Appendix G

Waterbodies without Adopted Minimum Flows and Levels (MFLs) Assessment

Introduction

Rivers, springs, and lakes without adopted MFLs were evaluated during the North Florida Regional Water Supply Plan (NFRWSP) process. This assessment provides a screening evaluation of the potential for water resource impacts in portions of the planning area where Minimum Flows and Levels (MFLs) have not been adopted. This document reviews the basic methodology used to evaluate these waterbodies without adopted MFLs within the NFRWSP area followed by a summary of the results.

Methodology

Reference conditions for the waterbodies without adopted MFLs were calculated using the NFSEG model 2009 pumps off (PO) scenario. Predicted river flows and spring flows under this reference condition were compared to the simulated withdrawal conditions at the 2045 planning horizon. Rivers with a simulated groundwater flow reduction greater than or equal to 10% and springs with a flow reduction greater than or equal to 10% from PO to 2045 were identified. The change in aquifer level from the PO to 2045 projection was used to evaluate lakes and was based on lake specific criteria.

A 10% reduction in flow does not necessarily correspond to an ecological threshold beyond which significant harm would occur. Conversely, waterbodies experiencing less than a 10% reduction in flow may still experience significant harm. The 10% threshold does, however, provide a high level of ecological protection for environmental flows and highlights areas where resource constraints may occur (Richter et al. 2012).

The MFL development process accounts for the unique hydrologic and ecological conditions of individual springs, and links changes in flow to a quantitatively significant harm threshold. Subsequent versions of the NFRWSP will include any newly adopted or reevaluated MFLs.

Results

Within the NFRWSP area, there were six river gages and 36 springs assessed. Of these, there are 20 waterbodies that are meeting the 10% screening criteria at 2045 and 22 waterbodies that are exceeding the screening criteria at 2045 (Table G1 and G2). Figure H1 shows the names and locations of the waterbodies assessed in this analysis and Figure H2 displays the results.

Rivers and Springs

In the SRWMD, there are 15 springs and two river gages that are meeting the screening criteria in 2045 (Table G1). The springs include Allen Mill Pond, Anderson, Bell, Bonnet, Hart, Little River, Otter, Pothole, Rock Bluff, Rock Sink Spring, Royal, Ruth, Telford, and Turtle, which are all on the Middle Suwannee River, and Gilchrist Blue, which is on the Lower Santa Fe River. The river gages that are meeting are Alapaha River near Jennings and Suwannee River at White Springs on the Upper Suwannee River.

Conversely, there are 16 springs and four river gages that exceed the screening criteria in 2045. The springs on the Upper Suwannee River that exceed the screening criteria in 2045 are Alapaha River Rise, Blue Sink (Suwannee), Blue Spring at Boys Ranch, Hamilton Unnamed (Ham1023971), Holton Creek Rise, Seven Sisters, Stevenson, Suwannee, and White Sulphur. The springs on the Middle Suwannee that exceed the screening criteria are Branford, Charles, Guaranto, Lime Sink Rise, Lime, and Suwanacoochee. Santa Fe Spring is the only spring without an adopted MFL assessed on the Upper Santa Fe River and it exceeds the screening criteria. There are also four river gages that exceed the screening criteria. They are the Santa Fe River at US 441 on the Lower Santa Fe River, Suwannee River at Suwannee Springs on the Upper Suwannee River, and Suwannee River at Branford and Suwannee River at Ellaville on the Middle Suwannee River (Table G1).

Of the five springs assessed in the SJRWMD, three springs are meeting the screening criteria Croaker Hole Spring, Satsuma Spring, and Welaka Spring. The two springs that are exceeding the screening criteria at 2045 are Beecher Spring and Green Cove Spring (Table G2). Beecher Spring is described as having a spring pool that is bordered on the north and west by a concrete walk and retaining wall (Rosenau et al. 1977 and Scott et al. 2004). The spring is not open to the public and ultimately discharges to the St. Johns River via a 1.25-mile run after it is diverted to numerous man-made holding ponds for a fish hatchery. Green Cove Spring, located in a city park, is bounded by a brick wall (Rosenau et al. 1977 and Scott et al. 2004). The flow from the spring discharges into a swimming pool then overflows to a spring run which ultimately discharges into the St. Johns River. The elevated spring pool levels resulting from retaining walls at both spring locations, coupled with limited discharge data, makes evaluation of impacts to these springs challenging (Rosenau et al. 1977 and Scott et al. 2004). Additional investigation will be initiated during the implementation phase of the NFRWSP to evaluate the impact of elevated spring pool levels on spring flow suppression.

