UPPER VENTURA RIVER GROUNDWATER AGENCY Item No. 12(b)

DATE: March 12, 2026

TO: Board of Directors

FROM: Executive Director

SUBJECT: Indirect Depletion Modeling Update

SUMMARY
The purpose of this item is to confirm the proposed approach to using the UVRGA numerical model to assess the relationship between timing and location of groundwater pumping and indirect depletion of interconnected surface water (ISW).

Review of Modeling Approach
During the February 12, 2026 Board meeting a three-step process was presented to develop a quantitative understanding of the relationships between the quantity, timing, and location of groundwater pumping and indirect depletion of interconnected surface water.

Step No. 1 consists of reviewing updated depletion estimates to identify specific indirect depletion event(s) for detailed analysis. This would be scheduled for the March Board meeting.

Step No. 2 would consist of detailed modeling analysis of selected depletion event(s) to quantify the impact of location and timing of groundwater pumping on indirect depletion. Four groups of wells located upstream of the Foster Park Aquatic Habitat Area would be identified for the analysis: (1) Meiners Oaks Water District (MOWD) wells, (2) Ventura River Water District (VRWD) wells, (3) MOWD and VRWD wells and (4) Casitas MWD's Mira Monte well plus all non-de minimis private wells located upstream of the Foster Park Aquatic Habitat Area.

The model would be run multiple times for each group of wells for each selected depletion event. Each model run will progressively eliminate one month of pumping from the well group starting with the last month of the depletion event and going backward in time until no change in depletion quantity is observed. Based on the February Board meeting discussion, it is proposed that the model would also be run multiple times removing individual months of pumping.

The output from the model runs would be processed to quantify the effect pumping from the different well groups at different lead times on indirect depletion in the Foster Park Aquatic Habitat Area.

Step No. 3 would include a proposal for further analysis, if needed.

Review of Updated ISW Depletion Estimates
Attachment A is a reprint of the GSP ISW depletion estimates from the Groundwater Sustainability Plan (GSP). Attachment B presents the updated ISW depletion estimates using the updated UVRGA numerical model. Depletion events in which a GSP minimum threshold exceedance is predicted are numbered on the GSP figure (Attachment A). The eight events indicated in the GSP results (Attachment A) are identified in the updated results using the same numbering (Attachment B). The updated model predicts one additional event (i.e., event nos. 9). Table 1 below compares the attributes of the events for both model versions.

Table 1.
Comparison of ISW Deletion Minimum Threshold Exceedance Events
GSP versus Updated Model (Draft)

Event No.	GSP Duration (days)	Updated Duration (days)	GSP Peak Depletion Rate (cfs)	Updated Peak Depletion Rate (cfs)	GSP Depletion Volume (acre-feet)	Updated Depletion Volume (acre-feet)	Comments
1	8	**12**	0.19	**0.29**	1.55	**4.0**	
2	**86**	N/A	**1.77**	N/A	**290**	N/A	MT is not exceeded in updated simulation
3	**342**	202	**2.00**	1.52	**1,015**	443	
4	**6**	N/A	**0.37**	N/A	**2.29**	N/A	MT is not exceeded in updated simulation
5	1	**28**	0.02	**0.53**	0.04	**14.8**	
6	**643**	403	**1.99**	1.47	**1,773**	762	
7	**371**	337	**2.00**	1.81	**891**	373	
8	**232**	149	**1.98**	1.39	**737**	227	
9	N/A	**3**	N/A	**0.48**	N/A	**2.0**	
Totals	**1,689**	1,134	**2.00**	1.81	**4,710**	1,826	Totals for 50 years simulation
Total Events 3; 6-8	**1,588**	1,091	**2.00**	1.81	**4,416**	1,805	

Notes:
+Bold font indicates larger result.
+Gray shading indicates minimum threshold exceedance is no longer predicted.
+Red shading indicates minimum threshold exceedance is likely within model uncertainty and may not actually occur.
+Blue shading indicates that real world implementation of Interim Order Protocols would likely avoid minimum threshold exceedance.
+Purple shading indicates both red and blue shading applies.

