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November 30, 2016

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Transmitted via email to [Melissa.Gulvin@swfwmd.state.fl.us](mailto:Melissa.Gulvin@swfwmd.state.fl.us).

Subject: Florida Springs Council Comments to Kings Bay/Crystal River Minimum Flow and Level (MFL) Draft

Dear Ms. Gulvin:

#### Executive Summary

The Florida Springs Council, Inc. (FSC) is providing the following comments for the purposes of constructive criticism and to facilitate improved understanding by the public and the Southwest Florida Water Management District (District) Governing Board. In addition, it is the intent of the FSC to improve the final rule for the benefit of the citizens of the state of Florida.

The format of these comments mirrors the draft structure and will refer to specific chapters and sections throughout.

#### Chapter 1

##### Section 1.3.3 Environmental Values

	Considered	Value Addressed
<b>(a) Recreation in and on the water;</b>	Yes	No
<b>(b) Fish and wildlife habitats and the passage of fish;</b>	Yes	Yes
<b>(c) Estuarine resources;</b>	Yes	No
<b>(d) Transfer of Detrital material;</b>	N/A	N/A
<b>(e) Maintenance of freshwater storage supply;</b>	Yes	Uncertain
<b>(f) Aesthetic and scenic attributes;</b>	Yes	Uncertain
<b>(g) Filtration and absorption of nutrients and other pollutants;</b>	Yes	No
<b>(h) Sediment loads</b>	Yes	N/A
<b>(i) Water quality; and</b>	Yes	No

<b>(j) Navigation</b>	Yes	Uncertain (relevance of eval. factors)
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Red highlights in the last column are points of disagreement or uncertainty in reference to Table 1-7. Discussion follows:

#### Section 1.3.4 Significant Harm

The District has inappropriately relied on an arbitrary 15% loss of resources as a threshold of significant harm in the development of MFLs. Used once in the peer review process to set the upper Peace River MFL, it has become the accepted standard throughout the District, without a case-by-case peer reviewed justification. Recently this 15% metric has been casually disregarded as a matter of convenience in support of large-scale reductions of flow in support of the District's interest in water supply. The standard is either defensible or it is not, and it serves no credible purpose when it is altered for the sake of expeditious rule development or in service of other agendas. This is critically important when it is offered in support of long-range planning and protection of the resources. Variable standards cannot be viewed by the District's constituents with credibility. The 15% significant harm standard should either undergo the rulemaking process with opportunity for public notice and comment and scientific peer review, or MFLs should be set exclusively on a case-by-case basis with a view toward conserving essential ecological resources.

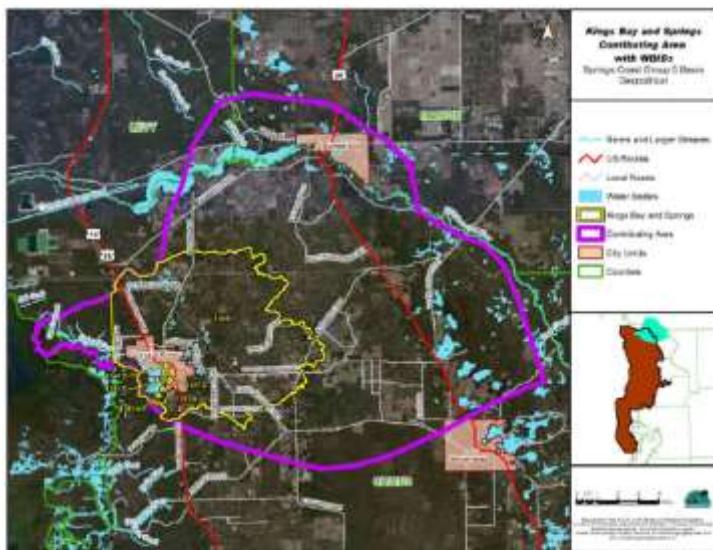
Because of the unique resources of the Kings Bay system/Crystal River, namely the presence of critical manatee habitat, it is worth examining whether this 15% derivation is indeed an acceptable measure for significant harm. If the 15% standard is already deemed flexible, as discussed above, then in setting the KB/CR MFL it would behoove the Department to adopt a more conservative threshold from the outset, even prior to explicitly linking flow reductions to decreased critical resources. Particularly given the uncertain effects posed by climate change, the District should apply a precautionary approach to standard setting to ensure the long-term viability of the system.

