Appendix H

Potential Adverse Change to Wetland Function Assessment

Introduction

As part of North Florida Regional Water Supply Plan (NFRWSP) development, the St. Johns River Water Management District (SJRWMD) and Suwannee River Water Management District (SRWMD) (Districts) assessed the extent to which water resources and related natural systems may be impacted in the projected increase in groundwater use through 2045. Adverse Change to wetland function is one component of the water resource assessment, along with saltwater intrusion/upwelling, minimum flows and levels (MFLs), waterbodies without adopted MFLs, and water reservations. This information helps guide the delineation of water resource caution areas and the formulation of project options.

This document details the methods used to assess wetlands in the NFRWSP area associated with projected groundwater demand at the planning horizon (2045) and the assessment results. Although significantly altered wetlands have occurred in the past due mainly to farmland conversion and urbanization, wetlands can be altered by factors other than groundwater withdrawals (e.g., modification of surface water hydrology). However, this analysis focused exclusively on assessing the potential for adverse change to existing wetlands only due to predicted changes in groundwater levels resulting from projected increases in groundwater demand. The outcome of this assessment was used with other factors in determining whether traditional water supply (i.e., fresh groundwater) sources are sufficient to meet future water demands.

Background

In previous Water Supply Plans and Assessments, the probability of adverse change in wetland functions was determined using variations of the Kinser-Minno method incorporated into a GIS model (Kinser and Minno, 1995; Kinser et. al., 2003). The Kinser-Minno method provides an estimation of the magnitude (acres), degree (high, moderate, low), and spatial distribution of the potential for future adverse change to wetlands throughout the planning region. The GIS model conducts a matrix analysis utilizing conditional statements dependent on soil permeability, sensitivities of plant communities to dewatering, and modeled declines in the surficial aquifer (SA) to estimate the potential adverse change to individual plant communities that may occur if future water demands were met with traditional sources. The model was updated in 2003 and 2008, which included the depth to the Upper Floridan Aquifer (UFA) potentiometric surface as an additional screening parameter for the areas of unconfined UFA. The additional steps of incorporating the depth to the UFA potentiometric surfaces with respect to the unconfined UFA provide further analysis depending on whether or not the area is hydraulically connected to the UFA and therefore, would or would not be influenced by changes in UFA levels. Since then, the model has received many minor updates such as the inclusion of a digital elevation model (DEM).

The Kinser-Minno GIS Model was reviewed and updated in 2022. The soils data, vegetation layer, and the Digital Elevation Model (DEM) data were updated. Another screening parameter, depth to water table or SAS, was introduced for the areas where

the UFA is confined. An additional tool was added to the workflow to make the thresholds for depth to water table and depth to potentiometric surfaces adjustable. The updates to the model are described in detail in Attachment A.

Methodology

The 2022 Kinser-Minno tool (Attachment A) was used to simulate potential adverse change in wetlands based on increased groundwater withdrawals (drawdown) between current pumping (CP) and 2045 projected withdrawals. Due to the way in which the Kinser-Minno applies the screening criteria, the tool was run using the 2009 “pumps-off” (PO) baseline conditions. Therefore, the tool used both PO to CP drawdown, and PO to 2045 drawdown. The difference in spatial and numerical results were subsequently used to estimate the effects of CP to 2045 drawdown. The area of potential adverse change to wetlands was summarized by county for the NFRWSP area. Furthermore, the Kinser-Minno tool predicts low, moderate, and high potential for adverse change, but only the moderate and high potentials for adverse change were considered in the analysis. Areas with a low potential for adverse wetland change were not included in the results because this classification indicates that plants are drought tolerant or the soils are not susceptible to dewatering (Kinser and Minno, 1995). Descriptions of the moderate and high classifications can be found in Attachment A.

Results of CP to 2045 Assessment

Out of over 900,000 acres assessed in the NFRWSP area (Figure H1), the analysis identified a total of 8,129 acres of wetlands with a moderate to high potential for adverse change based on increased groundwater withdrawals between CP and the 2045 projection (Table H1 & Figure H2). Of the total area, 1,828 acres were in the SRWMD, and 6,303 acres were in the SJRWMD. Flagler county had the highest potential for adverse wetland change with 4,201 acres identified. No potential adverse change to wetlands was predicted for Baker, Bradford, Duval, or Union counties.

