

Iowa Conservation Reserve Enhancement Program—Wetlands in Floyd County

RFR-A1898

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Introduction

The Iowa State University Wetland Research Group with help from Tyler Mitchell and the Northeast Research Farm monitors three wetlands in Floyd County.

Materials and Methods

A unique aspect of the Iowa Conservation Reserve Enhancement Program (CREP) is that nitrate reduction is not simply assumed based on acres enrolled but is calculated based on measured performance of CREP wetlands. Selected wetlands are instrumented for continuous flow measurement and automated sampling at inflows and outflows. Mass balance analyses are used to calculate mass removal rates of nitrate. The wetlands selected for monitoring span a broad range of factors affecting wetland performance including

hydraulic loading rate, residence time, nutrient concentration, and nutrient loading rate.

Results and Discussion

Figure 1 shows the wetland inflow discharge (m^3/day , blue line) and nitrate-nitrogen concentrations (mg/l) in the inflow (red dotted line) and the outflow (green dotted line) of each of the Floyd County wetlands monitored during 2018. Figure 2 shows percent of nitrate mass removed with respect to hydraulic loading rate of wetlands monitored in Iowa between 2004 and 2018. Each dot represents the percent of nitrate removed by an individual wetland for one year plotted against the hydraulic loading rate (volume of water received by the wetland divided by the area of the wetland). Large wetlands and/or dry years fall towards the left side of the graph while small wetlands and/or wet years will lie on the right side of the graph. The Floyd County wetlands monitored between 2014 and 2018 are represented by the red dots.

Nitrate removal depends primarily on hydraulic and nitrate loading rates, which depend on location, size, and weather patterns. On average, wetlands occupying 0.5-2 percent of a catchment can reduce long term nitrate loads by 30 to 70 percent.