#### Section 1.4.1 Hydrologic Setting

Figure 1-1 of the draft recommendations is misleading in that it is presented as the “water shed”. It does not represent the contributing area of the spring basin, which more properly defines the system under review. Properly defining this area is critically important in understanding the complexity of the system, which contains more than 70 spring vents with discharges of contrasting chemistry, temperature, and flow. See FDEP documents related to TMDL Rule and BMAP development or Figure 1.5.

The graphic below, extracted from the adopted TMDL Rule, reveals the disparity between the “water shed” (yellow border) and contributing area (purple border). The represented differences are significant, and use of “watershed” detracts from credibility of the draft.

### March 2016 FDEP NSILT Basin Map



**Figure 1.5. Estimated Contributing Area for the Following Verified Impaired WBIDs: Kings Bay (WBID 1341), Hunter Spring (WBID 1341C), House Spring (WBID 1341D), Idiot's Delight Spring (WBID 1341F), Tarpon Spring (WBID 1341G), and Black Spring (WBID 1341H)**

It also seems that it might be worthwhile for the District to specifically request a peer review analysis of the data underlying Figure 1-3, delineation of springshed potentiometric surfaces and transmissivity. Because this graphic reflects data published in 2006 (and likely gathered earlier), groundtruthing assessments at UFA performance test sites would be valuable to evaluating the regional consistency of the aquifer in light of increases in groundwater withdrawals over the intervening decade.

#### Section 1.4.4 Groundwater Levels and Withdrawals

It is not clear that ROMP TR21-2 is properly located to provide reliable reference for the Kings Bay Basin due to proximity to the basin boundary, nor is it clear that the well is actually within the basin. See Figure 1-12 in comparison to Figure 1-3. FSC suggests the ROMP locations be mapped with basin boundaries included.

Reference to ground water pumping “within a 5 mile radius of the springs” is irrelevant as to source and volume. Estimates or metered withdrawals for the basin are inappropriate if for no other reason than that there has been a lack of significant development within the 5-mile radius of the springs within the last 15 years. Development in the mid- and eastern portions of the basin has been more robust in the same time frame.

Citrus County’s population is concentrated in the coastal and northern portion of the jurisdiction, with a majority share found in the Kings Bay basin contributing area. Information from the FDEP NSILT/TMDL documents and supported by the county’s “CITRUS COUNTY 10-YEAR WATER SUPPLY FACILITIES

WORK PLAN - 2013" (attached) suggests clearly that approximately 58% of the population, or 96,065 residents, occupy the basin's contributing area. This suggests a level of groundwater withdrawal significantly higher than that presented in the draft recommendation.

Type	Volume
Potable water	14.40 MGD
<u>Non-potable water; all uses</u>	<u>5.48 MGD</u>
Total	19.88 MGD

It is understood that a large portion of the resource is returned to the aquifer as recharge, but a significant discrepancy exists between the numbers above and the volume presented in the draft. The 2.6 mgd/5-mile radius reference below is irrelevant and misleading:

*"Groundwater withdrawals have declined in the Crystal River Spring Group springshed since reaching their peak of 18.1 mgd in 2006. In 2014, groundwater withdrawals based on estimated and metered use were 15.3 mgd. Since 2005, groundwater use has essentially remained flat with a slightly negative change rate of -0.02 mgd per year. The quantity of groundwater withdrawn within a five-mile radius of the springs is relatively small and was 2.6 mgd in 2014." (CRKB MFL Draft; pp. 17)*

The Draft MFL also states that the District maintains a database of metered and estimated water usage from 1992-2014. FSC requests that the Draft MFL cite to where that data is publicly available, given that in other water management meetings that FSC members have been involved in, the District has given the impression that water usage can only be generally estimated and is not metered for agricultural users.