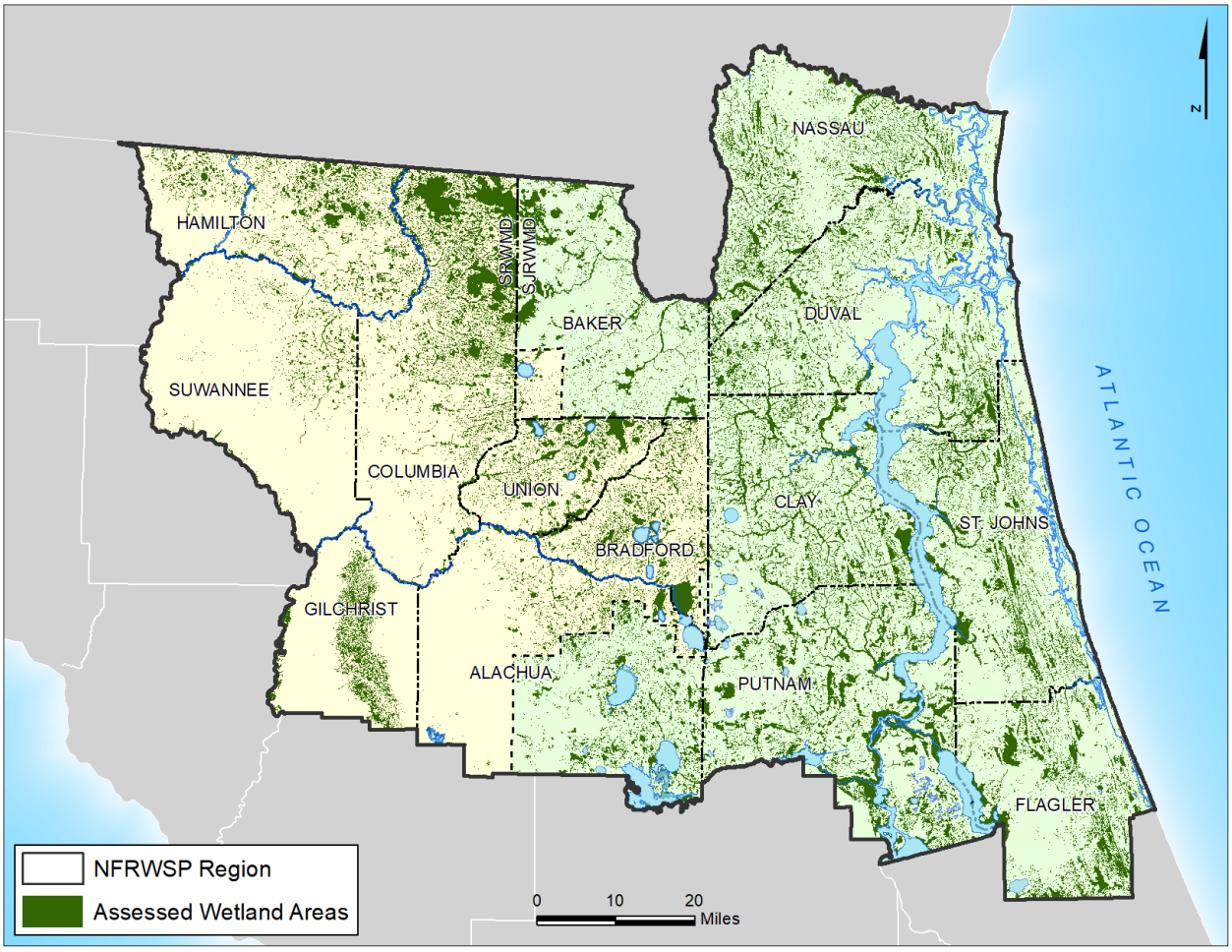

Figure H1. Total wetland acreage assessed in the NFRWSP area

Table H1. Wetland acreage identified as having moderate or high potential for adverse change to wetland function between CP and 2045 projected withdrawals

County	District	Potential Adverse Wetland Change (acres)
Alachua	SJR	557
Alachua	SR	168
Baker	SJR	0
Baker	SR	0
Bradford	SJR	0
Bradford	SR	0
Clay	SJR	494
Columbia	SR	68
Duval	SJR	0
Flagler	SJR	4,201
Gilchrist	SR	1,288
Hamilton	SR	157
Nassau	SJR	62

