PEER REVIEW PANEL REPORT

Of the Southwest Florida Water Management District's document

A Reevaluation of Minimum Flows for the Upper Peace River from Bartow to Zolfo Springs, Florida

Prepared for: Southwest Florida Water Management District
Peer Review Panel: Harry Downing, John Loper, Adam Munson
Date:
6/16/2026

1. Introduction

This report summarizes the findings of an independent Peer Review Panel convened to review the Southwest Florida Water Management District's draft reevaluation of minimum flows for the Upper Peace River from Bartow to Zolfo Springs, Florida, and associated technical documents.

1.1 Purpose of the Peer Review

The Southwest Florida Water Management District (District or SWFWMD) is mandated by the Florida Statutes (F.S.) to establish minimum flows and levels (MFLs) for priority surface waters and aquifers within its boundaries for the purpose of protecting the water resources and ecology of the aquatic ecosystems from "significant harm" (F.S. §373.042, 1972 as amended). To assist in the development of the MFL for the Upper Peace River the District has engaged in voluntary peer review of the technical documents associated with the development of the minimum flow recommendation. In their 2025 report, the District recommends minimum flows for the Upper Peace River, based on its reevaluation of an established low-flow threshold and recommends the establishment of new minimum flows to be protective of higher flow conditions.

Under the statutes, a minimum flow for a given watercourse is defined as the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area.

The Florida Statutes also require that MFLs be established using the "best available information," for the MFLs "to reflect seasonal variations," for the District's Governing Board, at its discretion, to provide for "the protection of non-consumptive uses." In addition, F.S. §373.0421 states that the District's Governing Board "shall consider changes and structural alterations to watersheds, surface waters and aquifers, and the effects such changes or alterations have had, and the constraints such changes or alterations have placed on the hydrology of the affected watershed, surface water, or aquifer…."

The State Water Resources Implementation Rule (specifically, Rule 62-40.473, Florida Administrative Code [F.A.C.]) contains additional guidance for the establishment of MFLs, providing that "…consideration shall be given to the protection of water resources, natural seasonal fluctuations, in water flows or levels, and environmental values associated with coastal, estuarine, aquatic and wetlands ecology, including:

1. Recreation in and on the water;
2. Fish and wildlife habitats and the passage of fish;
3. Estuarine resources;
4. Transfer of detrital material;
5. Maintenance of freshwater storage and supply;
6. Aesthetic and scenic attributes;
7. Filtration and absorption of nutrients and other pollutants;
8. Sediment loads;
9. Water quality; and
10. Navigation.

1.2 Peer Review Panel

Peer Review Panel members included:

- Adam Munson, Ph.D. P.E., (Panel Chair): Quantitative analysis, statistical analysis, engineering, hydrologic assessment, MFL experience.
- Harry Downing, M.S., P.E., Surface and groundwater modeling, statistical analysis, hydrology, flood risk assessment, MFL experience, receiving water impacts.
- John Loper, M.E., P.E., Integrated surface and groundwater modeling, MFL experience, surface water management, hydrologic restoration.

1.3 Peer Review Process

The District's draft minimum flows report and appendices were provided to the panel on December 16, 2025. Subsequently the panel members were able to engage in publicly noticed discussions in five Microsoft Teams teleconferences that were facilitated by the District. These began with a kick-off meeting on January 16th, 2026, followed by two panel discussions on January 23, 2026, and February 6, 2026. An initial Peer Review Panel report was delivered to the District on February 16, 2026. The District provided an updated minimum flows report and response document that addressed Panel suggestions in March of 2026. Two additional Panel teleconferences (via Microsoft Teams) were held to discuss the District's responses and report revisions. These meetings were also open to the public and were held on March 20 and March 27, 2026. During these meetings it was determined that while most of the panel's comments had been fully addressed, there remained a few comments that the panel felt were unresolved. The District's updated response to the panel's comments were posted to the District's webboard on April 13, 2026. An additional public meeting was hosted by the District on April 17th, 2026, to allow the peer review panel to discuss if all panel comments had been sufficiently addressed in the most recent version of the District's report and to allow an additional opportunity for public input into the proposed MFLs. All Panel communications occurred through use of a publicly accessible web forum, facilitated by the District. The final Peer Review Panel report will summarize the findings of the Panel and be completed by June 15th 2026.

1.4 Documents Reviewed

The primary document reviewed:

- A Reevaluation of Minimum Flows for the Upper Peace River from Bartow to Zolfo Springs, Florida (Draft, November 2025).

Supporting technical documentation reviewed (as applicable):

- Appendix A – Review and Recommendation for HEC-RAS Unsteady Flow Modeling of the Upper Peace River
- Appendix B – Peace River Integrated Modeling Project 2 (PRIM2)
- Appendix C – Peace River Baseline Flow Development
- Appendix D – Woody Habitat Analysis
- Appendix E – Upper Peace River SEFA Data Collection

- Appendix F – Instream Habitat Modeling Using SEFA
- Appendix G – Water Quality Assessment
- Appendix H – HEC-RAS Model Development
- Appendix I – Initial Peer Review Draft Report and District Responses
- Other supporting documents (e.g., Lake Hancock/Lower Saddle Creek reservation report; legacy Upper Peace River MFL report and peer review), as provided by the District.

2. Review Requirements and Overviews

The Peer Review Panel (Panel) was tasked with reviewing the Southwest Florida Water Management District's draft report, **"Recommended Minimum Flows for the Upper Peace River (Bartow to Zolfo Springs)"** from November 2025 and supporting appendices and technical documentation. Specifically, the Panel was tasked with reviewing all scientific and technical data, methodologies, and models used to establish the recommended minimum flows for the Upper Peace River. This included evaluating report conclusions, supporting data, all technical assumptions, and the procedures and analyses used. The Panel reviewed the draft report, supporting data sources, modeling documentation (including PRIM2 and associated baseline-flow development), and environmental analyses, and discussed key findings in publicly noticed meetings consistent with public-process requirements. The panel was also granted the ability to hear public comment and review documents submitted by the public.

2.1 Conclusions

The Panel was tasked with determining whether the conclusions specified by the District—including characterization of background/baseline conditions, identification of key stressors affecting the flow regime, and the expected effects of the recommended minimum flows—are supported by the analyses presented in the draft report and its supporting materials.

2.2 Supporting Data

The District relied on information from multiple public agencies, monitoring programs, and consultant studies to characterize watershed conditions and evaluate responses under historical and simulated conditions. The Panel was tasked with reviewing whether the best available data have been used, whether collection procedures and applicable standards are described, and whether the data are appropriate in type, coverage, and quality for the analyses performed.

2.3 Technical Assumptions

Determination of minimum flows requires technical assumptions embedded in analytical methods and modeling frameworks. For the Upper Peace River, this includes assumptions related to index gage representation, baseline-flow reconstruction and withdrawal adjustments, block-flow definitions and thresholds, hydraulic/habitat response assumptions, water-quality considerations, land-cover effects, and other system-specific processes (including karst-related gain/loss behavior and the influence of operational controls in the headwaters). The Panel evaluates whether assumptions are stated clearly, are reasonable, and are consistent with

available information. Where assumptions are uncertain or potentially influential, the Panel may recommend clarification, sensitivity checks, or additional documentation to support their use.

2.4 Procedures and Analyses

The District relied on multiple data sources: habitat transects, elevation transects, historical flow data, water quality modeling, etc. to develop relationships and expectations in regard to minimum flow effects. The Panel was to determine if the procedures and analyses were appropriate and reasonable for determining the recommended minimum flows. The Panel was also to determine if appropriate factors were applied, that nuances encountered were adequately addressed, that procedural processes and definitions were sufficiently documented to ensure repeatability of the results, and that procedures and analyses were performed so that conclusions could be derived from the results. Conclusions were reviewed by the Panel to ensure they are supported by input information and output information generated from the modeling.

3. Overview of Upper Peace River and Recommended MFLs

3.1 Upper Peace River Watershed and River Corridor Overview (Bartow to Zolfo Springs)

The draft reevaluation of Minimum Flows and Levels for the Upper Peace River focuses on the river segment extending from the headwaters region near Bartow downstream to Zolfo Springs, Florida. This portion of the Peace River system is a hydrologically complex, highly managed landscape where long-term changes in rainfall, groundwater levels, surface-water regulation, land use, and water use have all contributed to observed changes in river flows. The purpose of this section is to summarize the dominant physical setting and the principal natural and anthropogenic factors that affect flow in the Upper Peace River, recognizing that detailed supporting analyses and datasets are provided throughout the draft report and technical appendices.

The Peace River headwaters occur in the northern lake and tributary network, where surface water from the upper sub-basins converges and forms the Peace River at the confluence of the Peace Creek Drainage Canal and Lower Saddle Creek near Bartow**,** south of Lake Hancock**.**

Lake-rich headwaters and tributary networks serve as detention and storage elements that can attenuate runoff and redistribute flow seasonally, while also providing a pathway for managed discharges and structural regulation to influence downstream hydrology.

The Upper Peace River is characterized in part by its strong coupling to groundwater systems. This includes the surficial aquifer and deeper aquifers that influence baseflow, seepage losses, and the gain/loss behaviors that vary by reach.