#### Figure 1-15

The relevance and accuracy of this figure is unclear. In addition to the concerns stated above, the Northern Planning Area encompasses far more than the Kings Bay Basin. Specificity in relation to the Basin is strongly recommended.

#### Section 1.4.5 Groundwater Level Trend

Due to the previously mentioned variability of water chemistry and quality identified in the myriad of vents in the Kings Bay system, it is reasonable to conclude that the overall system acts in unity within the bay, yet it in fact illustrates sub-basin dynamics. The use of a single well as reference to characterize trends within the sub-basins is highly suspect. Evidence to this point is found in the Kings Bay/Crystal River TMDL Rule (<http://www.dep.state.fl.us/water/tmdl/docs/tmdls/final/gp5/KingsBay-1341-nutr-tmdl.pdf>) and within the draft itself. See Section 1.6.1.1 of the draft and Table 1-6. It is not the concentration that is significant, it is the variability presented which requires finer resolution of the proposed rule. In the short term, this analysis is not immediately significant, but the long term success of the rule makes a focused examination of sub-basin dynamics extremely important during the first 10-year review cycle.

### Section 1.4.6 Predicted Change in Spring Flow

Predictions based on a macro view of the Crystal River Group, Manatee Spring, and House Spring are data set limited, and will not provide the micro level view necessary for long-term assurance of the rule's success. Without determination of the sources of various spring discharges in the larger system, WUP review cannot reasonably be expected to achieve stipulated objectives. In short, it is perfectly reasonable to anticipate adverse reductions of flow in select springs if well siting is not adequately regulated. The District does not possess a database that can, at present, satisfactorily address this issue.

### Table 1-2 Predicted Flow Changes

The segment "Model Groundwater Withdrawals" is confusing. FSC requests clarification regarding what purpose this data is expected to serve. In a similar vein, more information is needed regarding how the NDM evaluated 2035 estimates: what values of recharge were used, where alternative water supply and conservation and reuse factors were evaluated, and the likely impacts of climate change and possible changes in the potentiometric surface of the UFA. Recharge estimates can also not be assumed to remain constant with increasing regional development and land use changes.

### Section 1.4.7.1 Vegetation

Historical perspective of aquatic vegetation is described herein and in the District's adopted SWIM Plan. Threats to SAV communities due to algal proliferation fueled by nutrient pollution are recognized. Another issue pertinent to this system, and recognized in the system TMDL, and by the District, is residence time of discharged spring flows in the system. The Draft MFL discusses the impact of nutrients, but fails to include a discussion of residence time and the interrelations among flow, nutrients, residence time, and increased algal proliferation. Edits to that effect should be included in the draft.

### Section 1.4.8 Human Use

The popularity of the system as an attraction and economic driver is acknowledged, and 14-year old data for economic contribution are presented in the form of \$17.13 million direct input to the local economy. In fact, more recent information suggests clearly that Kings Bay and two additional spring systems (Homosassa and Chassahowitzka), in concert, generate nearly \$200 million per annum to the Citrus County economy.

This section should include an analysis of projected trends as well as historical land use changes. It is important to address how anticipated regional development will further contribute to nitrate pollution as well as groundwater withdrawals in the area, and the likely impacts associated with those changes.

### Figure 1-18

This graphic clearly depicts the reason Figure 1-1 is inappropriate. Changing regional land use patterns alter hydrology and impact delineating of watershed and contributing area boundaries.

Development and groundwater withdrawals in the region overall may also result in some springflows declining and rerouting groundwater discharges to other vents. These complicated changes should be studied relative to past land use changes and modeled future predictions in order to fully assess human use and impacts on the system.

### Section 1.5 Measured Criteria Linked to Significant Harm

Salinity Habitats and Thermal Refuge for manatees are the two metrics examined in development of the draft. This narrow focus is insufficient.