Springs in the SJRWMD with a flow of less than one cubic feet per second (cfs) were not evaluated as part of this assessment due to the significant uncertainty in the estimates of low spring discharges. These small springs have limited discharge data. SJRWMD will investigate other potential approaches for evaluation of small springs in the SJRWMD portion of the NFRWSP region.

Lakes

There were no lakes without adopted MFLs assessed in the NFRWSP area.

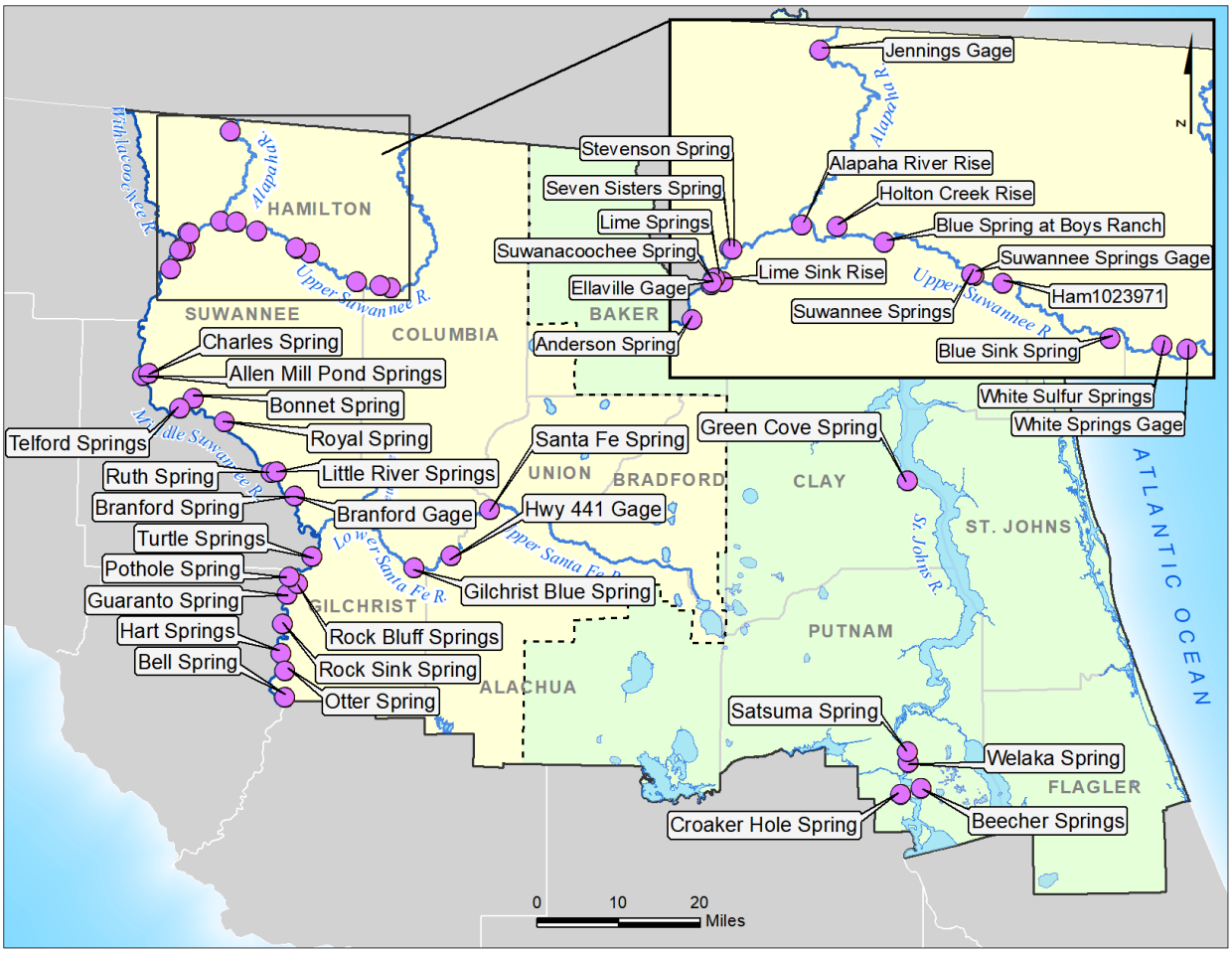

Figure H1: Names and locations of waterbodies without adopted MFLs in the NFRWSP area