The Peace River watershed is largely developed and has historically relied on groundwater for consumptive uses. Long-term decline in Peace River flow is evidenced beginning by the early 1930s, with impacts described as most pronounced in the Upper Peace River, which has been observed with a total loss of flow.

From a conceptual standpoint, changes in potentiometric conditions (particularly in the Floridan system and connected units) can alter vertical gradients and exchange fluxes between the river and aquifers. As groundwater levels decline (or recover), the river can shift toward more losing conditions (or more gaining conditions). The Upper Peace River includes karst influences within the riverbed and corridor that can create localized and sometimes episodic flow losses, complicating both interpretation of gage records and representation in numerical or hydraulic models.

3.2 Land use and landscape alteration: agriculture and mining

The Upper Peace River watershed is used for agriculture and mining/industrial activities, and these uses influence river flows through multiple mechanisms:

- Groundwater withdrawals for agricultural, industrial, public supply, mining, and other uses can lower potentiometric surfaces and reduce baseflow contributions or increase seepage losses from the channel.
- Return flows and land application of pumped water can augment surface runoff in some settings, while also increasing or decreasing evapotranspiration and/or recharge depending on how and where water is applied and the nature of the agricultural activities.
- Mining can alter drainage connectivity, capture runoff, reduce groundwater recharge, and change effective contributing areas.
- The Winter Haven Chain-of-Lakes is a lake system with structure control systems that regulate levels and outflows.

3.3 Structural regulation and major infrastructure: the P-11 structure and related operations

A key management element in the Upper Peace River system is the modified P-11 structure and related watershed operations associated with the Lake Hancock control structure project and effluent/operational changes in the headwaters region. The draft report text describes an assessment of the P-11 influence using an empirical water budget approach and reports average flow adjustments associated with removal of effluent from the City of Lakeland Wastewater Treatment Facility and operation of the P-11 structure on the order of several cubic feet per second at the primary index gages.

3.4 Recommended Minimum Flows

The draft recommended minimum flows are presented for three Upper Peace River segments, each represented by an index gage. The recommended minimum flows use a block approach: the applicable block is determined by the flow, and the minimum flow requirement is expressed either as (a) a fixed low-flow threshold (Block 1) or (b) a percent-of-baseline minimum flow (Blocks 2–3), with an associated maximum allowable reduction in flow.

Index gages / segments

- Upper segment (Bartow) — USGS 02294650
- Middle segment (Fort Meade) — USGS 02294898
- Lower segment (Zolfo Springs) — USGS 02295637

Recommended minimum flows (by segment and flow block)

Segment / index gage	Block 1 (low)	Block 2 (medium)	Block 3A (high)	Block 3B (very high)
Upper segment – Bartow (USGS 02294650)	≤ 30 cfs; max reduction 0%	>30 to ≤71 cfs; max reduction 12%; minimum flow = 30 cfs or 88% (whichever is greater)	>71 to ≤483 cfs; max reduction 15%; minimum flow = 85%	>483 cfs; max reduction 7%; minimum flow = 93%
Middle segment – Fort Meade (USGS 02294898)	≤ 21 cfs; max reduction 0%	>21 to ≤120 cfs; max reduction 12%; minimum flow = 21 cfs or 88% (whichever is greater)	>120 to ≤529 cfs; max reduction 10%; minimum flow = 90%	>529 cfs; max reduction 7%; minimum flow = 93%
Lower segment – Zolfo Springs (USGS 02295637)	≤ 40 cfs; max reduction 0%	>40 to ≤274 cfs; max reduction 13%; minimum flow = 40 cfs or 87% (whichever is greater)	>274 to ≤1,047 cfs; max reduction 9%; minimum flow = 91%	>1,047 cfs; max reduction 7%; minimum flow = 93%

4. Peer Review Comments

4.1 Overall Impression

The Peer Review Panel finds the Upper Peace River draft MFL reevaluation to be an impressive and comprehensive body of work. The report and appendices reflect substantial effort to compile and interpret historical records, conduct field data collection and surveys, and integrate multiple lines of evidence across hydrology, hydraulics, habitat, and water-quality considerations. The Panel recognizes that the Upper Peace River system is technically challenging due to long-term climatic variability, extensive historical alteration, complex groundwater–surface water interactions, and managed headwaters operations (including Lake Hancock and the P-11 structure and the Winter Haven Chain-of-Lakes). Within this context, the scope and level of documentation provided in the draft report are commendable.

The Panel believes the District has relied on what appears to be the best available data and has made substantial efforts to collect, enhance and improve the suite of data available for modeling and analysis. It has used well-developed technical tools to develop the MFL recommendations. In particular, the integrated modeling framework (PRIM2) and the supporting hydraulic and habitat analysis tools represent appropriate and mature approaches at this point. The supporting technical appendices are thorough in documenting the District's work.

While the Panel's initial overall impression was positive, the review identified several targeted topics where additional clarification or modest enhancements could improve reader confidence and strengthen the final report. These included: (1) clearer documentation and support for the baseline-flow reconstruction procedure that relies on PRIM2 pumping-reduction scenarios; (2) a more explicit linkage between summary adjustment results (e.g., Table 5-6) and any "met/not met" status conclusions through rule-consistent compliance accounting; (3) additional context on how recent years of apparent improvement related to headwaters operations (Lake Hancock/P-11), hydroclimatic variability, and other watershed drivers; and (4) clarification of some details in the hydraulic modeling component of the MFL.

The Panels concerns are detailed below and specifically in the Peer Review Comments table presented in Section 6 of this report. The table also details two rounds of responses from the District. Responses included direct commentary, in the comments table as well as alteration of the MFL document and at times its associated appendices. Most of the panel's comments were successfully addressed in the initial District response. The remaining concerns were acceptably addressed after the second response from the District.

4.2 Specific Findings

Panelist specific comments can be seen in the Reviewers Comment Table presented in Section 6 of this report. Here we discuss the united concerns of the Panel which have a material effect on the reviewed document. It is worth noting that the methodologies used to establish flow thresholds and allowable reductions were all well-received by the panel. Most of the panel's

comments concern elements related to the establishment of the baseline flow and/or the projection of MFL compliance.

4.2.1 Baseline-flow reconstruction and the scaling of PRIM2 pumping scenarios

The reevaluation relies on integrated hydrologic modeling (PRIM2) to support analysis of the factors affecting flows, including climate variability and groundwater pumping scenarios. PRIM2 is explicitly described as a basin-scale tool intended to test management options and understand hydrologic interactions affecting river flows.

The modeled system is used to explore how changes in pumping and rainfall propagate through surface water–groundwater interactions and water budgets, including effects that can vary longitudinally along the river corridor. The panelists noted in several comments that the basin is heavily altered with structural operations and landscape modifications (including mining features and agricultural return flows). The Panel requested clarification on the rationale for not quantifying the extent to which unreclaimed mined lands, clay settling areas, other impoundments and related land alterations have altered the flow regime when developing the baseline flow record. Current or most recent watershed conditions appear to be modeled hydrologically (recharge and storage), but historical conditions were not considered.

The model is the best tool identified to evaluate the complicated hydrologic changes in the system. It is therefore highly relied on to create the baseline flow regime.

The Panel notes that the baseline flow reconstruction is an important component of the MFL recommendation. The reconstruction relies on the PRIM2 pumping reduction simulations. The draft report and Appendix C describe estimating "no-withdrawal" streamflow (baseline) by taking the modeled differences between the 100% pumping and the 50% pumping scenarios and doubling those differences to approximate a 0% pumping condition. This approach assumes that the streamflow response to pumping is reasonably approximated by a linear relationship over the range considered. The Panel feels this statement should be supported by additional evidence.

Appendix C states "75% pumping scenario was not needed to develop streamflow adjustment". However, the PRIM2 Scenario report does talk about a 75% scenario on page 4-1 (52 of the PDF). Could the 75% pumping scenario be used to increase confidence that the baseline flow adjustments are well approximated by linearity? The extrapolation will still be 50% but it might buttress the assumption. Regarding the linearity of responses to the PRIM2 model Appendix I is going to be added to the report which provides linear regression responses for the 100, 75, and 50 percent reduction scenarios. Appendix I is titled "Initial Peer Review Draft Report and District Responses."

The Panel also noted that PRIM2 pumping-reduction runs used initial conditions identical to the base case, and that any underestimation in reduced-pumping response could be carried forward and amplified if differences are doubled. In a previous peer review of the PRIM2 model calibration and scenarios it was pointed out that the effects of the 50% reduced pumping scenario were underestimated due to the initial conditions being unchanged from the 100% pumping condition (Anclote Consulting PLLC, 2023. Technical Memorandum. Peer Review of Peace River Integrated (PRIM2) Model.). The magnitude of this underestimation is a function of the

duration of the model "memory" of the initial conditions relative to the 16-year simulation period of PRIM2. If the initial error introduced decreases roughly linearly until the initial conditions are "forgotten", then the total underestimation (expressed as a fraction) is approximately one-half of the ratio of that memory duration to the full simulation period. When the change in river flows due to the 50% reduction scenario were doubled to represent a 100% reduction, the underestimation errors were also doubled. For example, if the changes in flow associated with the 50% pumping scenario were under-predicted by 10% because of this issue, doubling the differences to represent a zero-pumping scenario amplified the underprediction to 20%. If possible, a cursory sensitivity analysis should be conducted to demonstrate how the recommended MFLs would be affected by an underprediction of this magnitude in the baseline flow record.