Moreover, in setting flow criteria based on preserving manatee thermal refuge, the standard for Kings Bay and Crystal River should be to preserve 100% of anticipated manatee refuge, as at Blue Spring, because the two systems are of comparable importance to wintering manatee populations.

This section should include a more detailed discussion of manatee thermal refuge needs in the Kings Bay/Crystal River system and how that system compares to other Gulf and Atlantic coast springsheds that have used manatee thermal refuge as criteria linked to significant harm. The Draft MFL should also include information discussing the relationship among vegetation, salinity, flow, and availability of thermal refuge, as these factors are interdependent within the KB/CR system. Please also see further discussion of the analysis presented in section 1.5.2.

This seems to be the best location for the District to make its case for relying primarily upon these two criteria. Given the algae and nitrate problems in the system, water quality parameters may be more or as important to analyze in evaluating significant harm. It is particularly important for the District to clarify the interrelationship among salinity, flow, SAV health, and algal proliferation if it plans to rely on salinity as a primary criteria for assessing significant harm. Salinity harms SAV, but may also reduce the incidence of certain types of algae (or spawn growth of other algal species), and algal growth likewise impacts SAV; there has been no assessment of the net impacts on the system from these possibly conflicting trends, whereas a sustained strong flow would both reduce impacts from salinity and flush the system of algal buildup, thereby enabling the growth of natural and historical SAV communities. It may therefore make more sense for the District to consider setting the MFL relative to SAV, or else to use salinity and algae coverage or nitrate criteria combined to assess significant harm.

#### Section 1.5.1.2 Effects of Salinity

The fragile nature of the Kings Bay system is suggested by text within the draft:

*"Burghart and Peebles (2011) found that zooplankton, ichthyoplankton, and hyperbenthos communities in spring-fed estuaries of the Florida gulf coast experience more abrupt changes with salinity than in surface-fed estuaries."*

This implies a perspective limited to the bay, but there is no evidence reviewed in the draft regarding potential impacts in the near shore estuarine regions (coastal) of the system wherein salinity is a significant component of biological productivity.

This section is incomplete. It acknowledges salinity as a driver of decreased SAV, but should take the additional step of linking (here, as well as elsewhere in the document) salinity increases that damage SAV with system flow reductions. This is a general criticism of the document in that, in evaluating different parameters and criteria, the document neglects to tie the analysis back to the matter at hand – spring flows in the KB/CR system.

The Draft MFL should also assess the affects of salinity on algal growth and species composition to determine how such factors may exacerbate or mitigate SAV reductions.

#### Section 1.5.2 Manatee Thermal Refuge

Manatee thermal refuge habitat needs should be assessed in concert with an acknowledgement that increasing development and boat traffic in the area. The District should also consult with the federal U.S. Fish and Wildlife Service Crystal River National Wildlife Refuge staff for consistency and conservatism in evaluating thermal refuge needs.

As the Draft MFL notes, the warm water refuge at Kings Bay/Crystal River is anticipated to increase in importance as regional power plants and their artificial warm water discharges are taken offline. The Draft should carry that thought process forward and include discussion of the fact that any thermal refuge analysis must include consideration of increased numbers of manatees using the springs as winter habitat, both the local population grows and as manatees currently using artificial sources are relocated to natural warm water habitats, such as Kings Bay/Crystal River.

#### Section 1.6.1.1 Water Quality Standards

Please reference prior comments in this document's analysis of Section 1.4.5, in addition to the following considerations:

Table 1-6 illustrates that existing nitrogen concentrations currently exceed TMDL targets for all listed WBIDs. These water quality exceedances indicate that nitrogen is the limiting nutrient fueling algae proliferation in some of the KB/CR waterways. Again, this analysis requires a discussion of residence time, as low flow and algal buildup both create a positive feedback loop resulting in more algae.

#### Section 1.6.1.2 Are Water Quality Standards Being Met?

Harmful algal growth resulting from nutrient exceedance in this system is exacerbated by prolonged residence time. A 12% reduction in flow will confound recovery actions significantly, in direct conflict with objectives of the District's adopted SWIM Plan. Furthermore, adoption of the staff recommendations will conflict sharply with the state's adopted TMDL rule, which is largely based on the impact of prolonged residence time.

