

Appendix 2-2 MFL Methodology

Technical Approach to the Establishment of MFLs

The District's approach for establishing MFLs assumes that alternative hydrologic regimes exist that are different from historic conditions, but that will protect the structure and function of aquifers and other water resources from significant harm. For example, consider a historic condition for an unaltered river or lake system with no local ground or surface water withdrawal impacts. A new hydrologic regime for the system would be associated with each increase in water use, from very small withdrawals that have no measurable effect on the historic regime to very large withdrawals that could markedly alter the long-term hydrologic regime. A threshold hydrologic regime may exist that is lower than the historic regime, but which protects the water resources and ecology of the system from significant harm. The threshold regime, resulting primarily from water withdrawals, will conceptually have less frequent highs and more frequent lows. The purpose of MFLs is to define the threshold hydrologic regime that would allow for water withdrawals while protecting the water resources and ecology from significant harm. Thus, MFLs represent minimum acceptable rather than historic or optimal hydrologic conditions.

Ongoing Work, Reassessment and Future Development

The District continues to conduct the necessary activities to support the establishment of MFLs according to the District Priority List and Schedule. Refinement and development of new methodologies is also ongoing. In accordance with state law, MFLs are established based upon the best available information. The District plans to conduct periodic reassessment of the adopted MFLs based on consideration of the significance of particular MFLs in water supply planning and the relevance of new data that may become available.

Scientific Peer Review

Chapter 373.042(4), F.S., permits affected parties to request independent scientific peer review of the scientific and technical data and methodologies used to determine MFLs. As part of the adopted MFL rules, the District has committed to pursuing independent scientific peer review as part of future efforts. The District voluntarily seeks independent scientific peer review of MFL methodologies that are developed for all priority water bodies.

Methodology

Wetlands

The District has developed a minimum levels methodology for palustrine cypress wetlands only due to data limitations on other wetland systems. Palustrine wetlands are defined as isolated, freshwater wetlands. Data collection and analysis is ongoing for the development of minimum levels for other wetland types. The establishment of minimum levels for isolated cypress wetlands was based on a statistical assessment of the relationship between hydrology and certain ecologic parameters in a number of wetlands. The goal was to identify a hydrologic threshold, expressed as a water level, beyond which it would be reasonable to expect that "significant harm" will occur in a wetland. Minimum levels for palustrine cypress wetlands are determined by surveying a normal pool, and calculating an elevation 1.8 feet below the normal pool. Such wetlands are determined to be below their minimum levels if the median stage (based on a long-term stage record) is below the adopted minimum level.

Lakes

For the establishment of minimum levels, priority lakes are classified as Category 1, 2 or 3. Systems with fringing cypress wetlands greater than 0.5 acres in size where water levels regularly rise to an elevation expected to fully maintain the viability of the wetlands (i.e., the median lake stage is not more than 1.8 feet below the normal pool) are classified as Category 1 lakes. Lakes with fringing cypress wetlands greater than 0.5 acres in size that have been structurally altered such that the median lake stage is more than 1.8 feet below the normal pool elevation are classified as Category 2 lakes. Lakes without fringing cypress wetlands or with less than 0.5 acres of fringing cypress wetlands are classified as Category 3 lakes.

Minimum lake levels (MLL) are established using lake-specific significant change standards and other available information. For Category 1 or 2 lakes, a significant change standard is established 1.8 feet below the normal pool elevation. This standard identifies a desired median lake stage that if achieved, may be expected to preserve the ecological integrity of the lake-fringing wetlands. For Category 3 lakes, six significant change standards associated with dock-use, aesthetics, basin connectivity, recreation/ski use, water column mixing, and maintenance of species diversity, are developed. Potential changes in the coverage of herbaceous wetland vegetation and aquatic plants are also taken into consideration.

The MLL is the elevation that a lake's water levels are required to equal or exceed 50 percent of the time on a long-term basis. For Category 1 Lakes, the MLL is established at the standard elevation 1.8 feet below the normal pool. The MLL for Category 2 lakes is established at the median lake stage that would be expected in the absence of withdrawal impacts, with existing structural alterations in place. For Category 3 lakes, the MLL is established at the most conservative (i.e., the highest) standard elevation, except where the standard elevation is above the median lake stage that would occur in the absence of withdrawals, with existing structural alterations in place. In these cases, the MLL is established at the median lake stage.

