

Executive Summary

Meeting the public need for a clean, safe, and reliable water supply is a challenging task. The population of the three-county Tampa Bay area has grown exponentially, from 125,000 people in 1920 to approximately 2.9 million people in 2018, creating a continually increasing demand for potable water. Adaptive management in developing and managing the local water resources has been necessary as the region developed first into an area dominated by agriculture and then into an expanding urban center. Early groundwater supplies near the coastline were abandoned due to saltwater intrusion into the aquifer and subsequent pumping from inland wellfields contributed to low water levels in lakes and wetlands north of Tampa Bay. The importance of balancing all water use needs, including those of the environment, was acknowledged by the state legislature with the passage of the Water Resources Act of 1972. It was clear that the region needed to find solutions that would provide for the growing drinking water demand of the Tampa Bay area and protect the environment.

In 1998, the leaders of the state and region came together and created Tampa Bay Water, reforming the former West Coast Regional Water Supply Authority into a true regional water utility. The six member governments, the Authority, and the Southwest Florida Water Management District (District) entered into a Partnership Agreement with three main objectives: 1) to develop new water supplies to meet future water demands; 2) to reduce the permitted pumping rate from the 11 wellfields north of Tampa Bay and allow area lakes and wetlands to recover; and 3) to end the existing and avoid future litigation between the parties to the agreement. In the 22 years since the agreement was signed, Tampa Bay Water developed multiple alternative water supplies to meet the current and future water needs of the Tampa Bay area. The new regional water supplies allowed Tampa Bay Water to reduce pumping from the 11 wellfields by approximately 50%, in order to promote the recovery of the environment. By working collaboratively with state and local governments, the region was able to allow environmental recovery and meet increasing water demand without any new water use litigation.

With all of these regional successes, one significant question remained: would the environment around the wellfields fully recover with the reduction in regional wellfield pumping? Tampa Bay Water and the District had documented historical lake and wetland impacts near the wellfields that were primarily due to wellfield pumping and periods of drought, compounded by impacts related to urbanization and changes in surface water flow patterns. The reduction in wellfield pumping began in late 2002 as the new alternative water supplies were introduced into the regional supply system. As groundwater pumping was reduced, less surface water leaked into the underlying aquifer through clay confining beds. This allowed area lakes and wetlands to retain more water which promoted their long-term health. In the areas of the 11 wellfields, retaining more water in lakes and wetlands allowed them to recover from past stress due to pumping. Tampa Bay Water and the District documented improving environmental conditions around the wellfields in the years following the reduction in wellfield pumping. However, it took lengthy and rigorous scientific studies to determine if the environment around the wellfields had fully recovered.

The District issued a Consolidated Water Use Permit to Tampa Bay Water in 1998 that authorized the pumping from the 11 northern (Central System) wellfields. This permit was renewed in 2011 with an annual average permitted withdrawal limit of 90 million gallons per day (mgd) from these wellfields. This renewed permit also required Tampa Bay Water to complete a Permit Recovery Assessment Plan to 1)

evaluate the recovery of water resource and environmental systems attributable to reduction of the groundwater withdrawals from the Central System wellfields to a long-term average of 90 mgd, 2) identify any remaining unacceptable adverse impacts caused by pumping the Central System wellfields at a long-term average rate of 90 mgd, and 3) identify and evaluate potential options to address any remaining unacceptable adverse impacts at the time of the Consolidated Permit renewal in 2020. The goals of this Recovery Assessment Plan were to answer the question “has the environment fully recovered from pumping impacts” in a thorough and scientific manner and to form the basis for the renewal of the Consolidated Permit.

Tampa Bay Water developed a multi-year investigation of environmental health and recovery around the 11 wellfields to address the permit requirement for a Recovery Assessment Plan (Plan). The first step in 2011 was to develop a work plan and schedule to guide the technical work. Staff met with District staff for several months as this Plan was developed and agreement was reached on several fundamental points. Both parties agreed that the Plan would focus on the recovery of wetlands and lakes and that the recovery of wetland and lake water levels would be the basis for assessing environmental recovery, not the recovery of wetland vegetation. There is a significant lag in time between the recovery of water levels in a surface water system and the recovery of the wetland plants; however, if water levels recover to normal levels, the wetland vegetation will reestablish over time. Tampa Bay Water and District staff also agreed that scientific and quantitative metrics of hydrologic recovery were necessary for different wetland types and committed to establish these new metrics.