In short, the Panel feels the report would benefit from a more explicit justification of linear scaling assumptions, and the use of static initial conditions in modeling various reduced pumping scenarios, both of which could affect the baseline flow regime. Alternatively, sensitivity envelopes could be developed demonstrating robustness and alleviating concern over uncertainty. See comment above regarding Appendix C.

The District responded to the panel's comments regarding the use of the PRIM2 model with regards to the assumptions of linearity in establishing the no-pumping conditions, and the inclusion of model spin-up data into the baseline flow record. The panel considers the District's response to be sufficient and reasonable. Additional discussion has been added to the report detailing the District's assumptions and evidencing the rationale for linearity. Regarding the initial heads used in the reduced-pumping runs, the District has opined that the spin-up is very short relative to the flow record and not believed to be a significant source of error, while also committing to explicitly quantify the duration of the spin-up period in the next PRIM2 model update.

Regarding the impacts of mining and other structural land alterations, the District responded that the baseline flow "is defined to represent conditions free from water withdrawal impacts only". Section 373.0421(1)(a) of the Florida Statutes states that "…the department or governing board shall consider changes and structural alterations to watersheds, surface waters, and aquifers and the effects such changes or alterations have had, and the constraints such changes or alterations have placed, on the hydrology of an affected watershed...". Because the statute appears to give the District considerable discretion regarding how (and to what extent) structural alterations are considered, their clarification now provided in the table and on pages 88 and 89 of the revised MFL report adequately addresses this comment.

4.2.2 Conclusion/prediction of compliance with proposed MFLs

The panel feels stronger evidence that the proposed MFLs are currently being met and are projected to be met should be provided. This is especially true because the monthly averages are being used to conclude compliance with the rule-based daily compliance accounting. It is also not clear how Table 5-6 based on 2003-2018 supports the statement that recommended minimum

flows are currently being met, particularly given the long-term plots showing low-flow thresholds not met for many years historically at Bartow and Fort Meade.

The District's response was a more expansive discussion of the conclusion that MFLs are currently being met and projected to be met over the next 20 years. The report now more fully explains these conclusions. Specifically, both the executive summary and chapter 7 now explain more clearly the District's approach.

4.2.3 Interpreting recent performance: P-11 / Lake Hancock operations and hydroclimatic context

The post-2016 period reflects both operational changes in the headwaters and potentially favorable rainfall conditions. Mr. Loper noted the draft report language stating that since operation of the modified P-11 structure began in 2016**,** the Upper Peace has met its MFLs in the 2020–2024 period and that compliance continued in 2025 and beyond. However, the 2020–2025 period is a short window from which to infer consistent long-term compliance. If attribution is to be made to the P-11 operations specifically rather than the totality of operations, groundwater recovery and rainfall, greater explanation is warranted.

Mr. Loper and Dr. Munson both suggested strengthening the rainfall/streamflow discussion through additional climate context (e.g., AMO) and explicit comparison of rainfall volumes during the recent upward-trend period versus longer historical periods.

The Panel also notes that PRIM2 scenario results indicate that percentage changes in rainfall can translate into materially larger percentage changes in streamflow**,** reinforcing the need for context when interpreting compliance narratives based on a limited recent record.

The District acknowledged the need for continued monitoring given the brevity of the post P-11 data and expanded their discussion. Specifically, they addressed the concern of whether the UPR is meeting its MFLs because of the Lake Hancock project and/or recovering GW levels, or whether it is being met because rainfall has been near or above normal in these past 6 years. Their response taken in conjunction with their response to Section 4.2.2 reads as a narrower statement focused on the low flow (Block 1).

It is the opinion of the Panel that the District's revisions to the text appropriately acknowledge that recent high rainfall makes it difficult to draw conclusions regarding the drivers of MFL compliance. The District's acknowledgment of the need for additional data before drawing conclusions addresses the Panel's concerns that previous statements inferring long-term compliance were not well supported.

Specifically, the Panel agrees that the recent data collected support the conclusion that the MFLs, as written, have been met, requiring no recovery plan be developed. The District acknowledges in the revised text that this does not forestall the need for continued annual and 5-year evaluations, as newer data become available. The Panel collectively agrees that these statements adequately addressed our concerns regarding the conclusion of MFL compliance in the report.

4.2.4 Modeling Details that could influence exceedance reporting

Generally speaking the Panel feels some of the hydraulic modeling decisions potentially affect interpretation of exceedance probabilities and seeks clarification.

- Most notably concerning flow that was added during a dynamic HEC-RAS simulation to prevent model crashing**.** The Panel requests a description of how this was addressed in exceedance and flow-regime interpretation.
- Also noted was the transition in reporting resolution (daily to monthly)
- And a clearer explanation of curve fitting/exceedance procedures.

In addition to those noted in section 4.2.1 above, we also note the HEC-RAS dynamic modeling was used to establish continuous flow conditions within the Peace River for establishing key inflection points for MFL block establishment along with environmental habitat consideration. Modelling sink losses was the main reason for choosing the hydro-dynamic model. However, instabilities in the model only allowed flows down to 13 cfs between Bartow and Fort Meade below which the simulation model would become unstable and terminate. It was identified that this artificial flow maintenance could affect the statistical results, but adequate assurances were provided that the added flows would be accounted for in the statistical results. It was also noticed that hysteresis created variations in the stage discharge curves which rendered the results impossible to apply for flow block establishment. As a result, the steady-state model was used in place of the hydrodynamic simulation. Based on the analyses presented for the HEC-RAS modeling, steady-state results were expected to be within the range of the hysteresis simulated. Multiple USGS gauging sites were used in the generation of the steady-state model that should render the results aligned with the observed data. The number of cross sections used in the simulations are considered adequate and of good quality.

The assumption used in the PRIM2 model results used to determine baseline conditions for Bartow, Fort Meade, and Zolfo Springs was to double the resulting flow projections for the 50% reduction in flows. It was assumed that the reductions were approximately linear. It should be noted that if there are biases in the projections they will be doubled using this technique. It is assumed that the bias is small, but further discussion should be inserted that considers uncertainty.

Part of the MFL recovery is the Lake Hancock Lake Level Project. Based on the proposed MFLs at Fort Meade, a potential reduction in release rates from Lake Hancock may occur altering the time to recovery. Lake Hancock can provide substantial recovery; however, the report may overstate the likelihood. It is recommended that additional language be provided summarizing the expectations through dry periods of the record.

The District addressed the modeling concerns mentioned above. The response noted that the flow added to gain stability in the unsteady model was not added to the steady state analysis, nor was it added into exceedance and flow regime development. Language was added to section

5.3.2.2. of the main report detailing further the two HEC-RAS models. There was also continued discussion of the use of the linear response assumption used to estimate the baseline flow from the PRIM2 model. This discussion continued through both rounds of District responses and is more fully discussed in section 4.2.1 of this report as part of the development of the baseline flow discussion. As a modeling detail the discussion is captured primarily in Comment No. 26 of the peer review comment table. Additional details concerning the P-11 structure were also added in response to panel comments. While some details were questioned during the review the modeling concerns were addressed to the satisfaction of the panel members.

4.2.5 Chemistry Discussion

The Peace River is considered impaired for nutrients, chlorophyll, bacteria, and dissolved oxygen levels. Twelve (12) monitoring sites are available for water chemistry and physical parameter collection. It is established that Lake Hancock generates substantial phosphorus and nitrogen load to the river. Phosphorus concentrations are the result of phosphorus rich matrices in the watershed while nitrogen concentrations are due to nitrogen fixing organisms in the water column of Lake Hancock and other contiguous hydro-systems. Another source of nitrogen concentration increases is atmospheric. The Panel requested that atmospheric data be included in the report as part of the nutrient source loading to the Upper Peace River. Atmospheric data was included which represented about 20% of the rivers concentrations.

However certain trends with flow or runoff were noted in the report. Color seems to be increasing over time and with flow. No explanations were originally suggested, but this may be the result of the mandatory reclamation where the natural habitats are reestablishing after mining. Some explanation of this trend is recommended, but not necessary. Decreasing trends in pH were also noted. Acid rain or organic matter oxidation could be the reason for the acidification. Again, explanation of the trend was recommended, and included in the response to comments.

The District addressed questions raised by the panel relating to water chemistry, none of which were likely to alter the MFL recommendation. Details are in Section 6 and appear mainly at Comment No. 9, 10, and 11.

5. Findings

The Panel found the District's draft minimum flows report to be well-organized. The revised minimum flows report includes applicable and pertinent data, appropriate numerical and statistical modeling, thorough analyses, and reasonable assumptions, along with reasonable conclusions. Initial caveats and suggestions are detailed in Section 6 and have been addressed and acknowledged during this peer review. The District's revised report is better substantiated and conveys its conclusions more accurately. Some procedural enhancements have been

recommended for future work, such as quantifying the spin-up period for the PRIM2 reduced pumping scenarios.