The High Minimum Lake Level (HMLL) is the elevation that a lake's water levels are required to equal or exceed ten percent of the time on a long-term basis. For Category 1 lakes, the HMLL is established 0.4 feet below the normal pool. The HMLL for Category 2 lakes is established at the elevation water levels would be expected to equal or exceed ten percent of the time, given existing structural alterations and the absence of withdrawal impacts. For Category 3 lakes, the HMLL is developed by summing the MLL elevation and the expected difference between the median lake stage and the water level equaled or exceeded ten percent of the time. A complete description of the methodology used for establishing MLLs can be found in SWFWD (1999a and 2001).

Minimum levels are determined by surveying normal pool and control point (i.e., the point at which water flows from the lake) elevations, analysis of available lake stage data, and identification of appropriate significant change standards. Lakes are determined to be below their minimum levels if their long-term median lake stage is below the MLL or the long-term water level equaled or exceeded ten percent of the time is below their HMLL.

Aquifers

Saltwater Intrusion Minimum Aquifer Levels (SWIMAL) in the Upper Floridan aquifer have been developed for the Northern Tampa Bay Water Use Caution Area (NTB WUCA) and Southern Water Use Caution Area (SWUCA) to slow the rate of saltwater intrusion. Due to differing hydrogeologic conditions and water use patterns, the approaches used to determine minimum aquifer levels in these areas are slightly different. The development of a SWIMAL is a three-step

process. The first step is to assess the current status and anticipated future advancement of saltwater intrusion. For the SWUCA the number of wells and water supply potentially at risk to saltwater intrusion over the next 50 years was determined through use of a solute transport model. Secondly, a proposed goal of the SWIMAL in the region is determined. Finally, a network of monitor wells and corresponding water levels is selected to evaluate compliance. A complete description of the methodology can be found in SWFWMD (1999a and 2001).

In 2006, the Governing Board approved a SWIMAL in the SWUCA. In contrast to the approach used for the NTB WUCA, because of the well confined and highly transmissive nature of the Upper Floridan aquifer in the SWUCA, the SWIMAL was determined as the average groundwater level over the critical area of saltwater intrusion. The area over which the aquifer level was calculated is approximately 700 square miles and encompasses the coastal portions of southern Hillsborough, Manatee, and northern Sarasota counties, which is known as the Eastern Tampa Bay Most Impacted Area of the SWUCA. In 2002, the Governing Board directed that the SWIMAL be developed to slow the rate of saltwater intrusion based on the number of wells and water supply potentially at risk to saltwater intrusion in the future. The SWIMAL is the area-weighted average of the water levels in the 10 wells for the period 1990 to 1999. Compliance with the SWIMAL is determined by comparison of the 10-year moving average aquifer level to the minimum aquifer level. The 10-year moving average aquifer level in the Southern Planning Region continues to be below the adopted SWIMAL.

Rivers

Fundamental to the District's approach for developing minimum flows for rivers is the understanding that a flow regime is necessary to protect the ecological integrity of river systems. The initial step in this process requires an assessment of historic and current flow conditions to determine the extent to which withdrawals or other anthropogenic factors have affected flows. To accomplish this, District staff evaluated the effects of climatic oscillations on river flows and identified two benchmark periods for the evaluation of minimum flows. Based on a comprehensive review of river flows throughout the District, the period from 1940 to 1969 was demonstrated to consistently have higher flows than the period from 1970 to 1999.

For development of river minimum flows, the District identifies short-term seasonal flow standards and long-term hydrologic statistics for selected gauging sites to aid in compliance monitoring and evaluation. Short-term flow standards for periods of low, medium and high flows include prescribed flow reductions based on limiting potential changes in aquatic and wetland habitat availability that may be associated with seasonal changes in flow. The prescribed flow reductions are established to prevent no more than a 15 percent loss of habitat. The short-term standards may also include a low flow threshold, which is based on maintaining adequate depths for fish passage across shoal areas and maximizing the wetted stream channel width with the least amount of flow. Long-term hydrologic statistics identify the lowest average flows that may be expected for five and ten year periods, based on the long-term flow record and compliance with the short-term seasonal flow standards.

Springs

The MFL statute requires all first magnitude springs and all second magnitude springs within state or federally owned lands purchased for conservation purposes to be placed on the priority list. The District's approach for developing minimum river flows serves as the basis for establishing minimum flows for spring systems.