

## **MINIMUM FLOWS DEVELOPMENT IN A SPRING SYSTEM DISPLAYING INCREASED FLOWS**

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Wakulla Spring is one of the largest karst springs in the world, discharging an average 575 cfs between 2004 and 2019. Combined with the second magnitude Sally Ward Spring, the Wakulla and Sally Ward Springs System discharged an average of 598 cfs between 2004 and 2019. Unlike most springs in Florida, flows at Wakulla and Sally Ward Springs have increased dramatically during the past two decades. The increased flows are thought to be a result of several factors including lower river stages and changes in aquifer head gradients. These increased flows have resulted in increased water velocity, increased scouring of sediment, and decreased submerged aquatic vegetation.

Water management districts are required to set minimum flows and/or minimum water levels for Outstanding Florida Springs under Section 373.042(1), Florida Statutes. The minimum flow for a given water body is defined as the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area. Most metrics utilized for determining minimum flows along the Wakulla River were shown to be relatively insensitive to spring flow reduction. One metric, safe manatee passage, was found to be limiting resulting in a 9.9 percent allowable flow reduction from the long-term average discharge for the combined Wakulla and Sally Ward Springs System. This is particularly interesting since manatee use of the spring system was minimal prior to 2007. Increased water depths associated with sediment scouring and vegetation loss are thought to have allowed manatee to regularly access the spring post 2007.

**PRESENTER BIO:** Dr. Thurman manages the Minimum Flows and Levels Program for the NFWFMD. In addition, he serves as the NFWFMD's senior ecologist with more than 25 years of experience in aquatic ecology. Prior to working at the NFWFMD he spent many years in the fields of wetland restoration and fisheries.