#### Section 1.6.1.4 Effect of Flow on Water Quality

*"We conducted an analysis to correlate rate of discharge from spring vents with water quality of that discharge."*

While this study would be valuable in informing the MFL development process, this section fails to meaningfully discuss the results. FSC requests citation and access to the study's methodology and results. This study and its results would be particularly helpful in evaluating whether additional measurable criteria linked to significant harm, such as nitrate concentrations or algal coverage, should be included in section 1.5.

#### Section 1.6.1.5 Management Plans

It would be of great value to citizen stakeholders, and likely to peer reviewers and regulators themselves, to outline the interrelationships among these various management schemes. It is essential for the success of the SWIM, TMDL, and BMAP processes that future management decisions such as MFL determinations be consistent with and promote the aims of prior management plans. A bird's eye level analysis here of how these different rules and tools interact and support each other would ensure cohesion across different water management categories, plans, and levels.

#### Section 1.6.2 Sea Level Rise

FSC requests that the District summarize the USACE recommendations it used concerning potential sea level change for evaluating coastal projects to assess the need for specific minimum flow prevention strategies for the KB/CR system over the 20-year planning horizon. If the District is anticipating or relying on aquifer levels rising due to pressure from rising sea levels, that modeling and analysis needs to be made available for public review, considering that the MFL process will essentially cement underlying assumptions and grant water withdrawals on the basis of those assumptions for at least the 10-year period prior to the MFL's next anticipated review.

More substantially, this section should be revised to be titled "Sea Level Rise and Climate Change." The Draft document acknowledges in Section 2.7 that no other effects of climate change were modeled or discussed for the purposes of developing the MFL, despite the fact that drought conditions may persist, reducing spring flows, or that increased frequency and intensity of tropical weather systems may exacerbate saltwater intrusion and a decline in the SAV community, to name only a few possible factors. A full analysis of these factors' likely and potential impacts over the course of the planning period should at least be given some consideration. These impacts have the potential to significantly alter the watershed hydrology even over the short-term, and the very uncertainty involved should obviate the importance of a precautionary and conservative approach in setting the MFL.

#### Section 1.6.3 Estuary Residence Time

*"We include residence time as an output of our modeling effort and consider substantial increases to residence time as potentially harmful, and therefore as evidence in favor of reevaluation."*

Prolonged residence time is an important driving factor in nutrient accumulation and algae growth according to the state's TMDL Rule. It is a factor that should be seriously evaluated in context of Section(s) 1.1.3 and 1.1.4 of this draft. If an 11% increase of residence occurs as envisioned in Section 4.6.2, the draft must be demonstrated to not violate the objective of significant harm or

disrupt the basis of the TMDL Rule. Arguably the TMDL rule in and of itself is basis for no further reduction of flows in the Kings Bay spring system.

#### Section 1.7.1 Recreation in and on the Water

***"Surveys of residents revealed that they are interested in water clarity and reductions in algal blooms, both of which are identified in the District's SWIM plan, and which will be addressed, in part, through minimum flow development and implementation by maintaining salinity habitats supportive of native plant establishment and persistence (Evans et al. 2007; SWFWMD 2015)."***

The surveyed residents are the District's constituents and primary source of tax revenue that funds District operations. The SWIM Plan was developed with participation of multiple stakeholders, to include ordinary citizens. They recall with clarity the many events so well presented in the FDEP TMDL document as Figure 2-3; page 18. Given their concerns, therefore, it would be helpful for the District to calculate an estimated timeframe for the time it takes an influx of nutrients in the system to vent discharge, and from discharge to algal blooms, as a function of residence time.



Hunters Cove; WBID 1341C - June 2010; Photo by Harley Means; FDEP

A discussion of water-based recreation should also include an assessment of the intensity of recreational resource use and its direct and indirect impacts **on** water quality as well as noting the importance **to** recreation of improved water quality.

