ST. JOHNS RIVER WETLANDS

Prepared for City of Jacksonville
Storm Resiliency Infrastructure Development Review Committee
June 2019

Wetlands in the St. Johns River watershed remove 79,873 MT of Nitrogen and 2,423 MT of Phosphorus each year from burial/accumulation in soil.[1] This figure represents removal total for ~ 1,537,737 acres of wetlands within our watershed and is specific to Nitrogen and Phosphorus removal only, and does NOT include the benefits of wetland functions such as flood control, biological productivity, and biodiversity in addition to their ability to retain nutrients. *The replacement cost for removing a similar amount of nitrogen by a wastewater treatment plant would cost between $240 million and $150 billion per year. For phosphorus, the cost is $17 to $497 million.*[2]

WETLAND LOSS IN THE LOWER ST. JOHNS

Development pressures that result in wetland loss and function indicate a WORSENING trend in total wetland acreage within the LSJRB.[3] Data to show total wetland loss by county from 2000 to 2018 says that in Duval County, 6,246 total wetland acres have been lost, nearly double any other county in the St. Johns River Water Management District.[4] Only 4,754 acres have been preserved, enhanced or created in the same time frame, fewer than many counties with similar acreage.[5]

Cumulative Wetland Impacts, Restoration, and Preservation
St. Johns River Water Management District
Report through December 31, 2018

County[1]	Wetlands Permanently Impacted (Acres)[3]	Wetlands Created, Enhanced or Restored (Acres)[4]	Wetlands Preserved (Acres)[5]
Alachua	384	565	10,324
Baker	37	7	2,350
Bradford[2]	0	0	0
Brevard	2,458	19,208	109,015
Clay	1,576	1,609	14014
Duval	6,246	4,754	30,989
Flagler	851	861	8719
Indian River	906	12,793	31,713
Lake	584	4,211	22,149
Marion	96	7,972	412
Nassau	650	1,155	6,319
Okeechobee[2]	27	28	28
Orange	2,033	4,444	27,493
Osceola	59	57	212
Putnam	273	179	19,961
Seminole	1,021	375	31,403
St. Johns	2,824	2,875	40,247
Volusia	3,258	2,868	53,107
Grand Total	23,281	63,961	408,455

Net Wetland Restoration Gained Within the District	40,680
Total Wetland Restoration and Preservation Gained Within the District	449,135

1 Mitigation requirements, per rule, are based on regulatory drainage basins, not county boundaries; therefore, impact acreages in one county may be offset in another county, due to basin boundary limits crossing county boundaries.
2 SJRWMD District Boundary includes a very small area of Bradford and Okeechobee counties.
3 Data for wetland impacts is from October 2000 for ERP and from 1996 for FDOT Mitigation Program.
4 Data for wetlands created, enhanced or restored is from October 2000 for ERP, from 1996 for FDOT Mitigation Program and from 1992 for District restoration efforts.
5 Data for wetlands preserved is from October 2000 for ERP, from 1996 for FDOT Mitigation Program and from 1989 for District acquisition efforts.

Attachment: Cumulative Wetland Impacts Activities Table [Revision 1] (Annual Wetland Activities Report)

NUTRIENT POLLUTION TRENDS

Trending for Total Nitrogen, Total Phosphorus, nitrate, ammonia and phosphate are UNSATISFACTORY.[6] Elevated levels of nitrogen have been observed in several tributaries as well as specific locations in the mainstem of the LSJR, such as the Main St. Bridge. Downtown Jacksonville receives a substantial upstream contribution, city storm drainage inputs and power plant effluent, as well as many other nutrient inputs making it difficult to identify a predominant source.[7] There are wide fluctuations in these and other nutrients loads. Hurricane activity has increased flooding into the LSJR over the past two years, which affects nutrient loading.[8]

WETLAND BENEFITS FOR NUTRIENT REDUCTION

The loss of wetlands in parts of the U.S. and Canada has resulted in an increase of 5 million to 150 million tons per year of sediment entering surface waters. The loss decreased the carbon sequestered by the wetlands by about 1 million to

