DEP Comments
Gum Slough Spring Run MFL
May 26, 2011 Draft Report

General Comments

1. Page 2-1: *For the purpose of this report, the Gum Slough watershed boundaries were those delineated by the United States Geological Survey (Sepulveda 2002).* It would be useful to include a map with the watershed boundaries as delineated by the USGS. Inclusion of this map would show that the geographical recharge area for the springs (which contribute about 75% of the average flow to Gum Slough) is known. We also recommend including a brief description of how the recharge area was used in the analysis.

2. The Gum Slough Springs Run is a groundwater supported system with occasional peak flows generated by overland runoff from significant local rainfall events. Unconfined aquifer conditions in proximity to Gum Slough and the fluctuation range in flow of the group of springs that provide flow to the run suggests a significant portion of the springshed for the springs is local.

   The Gum Springs group of springs derives its flow from groundwater. Has the District considered evaluating the aquifer levels at which the springs in the Gum Slough group cease to flow? It may be that a minimum aquifer level that maintains an acceptable level of flow and aquatic habitat at the individual spring vent areas would be more appropriate than the currently proposed MFL.

3. We are concerned that changes in water quality due to declining flows are not adequately vetted in the report. Water quality data for Gum Springs Group only go back as far as 1998. According to a discussion about water quality at Gum Springs Group in the 2001 SWFWMD report *The Hydrology and Water Quality of Select Springs in the Southwest Florida Water Management District* (page 85)*,* "cursory review of water-quality data suggests that ground water discharging from the (Gum Springs) group is influenced by sulfate upwelling along fractures in the limestone bedrock." This indicates the likelihood of interconnectivity between the Upper and Lower Floridan aquifer at this location, and that Gum Spring discharge contains components from both the Upper and Lower Floridan. In other words, the Middle Confining Unit which separates the Upper Floridan from the Lower Floridan is permeable (i.e., not confining). Overpumping of the Upper Floridan in this area could cause upwelling of Lower Floridan aquifer water, which has different ground water chemistry. The 2001 SWFWMD report (page 85) also says "Nitrate concentrations at the Gum Slough group are significantly elevated above background concentration measured in the Floridan aquifer." The report goes on to state that the typical nitrate concentrations measured at the springs is "around 1 mg/L" – a high value compared to background concentrations measured from wells in the surrounding Upper Floridan. This number is likely to rise if discharge decreases in the future.

4. Section 5.2.1 (page 5-1) – Are the studies by Friedemann and Hand (1989), and the US EPA valid for springs? How do these data compare to Table 5-1 (page 5-3)?

5. Page 7-10, paragraph 1 – More discussion on how the data were combined would be helpful.

6. Page 7-12, how were the fish species, other than the spotted sunfish, selected for the analyses?

7. Figure 7-5 (page 7-11) – Please explain how a 40% flow reduction = 12% increase in March, while 10-30% flow reduction = -5 to -19% change. (Similar explanations are needed for April and August.) These results seem to beg the question whether any reduction should be allowed in March. See also Figure 8-9 (page 8-21).

8. Section 7.8.3, last paragraph (page 7-16) – As 40 cfs is almost 50% of total (93 cfs), additional clarification would be helpful.

9. Despite having a limited flow dataset, the report effectively describes the relationship between flows and habitat type by focusing on a range of key habitat indicators from fish passage to macroinvertebrates and woody habitat. The influence of water withdrawals and the resulting hydrologic changes in the system were well documented and the methods used to determine total streamflow – runoff and ground water (baseflow) – contributions in the river were scientifically sound. However, as a primary objective of minimum flows and levels analysis is to provide for the hydrologic requirements of biological communities associated with the spring run ecosystem, it would be beneficial to include a more in depth characterization of the benthic macroinvertebrate and fish communities – such as was done in the minimum flow analyses for systems including the Chassahowitzka and Homosassa Rivers – to aid in understanding their habitat needs and uses. With the understanding that data may be limited, including a more detailed species' composition characterization would provide significant insight into taxa sensitivity to changes in the hydrological regime.

10. Section 8.2.3 (page 8-3) – Why does the LFT apply only to surface water withdrawals and not also to the effects of groundwater pumping?