As shown in Table 1, the updated model predicts smaller duration and magnitude minimum thresholds exceedances for 6 of the 8 minimum threshold exceedance events predicted in the GSP (i.e., Event Nos. 2, 3, 4, 6, 7, and 8). This is due to the incorporation the updated protocols for operation of the City of Ventura's Foster Park extraction facilities (a.k.a. Interim Order Protocols) and improved model calibration.

Event Nos. 1 and 5 are predicted to be longer duration and higher magnitude using the updated model. However, Event No. 1 is likely smaller than the model uncertainty and, therefore, might not actually manifest under real world conditions. Inspection of Event No. 5 reveals that the minimum threshold exceedance would likely be avoided given real world implementation of Interim Order Protocols.

Event No. 9 was not predicted by the GSP modeling; however, this event is likely smaller than the model uncertainty and, therefore, might not actually manifest under real world conditions. Additionally, inspection of Event No. 9 reveals that the minimum threshold exceedance would likely be avoided given real world implementation of Interim Order Protocols.

Based on the foregoing, Event Nos. 3, 6, 7, and 8 are left as possible candidates for the detailed modeling analysis. Given the close timing of Event Nos. 6 through 8, they can be treated as single event for analysis purposes. Therefore, it is recommended that the detailed modeling analysis be performed twice, once using (1) Event No. 3 and once using (2) combined Event Nos. 6 through 8.

RECOMMENDED ACTIONS
Receive an update on the technical assessment of the relationship between timing and location of groundwater pumping and indirect depletions of interconnected surface water. Consider providing feedback to staff.

BACKGROUND
The GSP includes a management action called "Actions to Address Indirect Depletion of Interconnected Surface Water (ISW)," which consists of a sequence of actions that are designed to lead to implementation of a project or management action that addresses significant and unreasonable indirect depletions of ISW. In general, the path includes (1) addressing the groundwater level data gaps that impact quantification of indirect depletions of ISW, (2) updating to the numerical flow model to provide better quantify indirect depletion, and (3) using the updated model to prepare updated estimates of indirect depletions (4) developing appropriately sized projects or management actions to address indirect depletions. Action No. 4 would include additional modeling to explore the relationship between the quantity and timing of groundwater extractions and indirect depletions to inform potential management approaches.

Actions Nos. 1 and 2 have been completed and Action No. 3 (updating indirect depletion estimates) is in progress. Action No. 4 (developing projects or management actions) will begin with additional modeling to develop a quantitative understanding of the relationships between the quantity, timing, and location of groundwater pumping and indirect depletion of interconnected surface water.

FISCAL SUMMARY
Intera is already authorized to perform this work.