Tampa Bay Water and the District worked together in an open and collaborative manner to accomplish the work of this Plan. The responsibility for documenting recovery lies with Tampa Bay Water as the permittee but the District staff have devoted an exceptional amount of time and energy to evaluate data and site conditions, review and comment on the technical analyses, and work through the complex and interrelated investigations. Between 2012 and 2020, Tampa Bay Water and District staff completed more than 130 technical meetings and field reviews to complete the work under this Plan. All of the technical analyses performed to complete this Plan were discussed with District staff during technical coordination meetings and suggested improvements have been incorporated into the final results. Tampa Bay Water submitted each process, recovery metric, and preliminary analysis to the District in writing as they were developed and requested review and written approval or concurrence from the District. This process ensured that the District staff was fully informed on a continual basis and has avoided disputes and substantial analytical changes at the end of the process. It also allowed District staff to review voluminous technical material as it was developed, which will facilitate their review of these documents during the 30-day statutory review period following the submittal of the Consolidated Permit renewal application.

Tampa Bay Water and the District have collected an abundance of environmental data from hundreds of lakes, wetlands, and monitor wells throughout the Tampa Bay area. The oldest monitoring sites have data that extend back to the 1930’s. These data are essential to the determination of lake and wetland recovery and considerable time was devoted to assuring that the data is of the highest quality. District and Tampa Bay Water staff agreed to share these collective data so there will be no discussion about the validity or quality of the data at the end of the assessments. The Plan contains lists of sites for which recovery is assessed and includes 378 monitored wetlands and 137 monitored lakes. Water Use Permitting rules require that an applicant demonstrate that pumping will not cause adverse impacts to the water resources of the area, not just monitored lakes and wetlands. A modeling analysis was completed of potential impact in the surficial aquifer based on the wellfield pumping at 90 mgd and Tampa Bay Water agreed to

assess the health/recovery of all unmonitored wetlands within these defined areas. This resulted in assessment of an additional 845 wetlands and lakes for which there is little or no available site-specific data. Likely environmental conditions in these unmonitored wetlands and lakes were assessed, to the extent possible, from extrapolation and interpolation of available data. In total, the Recovery Assessment Plan contains some level of assessment for 1,360 individual lakes and wetlands.

In order to make a scientific assessment of recovery at a wetland or lake, water level data must be compared to a numeric metric that is based on the ecological health of that wetland type. The District has established Minimum Levels or Management Levels for most of the lakes in the Plan and these levels were used as the metrics for the lakes. The District also had an established metric for isolated cypress wetlands as part of the Minimum Level program for wetlands. This metric was incorporated for all isolated cypress wetlands in a mesic soil setting. The remaining wetlands were classified into other types (isolated wetlands in a xeric soil setting, marshes, connected or flowing wetlands) and scientific metrics of ecological health were established for each wetland type using available ecological data from these sites. These new metrics of wetland health were used in the subsequent analyses; if a wetland meets the appropriate metric of health, it can be considered “recovered.”

The Tampa Bay area has experienced average to slightly above-average annual rainfall during the past 10 years except for 2015 which recorded well above-average rainfall. The analytical methods that were developed within the Plan were designed to factor out the effect of rainfall on wetland water levels as much as possible so that the results assess the recovery due to the reduction in wellfield pumping. A weight-of-evidence approach was employed through all recovery analyses to use the wealth of available historical data from monitored lakes and wetlands. The 50 percent reduction in wellfield pumping since 2002 is significant enough for the analyses to detect a recognizable response in the environmental data collected before and after the pumping reduction. For wetlands not meeting their recovery metric, the weight-of-evidence approach considers the multiple factors that influence water levels and environmental health by examining all available lake and wetland data using multiple assessment techniques. This assessment method weighs all available lines of information and examines the current environmental condition in light of actual pumping, rainfall and drainage alterations that have occurred on and near the wellfields. This approach, while acknowledging the uncertainty present in all analytical methods, ameliorates this concern by relying on multiple analyses and data types. Multiple lines of available evidence, including field assessments, were evaluated for lakes and wetlands during the preliminary and final technical analyses before making the final determination of recovery and environmental health.