6. Reviewer Comment Tables

			Detailed Comments on Reevaluation of Minimum Flows for the Upper Peace River Draft Report						
Comment No.	**Peer Reviewer**	**Figure, Table, or Page and Paragraph Number[1]**	**Does Comment Directly and Materially Affect Conclusions of Report? (Yes/No)**	**A. Reviewer's Specific Comments**	**B. Reviewer's Specific Recommended Corrective Action**	**District Response[2]**	**District Response Sufficient? (Yes/No)**	**District Additional Response[3]**	**District Response Sufficient?**
1	HD	Pg. 1 from report reference 1 below, all comments are based on this referenced report	Direction in intent	Base line change from 17, 27, 45 Bartow, Fort Meade, and Zolfo to 30, 21, 40	Discussion of direction from previous assumptions	The proposed new low flow thresholds are 30, 21 and 40 cfs, which, if approved by the Governing Board, will replace the existing low flow thresholds of 17, 27 and 45 cfs. This change is intended to optimize the use of the Lake Hancock Project to help offset flow losses that primarily occur between Bartow and Fort Meade.	Yes		
2	HD	13	no	lines in graph could be better represented by shading	Possible shading for better definition	Figure 13 on page 13 has been revised per your suggestion.	Yes		
3	HD	15	maybe	spelling	Looks like the word should be No	Could you please clarify this further? We are not entirely sure what you mean.	Yes taken care of		Yes
4	HD	26 Figure 2-4	no	Lines could be more definitive using different style	Box whisker provides more detail	Figure 24 on page 26 has been revised to a box-whisker plot per your suggestion.	Yes		

[1] Page number refers to the version of the District's minimum flow report for the Upper Peace River titled "UPR_MFLs_Draft_20251105".
[2] Page number refers to the version of the District's minimum flow report for the Upper Peace River titled "UPR_MFLs_Draft_20260315_Revised".
[3] Page number refers to the version of the District's minimum flow report for the Upper Peace River titled "UPR_MFLs_Draft_20260413_Revised".

			Detailed Comments on Reevaluation of Minimum Flows for the Upper Peace River Draft Report						
Comment No.	Peer Reviewer	Figure, Table, or Page and Paragraph Number[1]	Does Comment Directly and Materially Affect Conclusions of Report? (Yes/No)	A. Reviewer's Specific Comments	B. Reviewer's Specific Recommended Corrective Action	District Response[2]	District Response Sufficient? (Yes/No)	District Additional Response[3]	District Response Sufficient?
5	HD	Pg 31 table	maybe	Significant increase in lake or waterbodies areas over time	Any discussion as to reason?	The "Lake" category in the table includes both lakes and open water, as defined by PBSJ (2007). The same definition was applied when summarizing the 2020 landuse acres and percentages (Table 2-2). As noted, the 1999 area and percentage are higher than those for 1940 and 1979, even though all three were prepared by PBSJ (2007). The increase in the "Lake" category from 1940 to 2020 in the Peace River watershed is mostly due to improved imagery resolution, enhanced classification techniques, and updated mapping rules that allowed more small ponds, mining pits, and open water features to be detected compared with earlier datasets. While some real hydrological changes, such as new water filled mining areas and constructed retention ponds, do contribute, the majority of the increase reflects improved mapping rather than substantial environmental change.	Yes		

			Detailed Comments on Reevaluation of Minimum Flows for the Upper Peace River Draft Report						
Comment No.	**Peer Reviewer**	**Figure, Table, or Page and Paragraph Number[1]**	**Does Comment Directly and Materially Affect Conclusions of Report? (Yes/No)**	**A. Reviewer's Specific Comments**	**B. Reviewer's Specific Recommended Corrective Action**	**District Response[2]**	**District Response Sufficient? (Yes/No)**	**District Additional Response[3]**	**District Response Sufficient?**
						A corresponding explanation has been added as footnote #4 under Table 2-2 on page 31.			
6	HD	Pg 33 graphics Figure 2-7	no	Streams and river portion very small and difficult to discern	Represents a very small percentage	Figure 2-7 has been revised to make streams and rivers stand out per your suggestion on page 33.	Yes		
7	HD	Pg 36	interpretation	Candler is typically well drained, discussion tends to indicate that it is not	Just indicate in parenthesis Candler is well drained in the paragraph discussion	The second paragraph has been revised accordingly based on your suggestion on page 38.	Yes		
8	HD	Pg 38	It could	Why this soil classification of Arents	Indicate significant disturbed soils from …..	Some soils in the Upper Peace River are classified as Arents because the area has been heavily disturbed by phosphate mining and subsequent land reclamation. These activities mix soil materials and remove natural horizons, resulting in heterogeneous profiles typical of Arents. According to Metz and Lewelling (2009) in *Hydrologic Conditions that Influence Streamflow Losses in a Karst Region of the Upper Peace River, Polk County, Florida*,	Yes		

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						Argents are defined as "soil alterations due to urban and mining alterations which includes a sandy and clayey substratum, gypsum land, clayey haplaquants and hydraquents, excavated udorthents, and an urban land and water complex" The third paragraph has been revised to clarify that Arents represent heavily disturbed soils on page 38.			
9	HD	Pg 98	Sources of Nitrogen Possible	Need to add rainfall concentration effects (atmospheric deposition)	Add possible atmospheric monitoring site data if significant	Rainfall provides a baseline TN concentration of approximately 0.2 mg/L, primarily as nitrate and ammonia (Barcan et al. 2023, Kebedew et al. 2025). While this concentration is lower than the river's average (2.026 mg/L), the cumulative load from atmospheric deposition is a significant component of the basin's nutrient budget. Barcan, R., Kassis, Z. R., Teaf, C. M., Danley-Thomson, A., Covert, D. J., & Missimer, T. M. (2023). Dry and Wet Atmospheric Deposition Composition in	Yes		

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						Southwest Florida: Environmental and Health Implications. *Atmosphere*, *14*(1), 102. https://doi.org/10.3390/atmos14010102 Kebedew, M. G., Tsegaye, S., James, A., Bottcher, A. D., Albrecht, K. K., & Rotz, R. (2025). Understanding Nutrient Loading in a Hydrologically Sensitive Coastal Watershed: The Peace River Watershed, Florida, USA. *Environmental Processes*, *12*(3), 40. https://doi.org/10.1007/s40710-025-00782-2			
10	HD	Pg 122	Color Increasing and pH decreasing with flow increases	Possible reason for the flow trends	Reclamation effects with wetland habitats increasing	A: Positive relationships between color and flow are characteristic of blackwater systems like the Peace River. Color is a physical property of water caused by the presence of tannins, which consists of humic and fulvic acids. This color-flow relationship indicates a 'flushing effect,' where rising waters come into contact with organic-rich soils in surrounding wetlands, mobilizing dissolved organic	Yes		

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						carbon (of which tannins are one part) into the main channel (Creed et al. 2015, Hopper et al. 2025, Kroening 2004,). Because these tannins are naturally acidic, their introduction during high-flow events directly lowers the pH of the receiving water. Additionally, increased flow typically represents a shift from mineral-rich, alkaline groundwater (baseflow) to acidic, poorly-buffered rainwater and surface runoff, further reducing the stream's ability to neutralize these organic acids. Creed, I. F., McKnight, D. M., Pellerin, B. A., Green, M. B., Bergamaschi, B. A., Aiken, G. R., ... & Stackpoole, S. M. (2015). The river as a chemostat: fresh perspectives on dissolved organic matter flowing down the river continuum. *Canadian Journal of Fisheries and Aquatic Sciences*, *72*(8), 1272-1285. Hopper, G. M., Smith, E. M., Dormoy-Boulanger, J., &			

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						Benitez-Nelson, C. R. (2025). Urbanization Impacts Dissolved Organic Matter Concentration and Quality in a Southeastern United States Watershed. *ACS ES&T Water*. https://doi.org/10.1021/acsestwater.4c01054 Kroening, S.E., 2004, Streamflow and Water-Quality Characteristics at Selected Sites of the St. Johns River in Central Florida, 1933 to 2002: U.S. Geological Survey Scientific Investigations Report 2004-5177, 102 p.			
11	HD	Pg. 130	DO Decreasing Strategy	Why the trend	Unknown	The decrease in DO during high-flow events is primarily driven by the "flushing" of organic-rich, low-oxygen water from the surrounding floodplains and wetlands. As rising waters mobilize dissolved organic matter (DOM) and leaf litter, microbial decomposition increases, creating a high Biochemical Oxygen Demand (BOD) that rapidly consumes available oxygen (Kroening 2004). This	Yes		

