Sustainable Innovation:** Exploring non-riparian positions and adapting in-field features offers promise to reduce nitrate loss.
- **Iowa Nutrient Reduction Strategy:** This research aligns with the Iowa Nutrient Reduction Strategy's goal of innovative and cost-effective nutrient reduction solutions in agriculture.

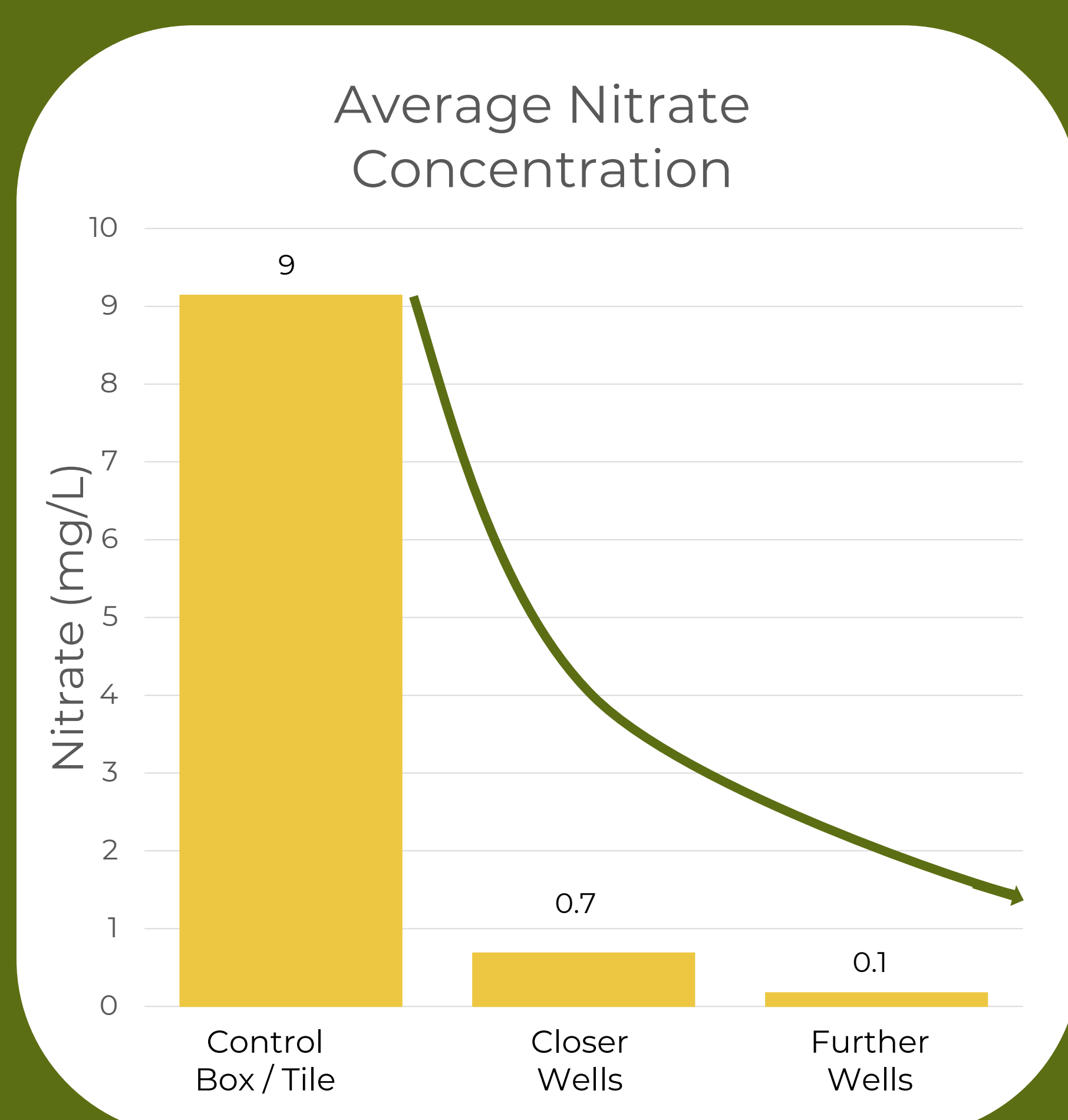
## Methods

1. Installation of a perforated tile distribution on edge of an existing grassed waterway.
2. Diversion of tile water into distribution line by a control box with stoplogs for hydraulic head control.
3. Deployment of down-gradient monitoring wells to intercept groundwater as it flows through waterway soil.
4. Regular collection of water samples from monitoring wells and control box for nitrate concentration.



## Results

Three years of monitoring nitrate concentrations has shown an average concentration reduction of up to 98% when comparing the tile water with the groundwater well the furthest distance from the tile line.



## Ongoing Research

Ongoing studies incorporate flow monitoring alongside nitrate concentration analysis. This expanded methodology will enable us to estimate the mass loss of nitrogen, providing a deeper understanding of the nutrient removal efficiency of saturated buffers. Based on initial results, the potential to significantly broaden the range of viable locations for establishing saturated buffers within tile-drained landscapes is great, which closely aligns with the overarching objectives of the Iowa Nutrient Reduction Strategy.

