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Gary Williams, Ph.D.
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604

April 16, 2012

Dear Mr. Williams:

Subject: Recommendations for Establishing Minimum Flows and Levels (MFLs) for the Gum Slough Spring Run in Sumter and Marion Counties, Florida

The Howard T. Odum Florida Springs Institute (FSI) is a private, non-profit organization dedicated to restoration and protection of Florida's springs through the development of sound science and effective management. As Director of the FSI and a professional springs ecologist, I am providing these comments and recommendations concerning establishment of technically sound and protective MFLs for the important first-magnitude Gum Slough Spring Run (Gum Slough) spring system.

The FSI has a number of concerns about the draft MFLs developed by the District for Gum Slough. General concerns include the following:

- The Northern District Water Resource Assessment Project (NDWRAP) groundwater flow and transport model is not a suitable tool for assessing the effects of groundwater pumping at Gum Slough. The scale of the NDWRAP model is regional (more than 10,000 square miles) and is not appropriate for making accurate water level and flow estimates at the local scale represented by Gum Slough (one model cell out of more than 40,000 grid cells). For example, in the HydroGeologic report the model developers state with reference to the model's limitations: "A 6-percent error resulted between the steady-state observed and simulated spring discharges and a 15-percent error resulted between observed and simulated base flow." The observed error in the model overwhelms the level of model precision assumed in

this draft MFL that assumes a flow reduction of 9 percent or less will not cause significant harm at Gum Slough.

- Standard engineering practice and available tools/analytical methods were not fully used to estimate existing anthropogenic impacts at Gum Slough.
- The District has not responded to critical comments from the peer review panel, or comments previously provided by the Florida Geological Survey and the FSI.
- Anecdotal evidence of worsening ecological conditions provided by adjacent landowners and professional guides/naturalists who have a long familiarity with Gum Slough has not been adequately considered to assess the effects of the increasing local development/groundwater uses in the springshed.
- The District's MFL procedure assumes that a 15-percent habitat change constitutes significant harm. By the District's own admission, this value is arbitrary and needs to be confirmed through an ongoing District-financed study. This unscientific approach is biased towards allowing significant harm to occur in fragile aquatic ecosystems such as Gum Slough.
- The District's MFL methodology does not acknowledge or account for the imprecise nature of the model predictions (PHABSIM and NDWRAP models) that form its foundation, and does not incorporate any assumed statistical error or margin of safety to protect the public's interest in maintaining healthy aquatic resources.

To rectify these deficiencies in this draft MFL, the FSI respectfully requests that the District incorporate the following additional analyses/ revisions before finalizing the Gum Slough MFL report and presenting it for Governing Board approval:

1. Prepare an empirical water balance for the Gum Slough springshed, independent of the NDWRAP model that provides individual estimates of historic and current recharge, groundwater pumping, and resulting spring flow.
2. Redefine "significant harm" for the Gum Slough ecosystem more conservatively by utilizing existing data and consideration of all ten human use and water resource values required by Section 62-40.473, Florida Administrative Code. Two examples include data recently published in the Gum Slough reported funded by the Florida Fish and Wildlife Conservation Commission (FWC), *An Ecosystem-Level Study of Florida Springs - Part II: Gum Slough Springs Ecosystem Characterization* (WSI 2011), that documents the relationship between spring flow and photosynthetic efficiency; the observed inverse statistical relationship between spring flow and spring nitrate concentrations illustrated by the District at the public meeting on April 4, 2012; and a longer modeled flow regime based on standard regression analysis

between rainfall, well levels, and Gum Slough flows as recommended at the April 4 meeting.

3. Estimate the likely margin-of-error in the NDWRAP model estimates of existing Gum Slough flow reduction impacts and incorporate those into the allowable flow changes incorporated in the Gum Slough MFL.
4. Incorporate an appropriate margin of error to account for uncertainty in this and all future District MFLs.

The District should let the public and the Governing Board know that existing flows in Gum Slough are 18 cfs, the lowest flow on record. If the recommended draft MFL is approved by the District, this MFL authorizes a cumulative 50% reduction in flows at a time of crisis when the upper half of the spring run and at least three named springs have zero flow. This situation surely cannot be conceived to be in the public's or the environment's best interest. Recent record low flows at Gum Slough illustrate the fact that this spring run has highly variable flows and that the short period-of-record available at the USGS station is insufficient to develop a protective MFL at Gum Slough without incorporation of a safety factor. Additionally, existing permitted human groundwater withdrawals in the Gum Slough springshed may already be exceeding the capacity of rainfall and recharge to provide adequate water to protect this natural system.

In summary, the FSI offers the following specific recommendations to the District concerning finalization of the Gum Slough MFL:

- The Gum Slough MFL should be set at “no additional harm” until additional relevant hydrologic and ecological data can be collected and analyzed.
- A recovery or provisional MFL should be adopted by the Governing Board as soon as possible to protect this important resource from additional significant harm.
- No additional consumptive use permits should be issued within the historic Gum Slough springshed and existing permits should be reviewed to evaluate their effects on the aquatic/wetland ecosystem.
- The District should commit to continuing ecological studies of Gum Slough with an updated assessment of existing harm within the next ten years.


On behalf of the FSI, I would like to thank the District for considering these and other informed comments concerning this MFL decision. The FSI recognizes that sound MFLs provide an important balance between water for our ecological resources and water that can be safely withdrawn for essential and efficient human uses. The best available science is needed to accurately and clearly identify the appropriate balance between these two competing water needs.

This letter offers recommendations that are intended to help the District Governing Board make a sound and defensible MFL decision at Gum Slough.

We urge the District to “Do No Harm” when establishing this MFL. If the District errs on the side of the spring, they will have helped preserve one of Florida’s irreplaceable natural wonders; if, on the other hand, the District errs on the side of greater water withdrawals, future generations will have lost one more precious natural resource.

If you have any questions or comments about these recommendations, please feel free to call me to discuss.

Sincerely,

A handwritten signature in blue ink that reads "Robert L. Knight". The signature is written in a cursive style with a blue highlight behind it.

Robert L. Knight, Ph.D.,

Director Howard T. Odum Florida Springs Institute