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						phenomenon is common in Florida blackwater systems, where the delivery of stagnant, tannic-rich water from backwaters temporarily overwhelms the river's capacity for re-aeration.			
12	HD	Pg 169	Possibly	It appears that the interpolated cross sections cross each other	Is this a problem and is it significant?	During the hydraulic modeling process, additional cross sections were automatically interpolated in HEC-RAS to improve model stability. These interpolated sections help reduce spacing between surveyed cross sections, which is critical for accurate flow calculations in areas with sharp bends and rapidly changing channel geometry. The automatic interpolation tool in HEC-RAS generates sections based on geometry and alignment rules, not manual adjustments. In complex areas (tight bends, variable channel widths), this can result in some interpolated sections crossing each other. The overlapping sections do not affect the hydraulic	Yes		

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						computations because HEC-RAS uses the stationing and connectivity of the river reach, not the physical intersection of section lines, to calculate flow and water surface elevations. The consultant (Verdantas) confirmed through review and testing that these overlaps have minimal to no impact on the accuracy of the results. Adjusting these sections manually would require significant effort without improving model performance or accuracy. The current configuration meets industry standards and best practices for dynamic hydraulic modeling. The overlapping interpolated cross sections are a normal artifact of automated interpolation in complex river geometry. They do not compromise the integrity or reliability of the model results.			
13	HD	Pg 174	Yes	In the dynamic simulation, flow was	Exceedance probabilities and	In the dynamic HEC-RAS model, a small amount of	Yes		

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				added during the simulation to keep the HEC-Ras model from crashing	flow regimes might be slightly affected, has this been adequately addressed?	flow was added solely to stabilize the numerical computation during unsteady flow simulation. This adjustment was a measure to ensure the model ran smoothly and produced reliable results under dynamic conditions. This added flow was only used in the dynamic (unsteady) model simulation. It was not incorporated into the steady HEC-RAS modeling, nor into exceedance and flow regime development, and thus it does not affect any reported results. An additional paragraph has been included at the end of Section 5.3.2.2 (page 178) to clarify this point.			
14	HD	Pg 179	Not sure	Went from daily to monthly reporting for HEC-Ras Dynamic model	Daily flow simulation can be difficult to model	The monthly adjustments referenced in Table 5-6 (Page 183) were derived from PRIM2 modeling (daily) to convert gaged flow data to baseline flow data. These adjustments were applied because groundwater withdrawals data are reported	Yes <u>The monthly averaged adjustments due to zero flows are applied on a monthly basis to the actual flow data for establishing the</u>		

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						on a monthly basis, and because PRIM2, as a regional groundwater model, is designed to capture seasonal and long-term fluctuations in water levels and river flows. The baseline flow dataset was developed specifically for minimum flow determination and was not used in HEC-RAS modeling. Therefore, the monthly adjustments and baseline flow data have no influence on the HEC-RAS results. We are not fully certain of the intent of your question, so please let us know if the explanation above addresses your concerns or if additional clarification is needed.	resulting flow for withdrawals.		
15	HD	Pg 187	Not sure	Need to better explain the curvature fitting of the data regarding flow exceedance curves	An example would be appropriate.	The metric used to identify breakpoints on the wetted perimeter versus discharge curve is the slope change, not curvature in the mathematical sense. To ensure accuracy, the term "curvature" has been replaced with "slope change.' The first paragraph of Section 5.5.2 (page 192) has been revised accordingly, and	Yes		

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						a formula for calculating the slope change has been provided. Throughout the report, all references to "curvature" have been replaced with "slope change" for consistency. In addition, an example (pages 191-194) using site or cross-section 179519 has been included to illustrate how the slope change was calculated and how the breakpoint for low flow was identified.			
16	HD	General comment	Possibly	Shouldn't removal of ground water withdrawals turn the River to a discharging stream between Bartow and Fort Meade	Explanation	The Upper Peace River basin has been extensively modified by the mining and agricultural activities over the last century. Groundwater withdrawals are one of the factors that caused the Peace River to the shift from a gaining stream to a losing stream between Bartow and Fort Meade. In combination with the land cover changes and the opening of karst features in the river channels, surface water and groundwater interaction in the basin has been permanently altered. At	Yes		

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						present time, the Peace River between Bartow and Fort Meade is losing flow to the aquifer, especially during low flow season. It is expected that the Upper Floridan Aquifer potentiometric surface will increase with reduced groundwater withdrawals and hence reduce the loss of river water.			
17	HD	General Water Quality and Habitat	Possibly	There is aquatic weed management on the Peace River	Any effect on habitat?	Aquatic weed management on the Peace River, such as mechanical harvesting and selective herbicide treatments, helps control invasive species and maintain water flow. These practices can improve habitat quality by restoring oxygen levels and promoting native vegetation. However, they may also temporarily disturb wildlife, reduce cover for fish and invertebrates, and affect non-target plants if not carefully managed. To minimize impacts, treatments should be targeted, timed appropriately, and monitored to protect ecological balance.	Yes		

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18	HD	Lake Hancock Project	Possibly	Is there a reevaluation of Lake Hancock Project with the new MFL proposal?	Affects the MFL recovery	A reevaluation of the Lake Hancock Reservation will be conducted using the newly proposed Minimum Flows, contingent upon their approval by the Governing Board. This reevaluation is scheduled to occur during the second half of 2026.	Yes		
19	JL	Page 3, 1st paragraph	Possibly	"*Since the District began operating the modified P-11 structure in 2016, the Upper Peace River has successfully met its MFLs from 2020 through 2024. The District continued compliance with MFLs in 2025 and beyond*." While very encouraging, 2020 through 2025 seems like a small number of years to conclude the MFLs are being met consistently.	More time may be needed to fully support the conclusion that MFLs are currently being met. Is the UPR meeting its MFLs because of the Lake Hancock project and/or recovering GW levels, or is it because rainfall has been near or above normal in these past 6 years?	Section 373.036(7)(b)(9), F.S., requires the annual preparation and submittal of a minimum flows and levels (MFLs) status assessment to FDEP. The statement in question was based on the status assessments conducted over the past decade (2016-2025) for the existing Minimum Flow for the Upper Peace River (UPR). To determine whether the minimum flow was achieved in a given year (e.g., 2020), three consecutive years (i.e., 2018, 2019, 2020) must meet or exceed the established minimum flows for the UPR (see the UPR MFL rules in Supporting Document #1). Within the 10-year period (2016-2025), 2017 was the only year in which minimum	No The response only refers to the low minimum flows (Block 1 threshold). What about flows in blocks 2, 3A, and 3B? If flows for all blocks combined were met only 59% of the time for the most recent period of analysis (2016-2022) would we still conclude that the minimum flows are being met? (See SF-12)	The MFLs status mentioned on Page 3, 1st paragraph is for the existing MFLs established in 2002. It refers to the Low flow (block 1) only, because there are no Blocks 2 and Block 3 MFLs in the existing one. To avoid confusion, we have revised the paragraph (page 3) as follows: "Since the District began operating the modified P-11 structure in 2016, the Upper Peace River has successfully met its **existing minimum**	Yes

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						flows were not met. So, the conclusion of the Upper Peace River successfully met its MFLs from 2020 through 2024 was accurate. The statement "The District continued compliance with MFLs in 2025 and beyond." has been removed from the first paragraph (page 3) because, while past compliance can be evaluated, future compliance cannot be concluded at this time. Multiple factors contributed to the recent period of compliance, including the implementation of the Lake Hancock Project, regional groundwater level recovery, and above-average rainfall. However, rainfall alone does not explain the observed compliance. Historical periods such as 1991-1998 and 2002-2005 experienced higher rainfall totals (>55 inches and >59 inches, respectively) than 2016-2025 (~51.3 inches). Despite these higher rainfall totals, minimum flows were not met during those earlier periods		low flow from 2020 through 2025. We don't agree with SF-12 analysis for the following two reasons: 1. Groundwater impacts should be assessed based on PRIM2 model outputs, not gaged flows. Because groundwater withdrawals rarely cause the same-day effects on river flows. 2. PRIM2 is a regional model, and it is designed to quantify impacts over time periods larger than daily. We provided a detailed	

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						because the Lake Hancock project has not yet been completed and regional groundwater levels were substantially lower. Additionally, MFLs for the UPR were not established until 2002.		demonstration of the status assessment during the March 27th meeting. In addition, the status assessment for the proposed MFLs in Chapter 7 has been updated, with Section 7.1 (pages 239-242) revised to offer further clarity.	
20	JL	Page 17, last paragraph	No	Excellent description of bathymetric data collection here and later in the report (Section 5.2.2). This is a very important dataset that touches all aspects of the MFL study efforts.	None	Thank you!	Yes		
21	JL	Section 2.2.4	No	This section provides a nice write-up on historical groundwater levels and declines.	None	Thank you!	Yes		
22	JL	Figure 2-21	No	I recall years ago there was some discussion within	The report would benefit from a discussion of	A new paragraph beginning with, "In response to the long-term decline in low	Yes		

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				SWFWMD about the possibility of taking action to fill or divert low flows around the karst features in the riverbed. Why was this idea not pursued further?	measures considered but not taken.	flows…," was added on page 54 to enhance the transition between the historical hydrologic conditions described in Section 2.2.5 and the District's subsequent evaluation of management alternatives.			
23	JL	Page 68, last paragraph	Possibly	This subsection on streamflow trends could be strengthened by including a discussion of the Atlantic Multidecadal Oscillation (AMO) and its effect on long-term rainfall in the Peace River basin. The cool phase from roughly the late 60's/early 70's to late 90's/early 2000's resulted in lower rainfall compared to the handful of decades that preceded it. We've been in a warm phase for at least the past 25 years,	Include a discussion of rainfall trends, the AMO, and how it relates to trends in streamflow.	The last warm phase of AMO was from approximately 1925-1970 (45 years), followed by a cool phase from around 1970-1995 (25 years). The current warm phase started approximately from 1995 and has persistently for nearly 30 years. In addition, observational data shows a clear long-term warming trend in Atlantic seawater temperatures. Recent modeling studies indicate that the AMO warm phase may extend longer and may not return to the previous cool phase level. CMIP6 model projections generally indicate a higher-than-average precipitation under future	Yes. Interesting observation about the current AMO warm phase continuing longer.		