County	District	Potential Adverse Wetland Change (acres)
Putnam	SJR	309
St. Johns	SJR	680
Suwannee	SR	147
Union	SR	0
Total	NA	8,129

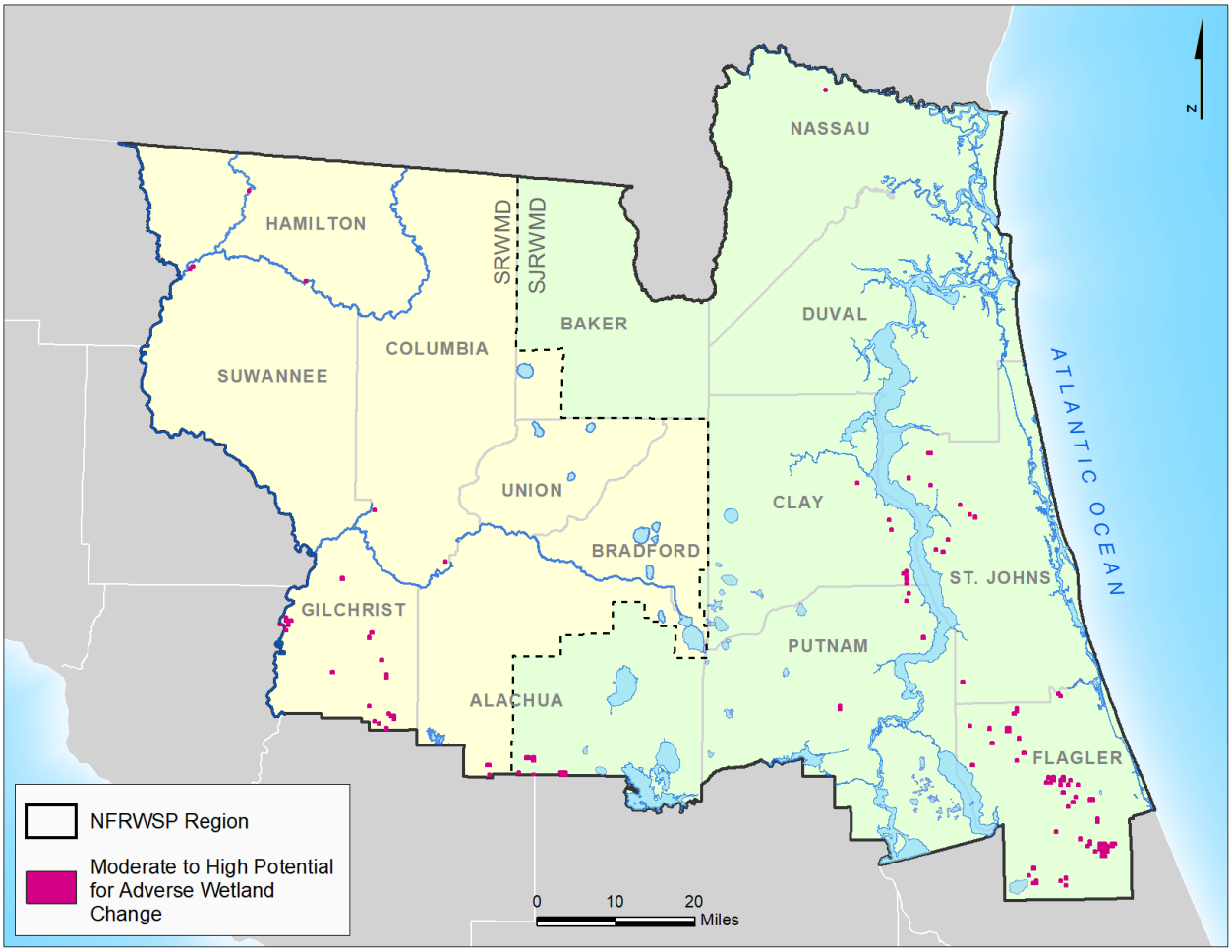

Figure H2. Locations with moderate to high potential for adverse change to wetlands

See Attachment A

2022 Kinser-Minno Wetland Assessment Tool

12/9/22 Update