Tampa Bay Water has assessed the environmental recovery and health of 1,360 individual lakes and wetlands due to the reduction in wellfield pumping to a long-term average of 90 mgd as part of this Recovery Assessment Plan. Staff completed rigorous analyses of hydrologic and ecological conditions at the 515 monitored lakes and wetlands and completed qualitative assessments of health for the 845 unmonitored lakes and wetlands near the 11 wellfields. Only qualitative assessments of the unmonitored sites were possible because no direct data is available for those sites and because of uncertainty in the statistically interpolated datasets used in the analyses. The final determination of environmental recovery on and near the wellfields has been made for the 515 lakes and wetlands that Tampa Bay Water and the District have monitored for many years. The final recovery assessment was based on analysis of long-term datasets that include the most recent 12-year period of 2008 to 2019. This period of time captures years of above and below-average rainfall and the 12-month running average pumping rate from the Consolidated Permit wellfields has been below 90 mgd since late 2009.

The final recovery analyses demonstrate that 85% of these monitored sites meet their numeric metrics of recovery. An additional 13.5% of these sites (70 lakes and wetlands) did not meet their numeric metric of recovery but did exhibit significant improvement in water levels since Tampa Bay Water reduced the wellfield pumping rates. Most of the improved wetlands missed their specific numeric water level target by less than one foot on a long-term basis and field review of many of these improved sites revealed that they do not show signs of adverse environmental impact. Changes to the landscape adjacent to several wellfields have influenced the degree of recovery that can be achieved due to persistent flooding concerns in recent years. Residential developments, some served by individual septic tank systems, were constructed adjacent to the property boundaries of several wellfields when the pumping rates were higher and drawdown in the water table was greater than today. Additional hydrologic improvements on these wellfield properties would exacerbate high water table conditions in the residential developments adjacent to the wellfield property boundaries.

Only eight wetlands across the 11 wellfields were identified as not fully recovered with a continued impact related to wellfield pumping. Environmental conditions at two of these wetlands, both associated with the Cypress Bridge Wellfield, will be addressed by a change in the Optimized Regional Operations Plan (OROP). The other six wetlands were assessed to determine if mitigation is required by Tampa Bay Water. Only one wetland requires mitigation in accordance with the baseline protocol developed by Tampa Bay Water and approved by the District. This single wetland is located on the property boundary of the Cypress Creek Wellfield, half on the wellfield/public property and half on private property containing a home and septic tank system. Since this wetland cannot be directly mitigated due to flooding concerns, Tampa Bay Water will propose to use existing wetland mitigation credits at our Model Dairy Wetland Mitigation Project to satisfy this mitigation requirement.

The technical analyses completed for this Plan demonstrate that environmental recovery has been achieved at the Consolidated Permit wellfields following the reduction of annual average pumping below 90 mgd. There are no remaining adverse environmental impacts related to the continued wellfield pumping at this long-term average rate. The successful completion of the Recovery Assessment Plan and resolution of the one wetland for which mitigation was required provide reasonable assurance to the District that the continued annual average pumping rate of 90 mgd from the ten remaining wellfields does not cause harmful hydrologic alterations to the lakes, wetlands, and surface water resources on and near the wellfields. This assessment will provide much of the basis for the Consolidated Permit renewal in late 2020.

The Consolidated Permit Recovery Assessment Plan is the culmination of many years of scientific study to evaluate environmental recovery following the reduction in pumping from Tampa Bay Water's 11 northern wellfields. This environmental recovery is directly attributable to the regional cooperation that created Tampa Bay Water, the cooperative agreements that funded the construction of multiple alternative water supply projects, and the significant \$1.7 billion financial investment to create a fully interconnected regional water supply system. The remaining question from 22 years ago has now been answered. Tampa Bay Water has continued providing reliable drinking water supply for Tampa Bay area residents while protecting the environment on and around the wellfields. This is a story where in the end, everyone wins.