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				expected to be a wetter period based on AMO phase. While Section 2.4.1 describes long-term changes in rainfall, the report does not discuss it's effect on streamflow beyond citing some reports from decades ago.		conditions. Section 2.4.1 on pages 83-84 has been edited to address this comment.			
24	JL	Page 79, 3rd paragraph	Possibly	A significant upward trend in streamflow was observed for the period 2006-2022. A partial recovery in groundwater levels and the Lake Hancock control structure project were both cited as possible reasons. How does rainfall volume for this period compare with the 1975-2022 period?	Investigate the role of rainfall on recent streamflow trends.	Rainfall is one of contributors to the observed upward streamflow trend, along with regional groundwater level recovery and the Lake Hancock Project. The increased likelihood of rainfall is associated with the warm phase of AMO that has persisted since the mid-1990s. We have added additional discussion in the third paragraph on page 71 to highlight the role of rainfall in recent streamflow trends, rather than page 79 as indicated in the comment.	Yes		

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25	JL	Page 88, 2nd paragraph	No	*"The hydrologic impact of the P-11 structure was assessed by Yang et al. (*2020*) using an empirical water budget model. Based on data from 1975 through 2012, their analysis estimated average flow adjustment resulting from the removal of effluent from the City of Lakeland Wastewater Treatment Facility and the operation of the P-11 structure as follows: 5.17 cfs at the Zolfo Springs gage, 5.12 cfs at the Fort Meade gage, and 2.94 cfs at the Bartow gage. These values represent modeled estimates of how historical flows might have differed had the P-11 structure been operational throughout the evaluation period."*	Clarification requested	The adjustments required for Fort Meade and Zolfo Springs were larger than those for Bartow due to the influence of sinkhole related flow loss. The Fort Meade and Zolfo Springs gages are located downstream of the major sink loss area between Bartow and Homeland, where substantial flow losses occur, necessitating greater adjustments to account for these effects. This explanation has been added to the first paragraph on page 91 for clarification.	Yes		

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				Why is the flow adjustment less at the Bartow gage compared to the Zolfo and Ft. Meade gages?					
26	JL	Page 178, 5th paragraph	Possibly	Baseline Flow Calculation – "*PRIM2 was used to assess the effects of groundwater withdrawal changes by simulating* scenarios *at the index gaging stations on the Upper Peace River: Bartow, Fort Meade and Zolfo Springs, under both current (100% pumping) and reduced (50% pumping) conditions*." In my August 2023 review of this scenario, I pointed out that the effects of the 50% reduced pumping scenario were likely under-estimated due to issues with initial conditions (they were unchanged	If the changes in flow associated with the 50% pumping scenario were under-predicted by say, 10% because of this issue, and by doubling the differences to represent the zero pumping scenario amplified the underprediction (to 20%), how would the recommended MFLs change? Would it be possible to conduct a quick sensitivity analysis to answer this?	As pointed out by the reviewers, numerical simulation of the Peace River streamflow is very complex, and certain assumptions are required. We acknowledge that initial conditions can affect groundwater model results for scenarios involving reduced pumping, especially when the system being modelled has not stabilized. However, it is standard modeling practice to use the calibrated initial heads as the starting conditions for reduced pumping scenarios to ensure consistency with the historical (100% pumping) condition. Because the model simulations were run over a relatively long period (2003-2018), the influence of using the initial conditions diminishes early in the	No. While it may be standard practice to use the calibrated initial heads as the starting conditions for reduced pumping scenarios, it is also standard practice to discard the results from the initial stabilization ("spin-up") period unless the stabilization period is very short compared to the simulation duration. The District has not provided an estimate of the stabilization period—that is, the duration required for the aquifer levels to return to a more natural range of fluctuations following cessation of pumping.	Given the high transmissivity of the Upper Floridan Aquifer (UFA) within the basin, the rebound from the calibrated initial heads following a reduction in pumping is expected to be rapid. In addition, for the reduced pumping scenarios, a time-varying time-step was used to stabilize initial heads faster. The smaller time-step (sub-daily) applied at the beginning of the simulation period allows to achieve faster numerical convergence by adjusting the time-step to handle the rapid changes in	Yes

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				from the base condition). If the changes due to the 50% reduction scenario were doubled to represent a 100% reduction, the underestimation errors were also doubled.		simulation period. Based on the model configuration and scenario results averaged over simulation period, the impact of initial condition is expected to be negligible. Therefore, we do not believe a sensitivity analysis is necessary at this time.		hydraulic head during the startup of the reduced pumping simulations. For that reason, we believe that the initial stabilization period was relatively short (most likely less than a month). Because the impact assessment conditions are monthly average over a 16-year period, any lingering impacts from the initial conditions are expected to be negligible. The District acknowledges the need to explicitly quantify the stabilization period (spin up) that is required for stabilizing initial heads and will address this issue during the next	

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								phase of the PRIM model upgrade. An additional paragraph was added (page 168) discussing the uncertainties and the model update.	
27	JL	Page 179, 1st paragraph	Possibly	It's not clear that doubling the differences for the 50% pumping scenario is justifiable for surface water flows (as is often assumed for groundwater heads). That assumes linearity. At what point does the Upper Peace shift from losing stream to gaining stream? Does that occur at 50% reduction in GW pumpage or somewhere in the 50%-100% range of reduction? Would we expect to see an inflection point in	Additional discussion is needed regarding this approach. The method assumes streamflow has a linear relationship with groundwater withdrawals. Is there justification for this assumption? Also, why was the PRIM2 model not run with zero pumping to achieve the desired flow adjustments? Was it because lateral boundary conditions for that scenario were not available from the regional models?	As a surface-groundwater integrated model, PRIM2 can experience numerical instability (e.g., extensive flooding cells) when the zero-pumping scenario applied. To avoid this issue, the 50%, 75%, and 100% pumping scenario runs were conducted instead. The scenario results demonstrated a linear relationship between simulated streamflow and pumping rates (see #2 in the Supporting Document). As a result, it is reasonable to linearly extrapolate the baseline streamflow from 50% pumping scenarios. A similar approach has been widely used in the MFL work in the last two decades. The District has also applied this approach when establishing MFLs for the Lower Peace	Yes		Yes

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				the GW stage vs. streamflow relationship at this point?		River, Charlie Creek and Horse Creek.			
28	JL	Page 180, last paragraph	Possibly	Baseline flow at Zolfo Springs is lower than gaged flow due to the absence of agricultural irrigation. It is understood certain agricultural operations (e.g., irrigated row crops) can have a large impact on streamflows, as documented in the integrated modeling performed by Interflow Engineering in the neighboring Myakka River watershed (Interflow, 2008). However, the numerous impoundments and abandoned mine pits associated with phosphate mining, and their effects on	Provide justification for accounting for the flow augmentation effect of agricultural irrigation but not accounting for the effective removal of contributing watershed areas by non-mandatory (unreclaimed) mined lands and those yet to be reclaimed.	The reclaimed and unreclaimed phosphate mining land uses are simulated in the PRIM2 model, as documented in Sections 2.6 and 3.3 of the modeling report. The model parameters were calibrated to better represent the surface runoff and recharge of mining areas. The impact of individual impoundments and abandoned mining pits are beyond the scope of MFL evaluation. Although the impacts of the mining land use on streamflow were not explicitly simulated as separate scenarios, they were captured by consideration of mining/dewater water uses represented in the reduced pumping scenarios. At the USGS Payne Creek near Bowling Green FL gage (No 02295420), a slight	No. What about the cumulative impact of the impoundments and abandoned pits? Why is this considered beyond the scope of the MFL evaluation? Chapter 2 of the report does a good job of qualitatively describing the general effects of the abandoned mine pits, clay settling areas, etc. on the watershed hydrology. However, the report should provide justification for why the effects of these structural alterations were not considered when developing the baseline flow record.	The District acknowledges that impoundments, abandoned pits, and other historical mining features influence watershed hydrology, and these effects are qualitatively described in Chapter 2. Section 373.0421(1)(a) of the 2025 Florida Statute states "When establishing minimum flows and minimum water levels pursuant to s. 373.042, the department or governing board shall consider changes and structural alterations to watersheds, surface waters, and	Yes