#### Section 1.7.3 Estuarine Resources

***"Estuaries are defined by the confluence of freshwater with marine waters (Day 1989; McLusky and Elliott 2004). As such, estuarine waters exhibit a range of salinities that limit the distribution and abundance of organisms. Our focus on salinity-based habitats will have wide-ranging protective effects on estuarine resources within the Crystal River/Kings Bay system."***

There is no apparent evaluation of impacts on estuarine resources external to and supported by the Kings Bay system. The coastal estuarine resources of Citrus County are a magnificent economic driver and should be defended with dedicated vigilance.

#### Section 1.7.6 Aesthetic and Scenic Attributes

*"Residents and users of Kings Bay and Crystal River are concerned with water clarity and preventing / reducing algal blooms (Evans et al. 2007; SWFWMD 2015). In addition, the tourism industry depends upon manatee thermal refuge during cold months. Both of these concerns are addressed in our analysis of salinity habitats and volume of warm water, which should have wide-ranging effects on maintaining natural aesthetic and scenic attributes, as well as manatee habitat."*

It is not clear that estimated increases in residence time will promote a linear response, or that the proposed rule will address and support SWIM Plan goals related to water clarity and algal blooms.

#### Section 1.7.8 Sediment Loads

*"Submarine groundwater discharge into Kings Bay is free of sediment. A natural community of submerged aquatic vegetation functions to uptake nutrients and prevent re-suspension of sediments and associated nutrients by wave action (Hoyer et al. 2001; Barko and James 2012). Therefore, focusing on preservation of low-salinity habitats and flows associated with their persistence should have strong, positive impacts on sediment loads and their effects throughout the system."*

The last sentence is speculative and conflicts with the first sentence.

#### Section 1.7.9 Water Quality

*"We analyze several water quality parameters and attempt to relate them to freshwater inflow to the system. The two criteria we consider for setting the minimum flow are salinity and temperature, which have both been used as criteria for setting minimum flows for estuarine systems. We also present results and analysis of nutrients and dissolved oxygen concentrations. Furthermore, we model residence time as a function of spring flow to the system."*

FSC applauds and supports the above analysis, and requests that the draft rule include supporting data in this section.

#### Section 1.7.10 Navigation

*"Navigation has been impeded in the past by invasive vegetation (Evans et al. 2007). We expect setting minimum flows to protect salinity-based habitats will provide for more effective restoration of native vegetation (See Section 1.5.1.1). Water levels in the system are largely dependent upon tide and not on freshwater inflow."*

By this rationale, obstruction by invasive vegetation would best be addressed by elevated salinity levels. Maximum restoration of native vegetation would be facilitated properly by reversion to baseline or flows without elevated nutrients.

## **Chapter 2**

### Section 2.1 Groundwater Levels and Discharge Measurement

How did the District account for possible seasonal variation in its ADCP measurements? The 25 days from July 27-August 20, 2009, seem unlikely to be indicative of year-round precipitation and weather patterns, which might have a measurable impact on the surface water levels and tidal variation that the study was designed to measure.

### Section 2.2 Predicting Freshwater Inflow

The close proximity of ROMP TR21-3 may be a convenient reference for correlating flows to potentiometric elevations, but its low elevation suggests it to have only general validity relevant only to those discharge points within its domain. The basin is far more expansive and in some cases terrain elevations in the eastern domain exceed 120'. Potentiometric elevations to the east exceed 40' NGVD and the region is rife with a variety of conduits in the karst environment.

### Section 2.5 Manatee Thermal Refuge

It is noted that thermal refuge parameters were defined per the space requirements developed for Blue Spring and the Chassahowitzka River and are designated requirements for individual manatees. The needs are presented here absent an analysis of the results of the study of available space. This section would do well to include a discussion of the impacts of the greater recreation in the KB/CR area relative to the Chassahowitzka and Blue Spring to determine possible additional space that may be needed for manatees to avoid motorboats and human harassment.

### Section 2.7 Sea Level Rise

See discussion from 1.6.2, above, requesting a restatement of the USACE recommendations utilized in the MFL draft process and discussing the need to evaluate the broader impacts of climate change to predict additional impacts that may undermine baseline flow assumptions.