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[1] Widney, S., Kanabrocki Klein, A., Ehman, J. et al. *The value of wetlands for water quality improvement: an example from the St. Johns River watershed, Florida.* Wetlands Ecology & Management (2018) 26: 265. https://doi.org/10.1007/s11273-017-9569-4
[2] Ibid
[3] St. Johns River Report Card, Sec 4.9, Wetlands. 2018. www.sjrreport.com
[4] SJRWMD, Governing Board Meeting Agenda, Staff Report, April 9, 2019
[5] Ibid
[6] St. Johns River Report Card, Sec. 2.3, Nutrients. 2018. www.sjrreport.com
[7] Total Nitrogen (TN) status in the mainstem and the tributaries is unsatisfactory, but the TREND is improving. However, due to no new data being added for TN in 2017, the STATUS and TREND cannot be determined in the 2018 report. The STATUS of phosphorus in the mainstem is satisfactory, and the TREND is unchanged in the freshwater portion of the LSJR and improving in the marine/estuarine areas of the LSJR. The STATUS of phosphorus in the tributaries is unsatisfactory, and the TREND in the tributaries is unchanged. St. Johns River Report Card, Sec. 2.3, Nutrients. 2018. www.sjrreport.com
[8] St. Johns River Report Card, 2018. www.sjrreport.com

14 million tons per year. Ten percent phosphorus retention was realized with up to 70% retention in wetlands during summer storm events.[9]

While the amount of nitrogen and phosphorus removed by wetlands can be measured and quantified, it is difficult to estimate the economic value of nutrient removal. Nutrient overload, or eutrophication, from too much nitrogen and phosphorous is one of the most serious water quality problems facing the St. Johns River and its tributaries. Excessive nutrients can cause Harmful Algae Blooms (HABs) that threaten the health of wildlife, pets, and people.

Studies that have attempted to calculate sediment and nutrient loading in waterways where wetlands have been lost show increases by 251% (N), 260% (P), and 890% (sediment). The same study also modelled loading when wetlands had been restored. Unfortunately, productivity decreased by 34.5%, 28.3%, and 37.0% respectively. *Modelling results also show that as riparian wetland loss increases, the corresponding environmental degradation worsens at accelerated rates. In contrast, as riparian wetland restoration increases, the environmental benefits improve, but at decelerated rates.*[10]

WETLAND BENEFITS FOR FLOOD RISK REDUCTION

Wetlands and coastal ecosystems reduce inland flooding during storm surge events by creating resistance to the flow of water and storage capacity. In addition, a study looking at the aftermath of Hurricane Sandy along properties protected by wetlands vs. those exposed showed:

- Wetlands are estimated to reduce flood damages between 20-30%.[11]
- Wetlands reduced flood heights across 1,242 miles of highways and roads by 2.36 in., on average.[12]
- Properties behind a marsh, on average, save 16% in flood losses every year compared to properties where marshes have been lost.[13]

ADDITIONAL WETLAND BENEFITS

- Wetlands absorb and sequester carbon. Drainage and degradation of coastal wetlands emit significant amounts of carbon dioxide directly to the atmosphere.[14]
- Wetlands sequester and remove nitrogen and phosphorus through plant uptake and burial in soil organic matter. Phosphorus is removed by wetlands through geochemical adsorption, precipitation and sedimentation.
- Wetlands and submerged aquatic vegetation serve as fish nurseries, create habitat for blue crab, mussels, plankton, and serve as the foraging grounds for manatee.

NEXT STEPS

Preventing impacts to wetlands is critical in order to protect against rising waters and future storms. It is also an important component of water quality and pollution prevention. This committee should:

- Reduce the impact to wetlands by enacting stronger buffer requirements, like those in St. Johns or Alachua County (see Wetland Buffers presentation, Steve Swann, pgs. 7-8 from SIRDRC, May 24, 2019).
- Recommend that the Jacksonville Environmental Protection Board request the St. Johns River Report Card authors to include a quantitative analysis on wetland loss and water quality impacts in Duval County for the Lower St. Johns River and its tributaries.
- Prioritize preservation, creation, enhancement, and restoration of wetlands as mitigation for wetland loss as close to the wetland impact as possible.

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[9] St. Johns River Report Card, Sec. 2.3, Nutrients. 2018. www.sjrreport.com

[10] Yang W., Liu Y., Ou C., Gabor S. *Examining water quality effects of riparian wetland loss and restoration scenarios in a southern ontario watershed.* J Environ Manage (2016) 174:26-34.

[11] Narayan, S., et. al. *The Value of Coastal Wetlands for Flood Damage Reduction in the Northeastern USA*. Scientific Reports (2017) https://doi.org/10.1038/s41598-017-09269-z

[12] Ibid

[13] Ibid

[14] https://www.iucn.org/content/degraded-coastal-wetlands-contribute-climate-change