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				streamflow in the Upper Peace River were evidently not considered in baseline flow development.		increase in flow was observed under both the 25% and 50% withdrawal reduction scenarios. This increase is likely due to return flows associated with groundwater withdrawals used in mining operations. Baseline flows are less than gaged flows at Zolfo Springs and in the lower river mainly due to the tighter confinement of the Upper Floridan aquifer in these reaches. In these areas, the river is not losing flow but instead gaining from groundwater that had been pumped for agricultural uses and subsequently return to the system as irrigation return flow.		aquifers and the effects such changes or alterations have had, and the constraints such changes or alterations have placed, on the hydrology of an affected watershed, surface water, or aquifer, provided that nothing in this paragraph shall allow significant harm as provided by s. 373.042(1) caused by withdrawals." The long-standing alterations within the Upper Peace River are part of the current hydrologic system and their cumulative impact are included in the observed flow record used for analysis. These structural alterations were not removed or independently quantified in the	

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								baseline flow development. The baseline flow is defined to represent conditions free from water withdrawal impacts only. Structural alterations such as abandoned pits or clay settling areas are not withdrawal impacts and are thus not considered in the baseline flow. This approach is consistent with statutory intent and ensures the MFL protects the water resource under existing hydrologic conditions from significant harm due to withdrawals. Two additional paragraphs were added on pages 88-89 discussing the consideration of structural alternations in the development of	

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								MFLs.	
29	JL	Figure 6-8 and Page 212, 4th paragraph	No	"*For the upper river segment at Bartow, a 15% flow reduction for baseline flows between 71 cfs and 483 cfs, and a 7% flow reduction for flows exceeding 483 cfs, would result in no more than 15%* decrease *in total inundated floodplain area.*" I'm not seeing how you get 7% flow reduction from the figure. It looks like 3-4% would cause a 15% reduction for the 99th percentile. Similar comment for the other two stations—3% at Fort Meade and 5% at Zolfo Springs would cause a 15% decrease in inundated area	District staff stated in the January 30th peer review meeting that 7% was chosen as an average for Block 3B. Please clarify this in the text of the report.	An additional paragraph was added to Section 6.2.2.1 (page 215) to clarify how the maximum allowable flow reduction (e.g., 7%) and corresponding minimum flows were calculated.	Yes		

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				based on Figures 6-9 and 6-10, respectively, yet the allowable reduction is 7% for all 3 gages in subblock 3B.					
30	JL	Page 233, 3rd paragraph	Possibly	"*As detailed in Section 5.3.1, the District developed PRIM2 to evaluate the impacts of climate variability, groundwater pumping, land use changes, and other influences on river flows in the Peace River and its tributaries."* The PRIM2 scenario report documents simulated changes in climate and groundwater pumping, but not land use changes.	Correct the text to remove mention of land use changes. Suggest adding the PRIM2 scenario report as an appendix to the MFL report.	"land use changes" were removed from the report. The PRIM2 scenario report was added to Appendix B, following the PRIM2 modeling report.	Yes		
31	JL	Page 233, 5th paragraph	Possibly	It is not clear how Table 5-6 supports the statement that recommended minimum flows for the UPR are currently being met. Figure 6-4 indicates	Further justification is needed to support this conclusion.	Additional information and a supporting table have been added in Section 7.1 (page 236-238) to address this issue.	No. It is not clear from the report how the average flows reported in Table 7-1 support the conclusion of compliance. It would	Please refer to the response provided for Comment 19. The presentation delivered during the March 27 peer review meeting demonstrated the	Yes

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				low-flow thresholds have not been met for most years in the past several decades at Bartow and Fort Meade. Of course, the Lake Hancock Project is now on-line, but it may be too soon to conclude that the recommended minimum flows are being met.			seem that using median flows and/or comparing flows for various percent exceedances among the scenarios would be a more convincing approach.	District's status assessment approach in detail. The proposed MFLs represent average flow requirement for each Block as is shown in Figures 6-8, 6-9 and 6-10 for B3A and B3B using the floodplain inundation criterion. The same approach is used for groundwater impact status assessment.	
32	JL	Page 234, Section 7.2	Possibly	The report needs more discussion on how the MFLs would be implemented. On any given day, how would one relate the previous day's gaged flow to the baseline flow? Add the monthly adjustment rate from Table 5-6? If so, will annual adjustment factors be somehow applied	Expand Section 7.2 to discuss how the MFLs would be implemented from a practical standpoint. What is the procedure to calculate the allowable withdrawal on any given day?	Additional information has been added in Section 7.2 to demonstrate how the proposed MFLs would be implemented on a daily basis using the previous day's baseline flow and Table 6-5. The previous day's flow is used because USGS daily mean discharge values are not available until the end of the day. The PRIM2 model simulated conditions from	No. This doesn't fully address the initial comment. Please clarify in the report exactly how the previous day's baseline flow would be calculated.	The previous day's baseline flow is calculated using the previous days' gaged flow together with the monthly adjustment rate as listed in Table 5-6 (page 186) of the revised report. A clear explanation of this calculation method is provided in Section 7.2 on page 241 of the revised report.	Yes

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				based on the previous year's GW withdrawals similar to Table 5-7? Or would it be based on the percentile flows as shown in Figures 6-5, 6-6, and 6-7? Also, how does the 95% exceedance goal for meeting the low flow threshold factor in (if at all)?		2003 to 2018, a period characterized by average groundwater withdrawals that were lower than those in earlier years and higher than those in more recent years. Table 5-7 provides the yearly adjustment ratios used to further adjust baseline flows outside the 2003-2018 simulation period. Figures 6-5, 6-6 and 6-7 show exceedances curves for low flow thresholds under the baseline and gaged flows for the period 1975-2022. These figures support the use of 95% annual exceedance criterion for meeting low flow thresholds. Under this criterion, the low flow thresholds will be met, if flows at Bartow, Ft Meade and Zolfo Springs exceed their respective low flow thresholds on at least 350 days per year.			
33	JL	Appendix H (multiple)	No	Documentation in Appendix H of the HEC-RAS modeling is very thorough and	If none of the 1970's cross sections are in the current HEC-RAS	With all available sources of river bathymetry incorporated, the old cross-sections from the	Yes		

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				the modeling procedures appear to be sound. One question—Among all the sources of river bathymetry documented in this appendix, it is not clear whether or not any of the old cross sections from the 1978 USGS step-backwater model found their way into the current HEC-RAS model (via the 2011 Chen model).	model, please indicate as such.	USGS HEC-RAS model no longer exist within the current HEC-RAS model (Verdantas 2024). An additional reason to fully replacing the old cross-sections is that the Verdantas HEC-RAS model is geo-referenced, whereas neither the USGS model nor the model developed by Chen (2011) was geo-referenced. This explanation has been added to Section 5.2.2 (page 155) as an additional paragraph for clarification.			
34	JL	Appendix H, Table 14	No	The table indicates essentially perfect agreement between simulated and observed flows at these 4 locations. Weren't these locations where the flows were imposed as internal boundary conditions?	No action required (this does not affect the quality of the calibration).	As described in Section 6.1.2 and Table 10 in Appendix H: the gage at SR-60 at Bartow was used as an external boundary condition and the other three gages at Clear Springs, Fort Meade and Zolf Springs were used as internal boundary conditions, represented as "IB Stage/Flow" within HEC-RAS.	Yes		

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35	JL	Page IV, 4th paragraph	No	"alternations" should be "alterations"	Fix typo	Fixed.	Yes		
36	JL	Page V, 2nd paragraph	No	"formally" should be "formerly"	Fix typo	Fixed.	Yes		
37	JL	Page 12, 1st paragraph	No	"alternations" should be "alterations"	Fix typo	Fixed.	Yes		
38	JL	Page 24, 1st paragraph	No	"Bear Ranch" should it be "Bear Branch"?	Fix typo	Yes. It should be "Bear Branch". The typo was fixed.	Yes		
39	JL	Page 24, 1st paragraph	No	"phosphorate mining" should be "phosphate mining"	Fix typo	Fixed.	Yes		
40	JL	Page 30, 2nd paragraph	No	In first sentence, suggest changing "uplands" to "native uplands" to clearly differentiate this general category from developed uplands.	Clarify	Revised.	Yes		
41	JL	Table 2-2	No	The 2020 acreage of wetlands is shown to be a much higher percentage than in 1999. I would assume this is due to a difference in	Clarify	The apparent increase in wetland acreage from 1999 to 2020 in the Upper Peace River primarily reflects advances in mapping technology and classification methods.	Yes		

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				mapping methodology between the PBSJ study versus SWFWMD's land use mapping. Please clarify this in the text.		Higher- resolution imagery and improved wetland detection techniques allow more small or seasonal wetlands to be identified, making the 2020 dataset appear wetter even though the actual landscape has not changed substantially. A corresponding explanation has been added as footnote #3 under Table 2-2 on page 31.			
42	JL	Page 33, last paragraph	No	Last sentence, "2002" should be "2020"	Fix typo	Fixed.	Yes		
43	JL	Page 41, 2nd paragraph	No	"*The phosphate mining industry use peaked at about 257 mgd in 1975 and declined to 114 mgd in 1996*." Over what area? Is this statewide? Within the Peace River Watershed? Please clarify.	Clarify	The text on page 42 has been revised to "The industry's water use later peaked at about 270 mgd in 1975 and declined to about 37 mgd by 2020 in Polk County, as shown in Figure 2-14." to be more cohesive with the preceding discussion in the paragraph.	Yes		