## **Chapter 3**

### Section 3.1 Modeled Salinity Habitats

It is not discussed why the District has selected a threshold of 85% of baseline conditions, unless this is a result of the 15% significant harm threshold discussed in Chapter 1 that is also meant to be evaluated on a case-by-case basis per the measurable criteria for significant harm. If such is the case, we are confused as to whether the 15% is arbitrary **or** is a result of analyzing a salinity threshold at which significant harm occurs. Please clarify this important point. If it is arbitrary, we argue for a more conservative and protective threshold. If it is based on the salinity threshold, we request an explanation of why 85% was selected as the point at which significant harm occurs.

### Section 3.2 Modeled Manatee Thermal Refuge

It is again unclear, but becoming more likely, that the 85% target is a product of an arbitrary assumption of 15% decline in resource availability as denoting significant harm. This target is wholly inappropriate for manatees, which are a federally listed species, and for which permitted water withdrawals that cause any harm would constitute illegal “take” as defined under the federal Endangered Species Act. Any deleterious impact on the species therefore qualifies as significant harm.

### Section 3.3 Modeled Sea Level Rise

Further explanation is requested to resolve confusion in this section. It is unclear, but it seems as though it is suggested here that habitat reductions that are a result of sea level rise are quantified differently or set apart from water withdrawal reductions. Anticipated sea level rise reductions should be accounted for in setting minimum flows and levels now so that consumptive use permits are not issued in the near term which may in the longer term result in reductions below the MFL as a result of sea level rise or other climate change impacts.

## **Chapter 4**

### Section 4.1 Crystal River Spring Group Discharge

Could the District please ask peer reviewers to weigh in specifically with respect to historical discharge estimates? It is confusing that the Draft MFL concludes a mean discharge of 374 cfs despite historical studies finding mean discharges ranging from 447 cfs to 735 cfs to as high as 971 cfs, while even acknowledging that “previous estimates lack the full spatial comprehensiveness” of the District’s study. Given the expanded spatial comprehensiveness associated with the 70 vents the District identified, one would expect the District’s discharge estimate to be even greater than historical values, at least in the absence of the marked influence of substantial climactic changes and groundwater withdrawals. An accurate estimate of historical discharges is important to determining whether “significant harm” has already occurred that would require mitigation efforts; the Draft MFL seems to assume current levels are an acceptable baseline and that there have not already been substantial declines in ecological resources in the KB/CR system. The District’s conclusion here is counterintuitive at best.

### Section 4.3 Modeled Manatee Thermal Refuge

This section makes the assertion that there is sufficient warm water, even with reductions, to provide thermal refuge for every manatee in the world, confusingly (and misleadingly) citing Table 3-2. This claim does not account for climate change and other damaging environmental factors, including development, that encroach upon KB/CR refugia suitability, and does not consider the physical imposition and reduction of suitable space associated with motorized water recreation activities.

#### Section 4.4.2 Nitrogen, Phosphorus, and Salinity

This section needs redress. Several contradictory statements are juxtaposed together within this analysis and clarification from the District or from peer reviewers is requested. The Draft MFL states on multiple occasions that the results of its system-wide analysis contradict, are even “opposite” to the results derived in the system’s TMDL process. Rather than seeking to resolve these paradoxical differences in findings, the District simply concludes that the lack of a trend means that nitrate levels have not increased. Absence of evidence is not evidence of absence. Moreover, this conclusion conflicts with findings in the BMAP process which indicate excessive N loading into the system that is estimated to be substantially higher than that which is currently reflected in discharges. Common sense (and evidence contained in BMAP documents) suggests that there is a lag time in N inputs to groundwater and the discharge to the spring. Moreover, if N has not increased in the system since 1984, the District should offer an alternative theory for the recent proliferation of nuisance algae in the system.

The assertion that nutrient levels are outside the scope of the MFL process is likewise questionable, because flushing and residence time, as has been noted throughout these comments, are important factors in nitrogen uptake and re-suspension and algal growth.