11. Overall, it appears that the MFL determination is adequate and based on the best available data; lack of an appropriate flow dataset suggests that the MFL recommended will require careful monitoring during implementation. Based on the available data, the integrated approach (fish habitat, macroinvertebrates, water quality, riparian vegetation) using appropriate models for each element to identify the most protective minimum flows in a year-round flow prescription is appropriate.

12. There is confusion concerning the expression of the proposed minimum flow. The Executive Summary states the low flow threshold for the USGS Gum Springs near Holder gage is 35 cfs based on maintaining fish passage and lowest wetted perimeter inflection point. No surface water withdrawals are permitted when this threshold (35 cfs) is exceeded. A prescribed flow reduction for the entire year was calculated at 9 percent. On page 8-20, in bold, the report states "At the Gum Springs near Holder gage, the proposed MFL allows removal of 9 percent of the flows for the entire year. Surface water withdrawals are prohibited from depressing flows below 35 cfs for the entire year." These statements can be interpreted as saying that an additional 9 percent loss of flow below a benchmark established using current low flow conditions is allowed all year. On page 8-20, should "flows below 35 cfs" be modified to "below 35 cfs at any time?"

<u>Additional Comments and Recommendations</u>

13. The references cited in the report need much cleaning up. We found several references in the report that are missing from the Literature Cited (see pages 1-4, 1-6, 3-1, 4-4, 4-12, 8-10, and 8-12), and more than 60 references in Section 9 that are not in the report.

14. Figures 1-1 and 8-9 (pages 1-8 and 8-21) – It would be helpful to have the months, rather than days, on these graphs to aid in the interpretation of the data

15. In Section 3, we recommend including a discussion on whether land use change (e.g., increase in urban land use as a result of a decrease in upland forest land cover) has had an impact on the flows and/or habitat available for biological assemblages. In addition, we recommend that a discussion addressing any future changes in land use and how these changes could affect the recharge capability and hydrograph of the run be included. How would environmental values associated with the spring run ecosystem (e.g., sediment loads, filtration and absorption of nutrients and other pollutants, water quality, etc) and therefore the proposed MFL, be impacted by any future changes in land use?

16. Page 6-6, paragraph 1 – Are there useful estimates of conditioning period that can be cited?
17. Although inundation analyses were not performed due to the limited flow dataset period of record, it would be beneficial to include a discussion on the importance of the river-riparian floodplain connection, as periodic inundations of riparian floodplains occur whether data are collected or not, and are closely linked with the overall biological, physical and chemical productivity of river ecosystems.
18. Figure 8-6 (page 8-15) – Reference the legend key in Fig. 8-8, or explain for this table.
19. Including a glossary (Section 10) is a helpful addition to the report.

ERRATA

Page	Paragraph	Line	Comment
2-1	3	6	Add a space after 15,000
3-1	4	2	Change “Figure 3-4” to “Table 3-1”
4-4	2	11	Change “then” to “than”
4-4	4	5	Change “that” to “at”
4-6	1	3	Change “approximate” to “approximately”
4-8	1	5	Change “department” to “departure”
4-8	2	3	Change “was” to “were”
4-11	2	last	Change “of” to “in”
4-12	3	12	Insert period after “al”
5-1	5	1	Insert “been” – Phosphorus has “been” measured by…
6-1	2	9	Insert comma after “Rather”
6-3	2	5	Change “Conder” to “Condor”
7-1	4	2	Insert comma after “levels”
7-4	1	7	Change “were” to “was”
7-6	1	14	Remove comma after “two”
7-7	1	12	Add parentheses “(Gum Springs near Holder)”
7-15	1	9	Fix gap in “0.6”
8-3	Figure 8-2	title	Change “Poings” to “Points”
8-3	2	1	Change “was” to “were”
8-4	1	last	Insert “record” after “flow.”
8-9	1	1	Change “8.2.2.2” to “8.4.2.2”
8-15	partial	6	Change “tend” to “tends”
8-16	1	2	Change “vegetations were” to “vegetation was”
8-20	1	3	Change “illustrate” to “illustrates”