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44	JL	Page 141, 2nd paragraph	No	"perennially" should be "perenniality"	Fix typo	Fixed.	Yes		
45	JL	Table 5-1	No	The three pipes described in the 4th row of this table are mounted on a bridge crossing high above the river.	Readers might get the impression that the crossing itself consists of the pipes. Suggest clarifying this in the crossing name "Three Pipes Bridge" or some such.	Revised using "Three Pipes Bridge"	Yes		
46	JL	Page 182, 3rd paragraph	No	"Once the low- and high-flow **thresholds** were established,…"	Insert missing word	Fixed.	Yes		
47	JL	Figure 6-3	No	Figure is missing the 38 cfs fish passage minimum for Zolfo Springs.	Insert missing point(s) in the graph.	Great catch. Figure 6-3 (page 210) was revised.	Yes		
48	ABM	P 3	No	It is impressive to see the use of P11 assisting in meeting Upper Peace 2006 MFLs. (a claim in the report). I think the logic of the P11 structure was always a good one.	No action requested	Additional discussion of the P-11 structure has been included in Section 2.4.6 (pages 89-90). The section concludes with the statement: "Continued monitoring during future dry periods will be necessary for assessing the	Yes		

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				However, the structure has only been operated recently in a period of high rainfall, noted in the report. It might be more accurate to make note that the efficacy of the project will be best evaluated during a drier period of time.		long-term effectiveness of the project."			
49	ABM	P 68	No	Noted increase flows before 1960. And an increased flow from 2006 to present. This is consistent with the AMO observations of Kelly and expected? P84. GW rebound likely also explains increased flow.	No	Since John Loper has a similar comment (24), additional discussion was added in Section 2.3.3.1, below Figure 2-30 on page 71, to indicate that the warm phase of the AMO since the mid-1990s has increased rainfall likelihood, which in turn has benefited river conditions. This is another factor contributing to the increased flow trend from 2006 to present.	Yes		
50	ABM	P 69		Flows trend up but variance decreased….tropical storms drives high. attenuation or were	Greater discussion of P-11s effect on higher flows.	Additional discussion of the P-11 structure has been included in Section 2.4.6 (pages 89-90), including an overview of the general	Yes		

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				the 40s wand 50s just larger events/more flashy. Is p11 reducing highs as well as augmenting lows.		operating protocols and management strategies.			
51	ABM	P 83	No.	Basso and Schultz 2003…Most declines at gages due to Rainfall deficiencies (post 1970)… Garlanger 2002 concludes only 11 of declines was anthropogenic (at Arcadia gage)…Examine High flow low flow differentiation in reports. This discussion of Upstream gages having higher anthropogenic losses and downstream gages having greater reductions related to rainfall seems consistent with later evidence that the downstream reference gages seem to demonstrate	None	Thanks for sharing your thoughts.	Yes		

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				greater recovery in recent high rainfall years and the upstream ones seem to display less certain evidence of recovery?					
52	ABM	P 88	No	Request Yang 2020.	Already Proved via Web board. Thank You	Understood. No action is required at this time.	Yes		
53	ABM	Water Chem	No	P-11 releases in low flow chemically similar? The releases of water form P-11 when river flows are there lowest. It would be interested to see how chemistry in the river changes during these times, though it is not necessarily a necessary discussion for the MFL.	No Action.	The Saddle Creek water quality site is essentially direct measurement of P-11 outflow water chemistry. Pairwise comparisons of station differences were significant for numerous water quality parameters, and by comparing with Bartow (the immediate downstream gage) you can see P-11 water is often quite distinct from other sites, and this distinction is moderated once water reaches the Bartow site.	Yes		

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54	ABM	P159	No	Request Van Wagner 1968	Already Proved via Web board. Thank You	Understood. No action is required at this time.	Yes		
55	ABM	P 163	No	PRIM update 2022 extend calibration 15 years which spans years before and after Lake Hancock project is completed.	No Action	Understood. No action is required at this time.	Yes		
56	ABM	Sec 5.3.2.3	No	HEC conversion USS to SS. Uniform distribution method for karst losses. Water added at lowest flows to maintain stability. Did that alter/effect the SS model?	No Action	Harry raised a similar question in Comment 13. Please refer to the response to that comment.	Yes		
57	ABM	P 178-180 and Appendix C	Perhaps	Assuming an approximately linear response of streamflow to pumping reduction across a *very large* change (from 50% to 0%), nonlinearity could appear if groundwater levels rise enough to change exchange	The report would benefit from greater justification for the extrapolation. I believe the best form this could take would be additional runs supporting the response linearity, preferable beyond 50%. In the	Responses to John Loper's question in Comment 27 address part of your inquiry. In addition, supplemental charts and accompanying discussions have been prepared in Supporting Document #2 to justify the extrapolation.	Yes		

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				dynamics (e.g., crossing the riverbed elevation, activating different leakage pathways, etc.) PRIM2 is still the best information available. Models by their nature are imperfect representations of reality and the model the district has created is impressive. Still the report treats this extrapolation as routine with little justification. However, the importance of the baseline flow justifies greater discussion of this extrapolation.	absence of that it appears a 75% reduction run has been completed and could be included to bolster confidence in the linearity of the relationship				
58	ABM		No	Physical alterations -The appendices themselves support the idea that the upper basin is heavily altered and difficult to represent	No Action.	Understood. No action is required at this time.	Yes		

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				perfectly. The district is still required to set MFLS… PRIM2 documentation states some key mined-area representations are not independently verifiable and that mining impacts are dynamic but treated as representative/averaged over larger areas in the model.					
59	ABM		Yes	Monthly adjustment factors are not the same thing as demonstrating compliance with a percent-of-flow MFL (which is typically evaluated using daily flows, thresholds/blocks, and explicit "met/not met" accounting). Table 5-6 seems to be the focal point of the claim that MFLs are likely to be met. But how table 5-6	Additional discussion of table 5-6 and how it demonstrates MFL compliance at all three gage sites is warranted. Alternately other means of compliance could replace this claim. It seems very likely that the claim is accurate at the downstream reference gage. But the Bartow gage seems less	Additional information has been added in Section 7.1 to demonstrate the proposed MFLs are currently being met and expected to continue to be met over the next 20 years. Additional information has also added in Section 7.2 to demonstrate how the proposed MFLs would be implemented on a daily basis using the previous day's baseline flow and Table 6-5.	There has been confusion around this point. I think it is fair to state that early in the document it is not clear how the district determines if the MFL is being met, and therefore if a recovery/prevention strategy is needed or not. I believe, it has been verbally articulated, and I also believe that with the language added in section 7 it is also in print.	Agree with your suggestion. Both the Executive Summary (page III-IV) and Chapter 7 (page 239-242) have been revised to better explain the status assessment. The footnotes for the Table on page III and Table 6-5 (page 227) have been updated, and Section 7.1 (page 238-241) and 7.2 (page 241-242) have been revised to ensure the	Yes

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				demonstrates that with monthly averages still troubles me.	certain.		The executive summary presents table 6-5. This table list the allowable % flow reductions for all 4 blocks. Note (a) tells us these flow reductions are based on the previous day's baseline flow. Note (b) tells us that for B1 (LFT) it will be accepted (proposed) as being meet if a 95% annual exceedance is met. Blocks B2, B3a and B3b are not further discussed. We are told the MFL has been meet and is predicted to be met over the next 20 years. (I think the reader can easily take away that all four blocks are met daily from this, except B1 which only has to be meet 95% of the time. I know that is not correct, but it is	information is clear for readers.	

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							what I think people might read.) It should be made clear that the low flow (B1) is evaluated directly with daily river flow data and both developed and evaluated based on daily flows (this point is very evident in chapter 7 from your response to the first round of comments). It should also be noted that the other Blocks, developed with daily flows, are not evaluated based on daily flows. Rather, they are evaluated based on the model. (I believe that assumption is that if the model has not allocated a higher % then the MFL allows, the MFL is met in B2 and B3s) Is that correct? I think you say that here "Compliance with District's water use		

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							permits will ensure that withdrawals do not exceed adopted minimum flows" p 239). In chapter 7 the district goes on to discuss the monitoring network, permitting and water supply planning as the ultimate assurance that ecological needs are being met. In short, I think the district should draw a brighter line between B1 and the B2, and B3s.		
60	ABM		No	Overall, PRIM2 is an appropriate foundation for basin-scale assessment. The report's baseline-flow reconstruction and the PRIM2 outputs to "minimum flows are being met" should be strengthened		Additional information and a table are added in Section 7.1 to address this issue.	Yes		

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				through (1) explicit justification or sensitivity testing of key scaling assumptions (linear assumption), and (2) a compliance accounting aligned with the proposed rule implementation.					