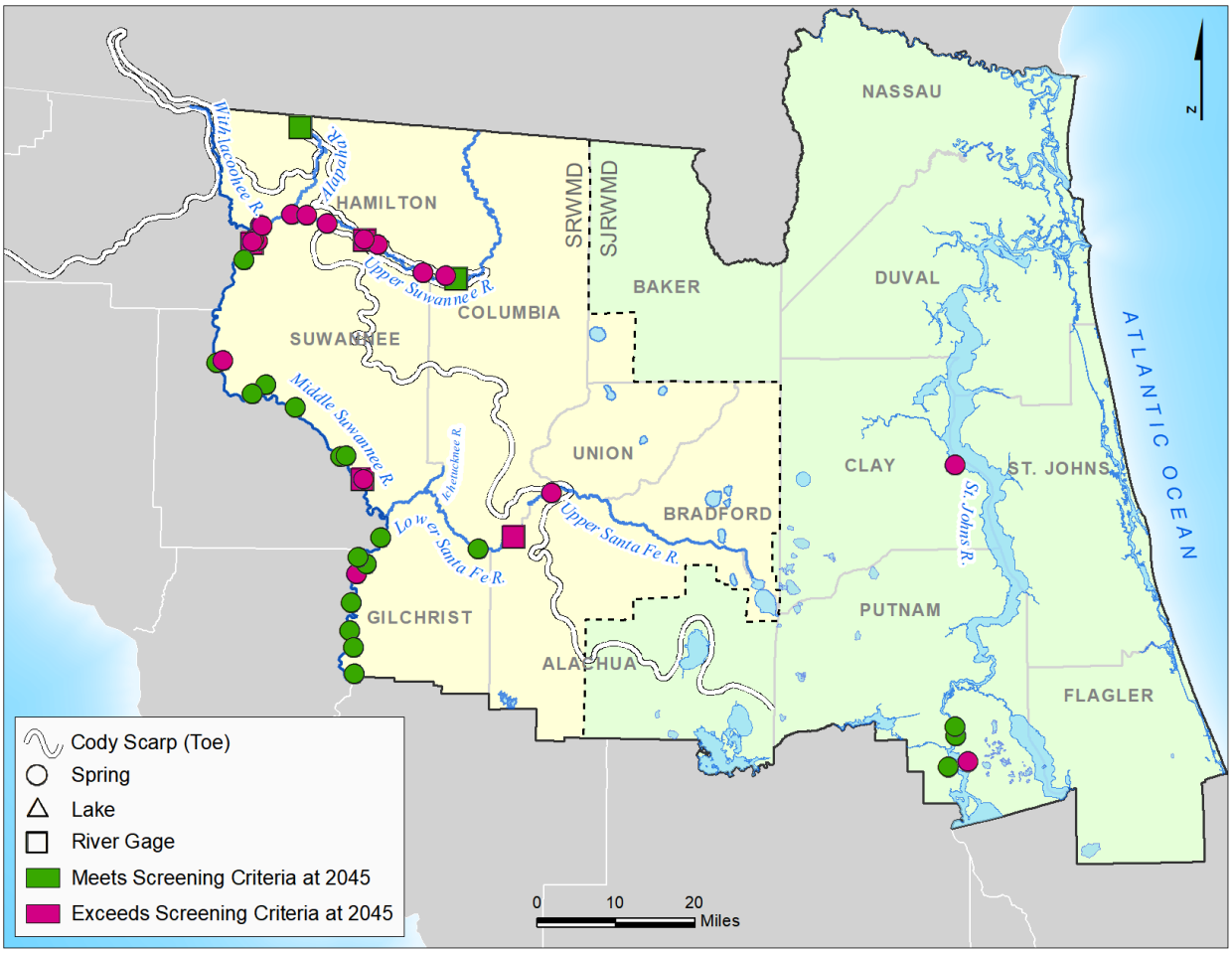

Figure H2: Waterbodies without adopted MFLs meeting or exceeding screening criteria