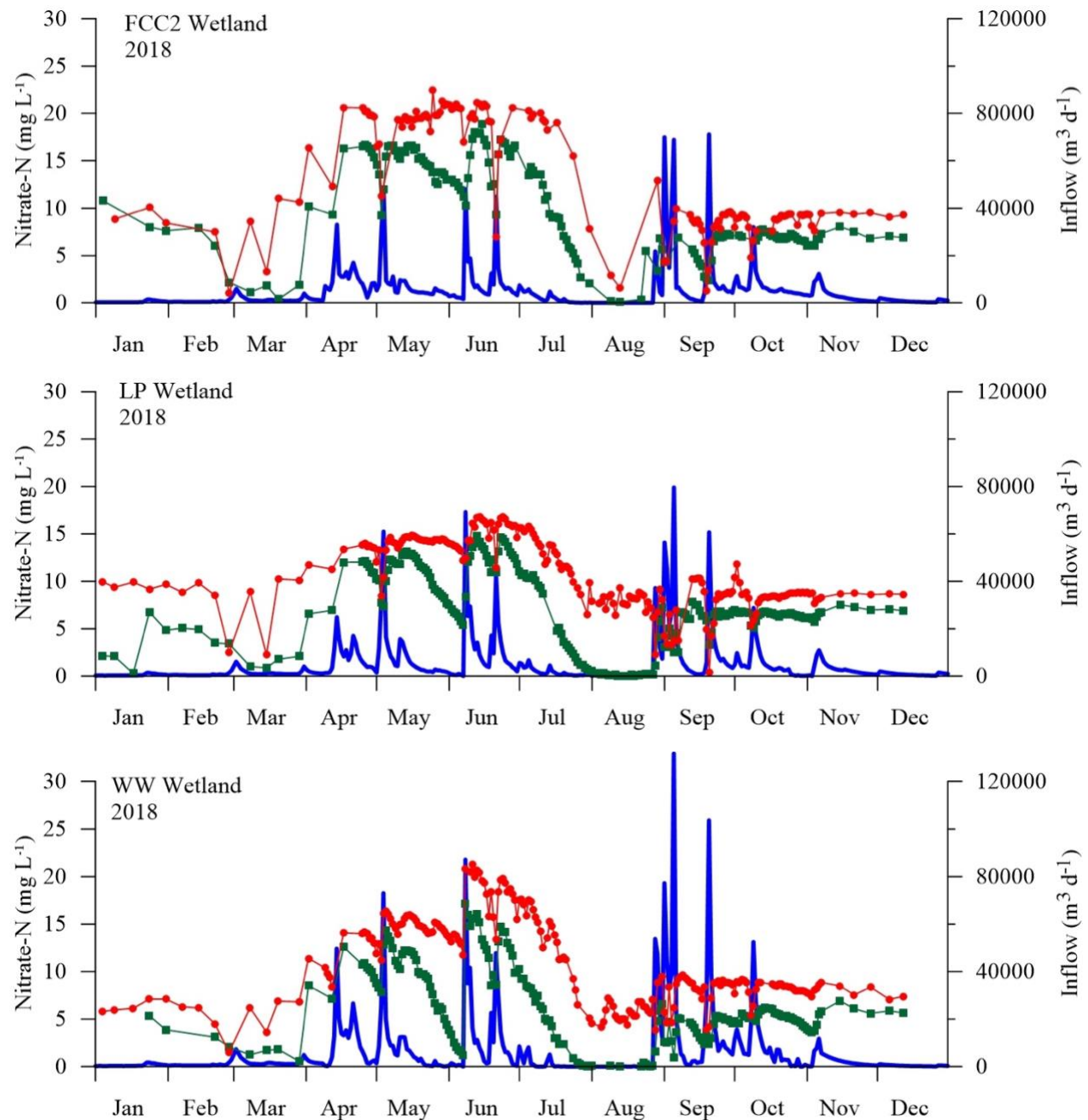


Figure 1. Figure 1 shows the wetland inflow discharge (m³/day, blue line) and nitrate-nitrogen concentrations (mg/l) in the inflow (red dotted line) and the outflow (green dotted line) of each of the Floyd County wetlands monitored during 2018.

Legend:

- Observed nitrate-N inflow (mg/L)
- Observed nitrate-N outflow (mg/L)
- Inflow

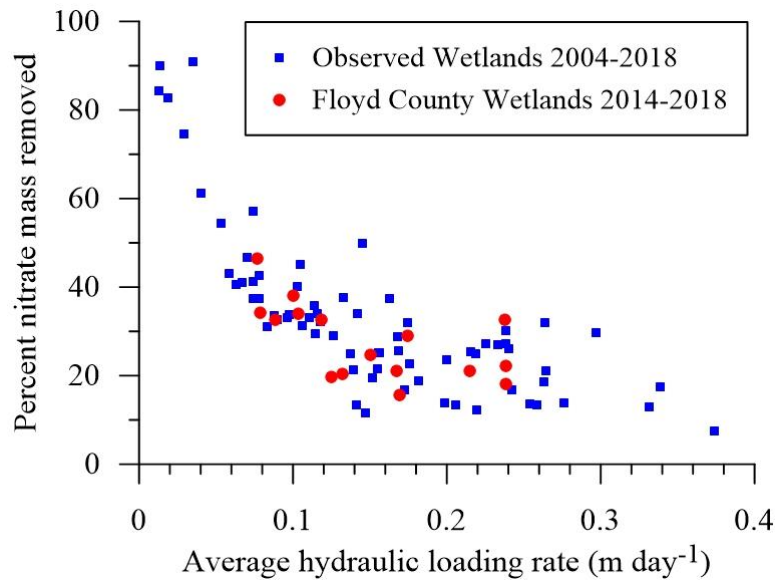


Figure 2. Percent of nitrate mass removed with respect to hydraulic loading rate of wetlands monitored in Iowa between 2004 and 2018. Each dot represents the percent of nitrate removed by an individual wetland for one year plotted against the hydraulic loading rate (volume of water received by the wetland divided by the area of the wetland). Large wetlands and/or dry years fall towards the left side of the graph while small wetlands and/or wet years will lie on the right side of the graph. The Floyd County wetlands monitored between 2014 and 2018 are represented by the red dots.