#### Section 4.6 Supplemental Analyses

*“Sea level rise and residence time were considered as supplemental to minimum flow development. This means they were not considered as measured criteria for establishing significant harm to environmental values, as was the case for salinity and manatee thermal refuge. However, once we identified the most sensitive criterion for establishing a proposed minimum flow, we determined the potential effects of implementation of the proposed minimum flow on residence time and as part of an analysis of sea level rise. Because a 15 percent decrease in the 2 ppt water volume was associated with a 12 percent reduction in flow, we investigated how that 12 percent reduction in flow will affect estuary residence time as well as salinity-based habitats and manatee thermal refuge under projected sea level rise conditions.”*

The failure to rely on all available components of evaluation does disservice to the draft and discredits its conclusions and recommendations. It is perfectly clear that nutrient loads, coupled with prolonged residence time in the system are, in tandem, the primary culprits of the system’s inclusion on the FDEP 303(d) List of Impaired Waters. While we have little control over sea level rise, we do have the ability to influence residence time. The anticipated median of increase (residence time) within the draft resulting from a 12% reduction of flow is 11%. There is no analysis of the nature of impacts this may promote. We note that during the drought in the early part of this decade that algal blooms proliferated in Kings Bay and the sole variable at play was increased residence time that resulted from diminished flow.

#### Section 4.6.2 Modeled Residence Time

*“Changes in residence time can contribute to increased frequency and severity of algal blooms within the estuaries (Valiela et al. 1997; Burghart and Peebles 2011 [included as appendix]; Wan et al. 2013), although the direct and indirect relationships between residence time and algal populations in the Crystal River/Kings Bay system are not known.”*

The statement above presents as contradictory and clarification is needed. The contribution of increased residence time is recognized to correlate with algal bloom severity, yet this factor is apparently dismissed due to the parameters of direct or indirect causal relationship, which are not established. District staff has asserted a clear correlation between residence time and algal blooms in public presentations and discussion. Prolonged residence time is the primary factor in the FDEP determination to set TMDL goals significantly below the standard .35 mg/l threshold for nitrate/nitrite pollution.

Failure to fully analyze this factor substantially detracts from the credibility of the draft.

**Findings:**

The Florida Springs Council, Inc. cannot support the draft recommendations for the following reasons:

- 1) The Kings Bay/Crystal River system is designated as impaired waters by FDEP for excessive nutrient loads. The state has developed and adopted a TMDL Rule with goals of reducing nutrient loads to levels significantly lower (0.23 mg/l N) than statewide adopted standards (0.35 mg/l N). The basis for these findings is predicated on residence time, a factor largely ignored by draft recommendations.
- 2) The basis for draft recommendations (2 ppt salinity) is irrelevant to findings in the TMDL rule, and in fact conflicts with the objectives of that rule.
- 3) The recommendations for 12% reduction are based on an essentially arbitrary 15% significant harm threshold and yet form the basis for future water use permitting, actions that may be irrevocable, or at best problematic, at a later date. The draft recommendations are not supported by review of forecasted demand increases or geographical scope of analysis. Should the Governing Board adopt the recommendations, it will be far more difficult to reverse the harm at a later date than to base authorization for higher levels of withdrawal on then current data sets. The proposed rule is subject to recurrent review for such reasons and such review provides for well-founded modification based on then-current information.
- 4) A strong argument can be made that staff recommendations for the Kings Bay/Crystal River Spring System should support a recovery strategy rather than one of additional degradation.
- 5) Staff recommendations are made independently of ongoing efforts by FDEP, which have resulted in a TMDL rule and development of a Basin Management Action Plan. This lack of synergy results in conflict within state agency policies, and is counterproductive to state responsibilities to protect the health, safety, and welfare of the citizens.

**Recommendations:**

- That staff consider the preceding comments and modify recommendations in the draft accordingly.

- That staff give consideration to recommending a recovery strategy for the system which is complimentary with ongoing FDEP rule/plan development.

Respectfully submitted,



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Enclosure

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