Table G1: SRWMD Waterbodies without Adopted MFLs Assessment Results

Waterbody Type	Waterbody Name	Basin	Reference Criteria (%)	NFSEG Pumps off Flow Estimate (cfs)	Modeled Change from PO to 2045 (%)	Exceeds Screening Criteria at 2045
River	Alapaha River near Jennings	Alapaha	10.0	803.3	0.0%	No
Spring	Alapaha River Rise	Upper Suwannee	10.0	298.0	-27.8%	Yes
Spring	Allen Mill Pond Springs	Middle Suwannee	10.0	5.6	-9.3%	No
Spring	Anderson Spring	Middle Suwannee	10.0	11.1	-8.4%	No
Spring	Bell Spring	Middle Suwannee	10.0	8.3	-4.7%	No
Spring	Blue Sink Spring (Suwannee)	Upper Suwannee	10.0	4.4	-134.3%	Yes
Spring	Blue Spring at Boys Ranch	Upper Suwannee	10.0	42.1	-37.4%	Yes
Spring	Bonnet Spring	Middle Suwannee	10.0	30.3	-4.3%	No
Spring	Branford Spring	Middle Suwannee	10.0	11.2	-10.7%	Yes
Spring	Charles Spring	Middle Suwannee	10.0	5.5	-17.0%	Yes
Spring	Gilchrist Blue Spring	Lower Santa Fe	10.0	35.3	-4.6%	No
Spring	Guaranto Spring	Middle Suwannee	10.0	8.4	-11.1%	Yes
Spring	Hamilton Unnamed Spring (Ham1023971)	Upper Suwannee	10.0	23.7	-56.8%	Yes
Spring	Hart Springs	Middle Suwannee	10.0	48.3	-5.5%	No
Spring	Holton Creek Rise	Upper Suwannee	10.0	88.2	-34.6%	Yes
Spring	Lime Sink Rise	Middle Suwannee	10.0	31.0	-12.0%	Yes
Spring	Lime Spring	Middle Suwannee	10.0	14.7	-10.3%	Yes
Spring	Little River Spring	Middle Suwannee	10.0	48.3	-5.6%	No
Spring	Otter Spring	Middle Suwannee	10.0	9.0	-4.2%	No
Spring	Pothole Spring	Middle Suwannee	10.0	26.5	-5.3%	No
Spring	Rock Bluff Springs	Middle Suwannee	10.0	17.4	-5.3%	No
Spring	Rock Sink Spring	Middle Suwannee	10.0	10.5	-7.5%	No
Spring	Royal Spring	Middle Suwannee	10.0	1.7	-6.1%	No
Spring	Ruth Spring	Middle Suwannee	10.0	5.4	-6.6%	No
River	Santa Fe River at US HWY 441 near High Springs	Lower Santa Fe	10.0	196.0	-34.3%	Yes
Spring	Santa Fe Spring	Upper Santa Fe	10.0	107.4	-54.0%	Yes

Waterbody Type	Waterbody Name	Basin	Reference Criteria (%)	NFSEG Pumps off Flow Estimate (cfs)	Modeled Change from PO to 2045 (%)	Exceeds Screening Criteria at 2045
Spring	Seven Sisters Spring	Upper Suwannee	10.0	8.4	-13.1%	Yes
Spring	Stevenson Spring	Upper Suwannee	10.0	101.4	-15.7%	Yes
Spring	Suwanacoochee Spring	Middle Suwannee	10.0	31.7	-12.1%	Yes
River	Suwannee River at Branford	Middle Suwannee	10.0	4,247.9	-12.8%	Yes
River	Suwannee River at Ellaville	Middle Suwannee	10.0	3,319.1	-14.4%	Yes
River	Suwannee River at Suwannee Springs	Upper Suwannee	10.0	266.3	-23.1%	Yes
River	Suwannee River at White Springs	Upper Suwannee	10.0	162.5	-0.3%	No
Spring	Suwannee Springs	Upper Suwannee	10.0	6.7	-49.6%	Yes
Spring	Telford Spring	Middle Suwannee	10.0	29.8	-5.5%	No
Spring	Turtle Spring	Middle Suwannee	10.0	17.2	-5.1%	No
Spring	White Sulphur Springs	Upper Suwannee	10.0	2.0	-492.5%	Yes

Table G2: SJRWMD Waterbodies without Adopted MFLs Assessment Results

Waterbody Type	Waterbody Name	County	Reference Criteria (%)	NFSEG Pumps off Flow Estimate (cfs)	Modeled Change from PO to 2045 (%)	Exceeds Screening Criteria at 2045
Spring	Beecher Spring	Putnam	10.0	6.4	-17.6%	Yes
Spring	Croaker Hole Spring	Putnam	10.0	72.7	-1.4%	No
Spring	Green Cove Spring	Clay	10.0	4.0	-45.2%	Yes
Spring	Satsuma Spring	Putnam	10.0	1.1	-4.4%	No
Spring	Welaka Spring	Putnam	10.0	8.1	-4.6%	No

References

Richter, B.D., Davis, M.M., Apse, C. and Konrad, C. (2012), A PRESUMPTIVE STANDARD FOR ENVIRONMENTAL FLOW PROTECTION. River Res. Applic., 28: 1312-1321. https://doi.org/10.1002/rra.1511

Rosenau, J.D., et al., Faulkner, G.D., Hendry, Jr., C.W. and Hull, R.W. (1977). Springs of Florida. Bulletin No. 31 (Revised). Tallahassee, FL: United States Geological Survey in cooperation with Bureau of Geology and Bureau of Water Resources Management, Florida Department of Environmental Regulation.

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