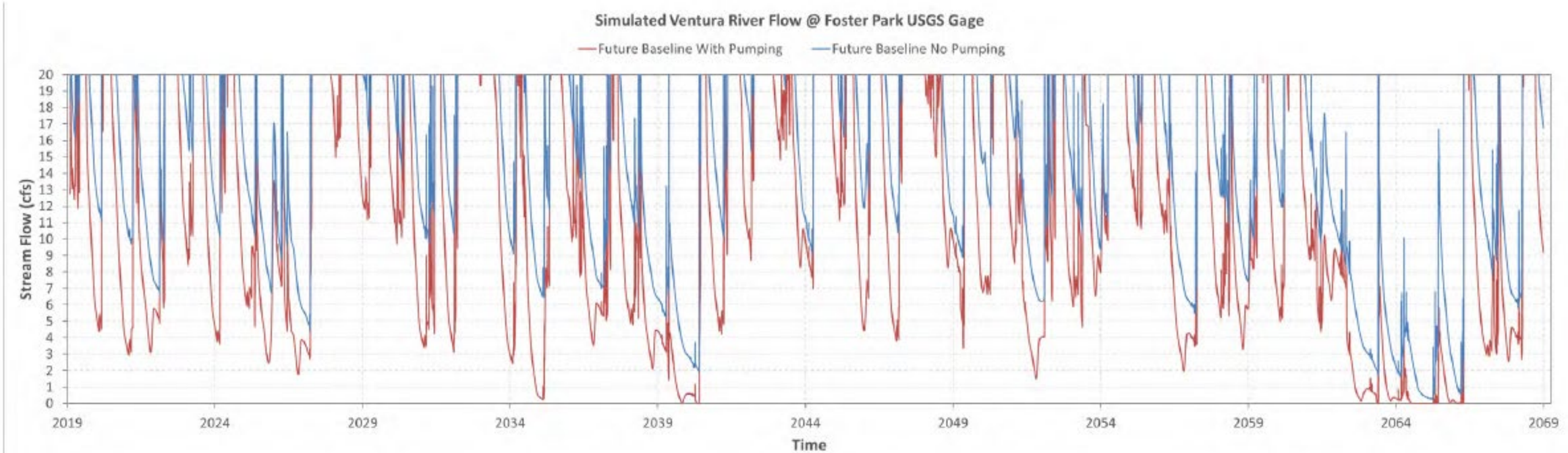
ATTACHMENTS
A. GSP ISW Deletion Minimum Threshold Exceedance Events Summary Figure
B. Updated GSP ISW Deletion Minimum Threshold Exceedance Events Summary Figure
C. Minimum Threshold Exceedance Event Detailed Graphs

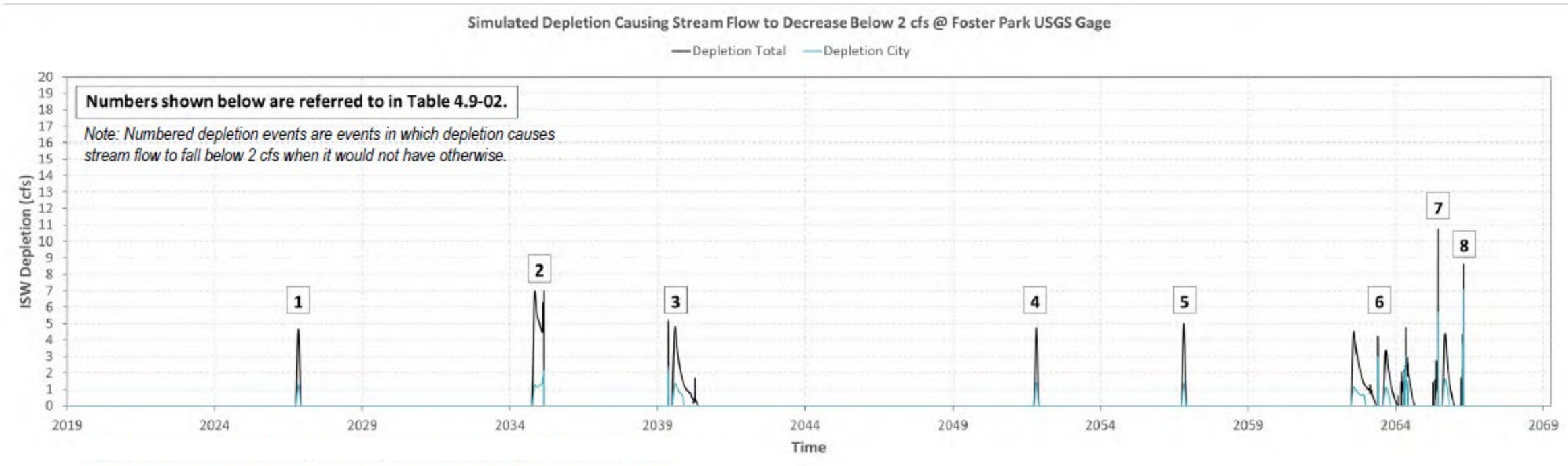
Action: _____

Motion: _____

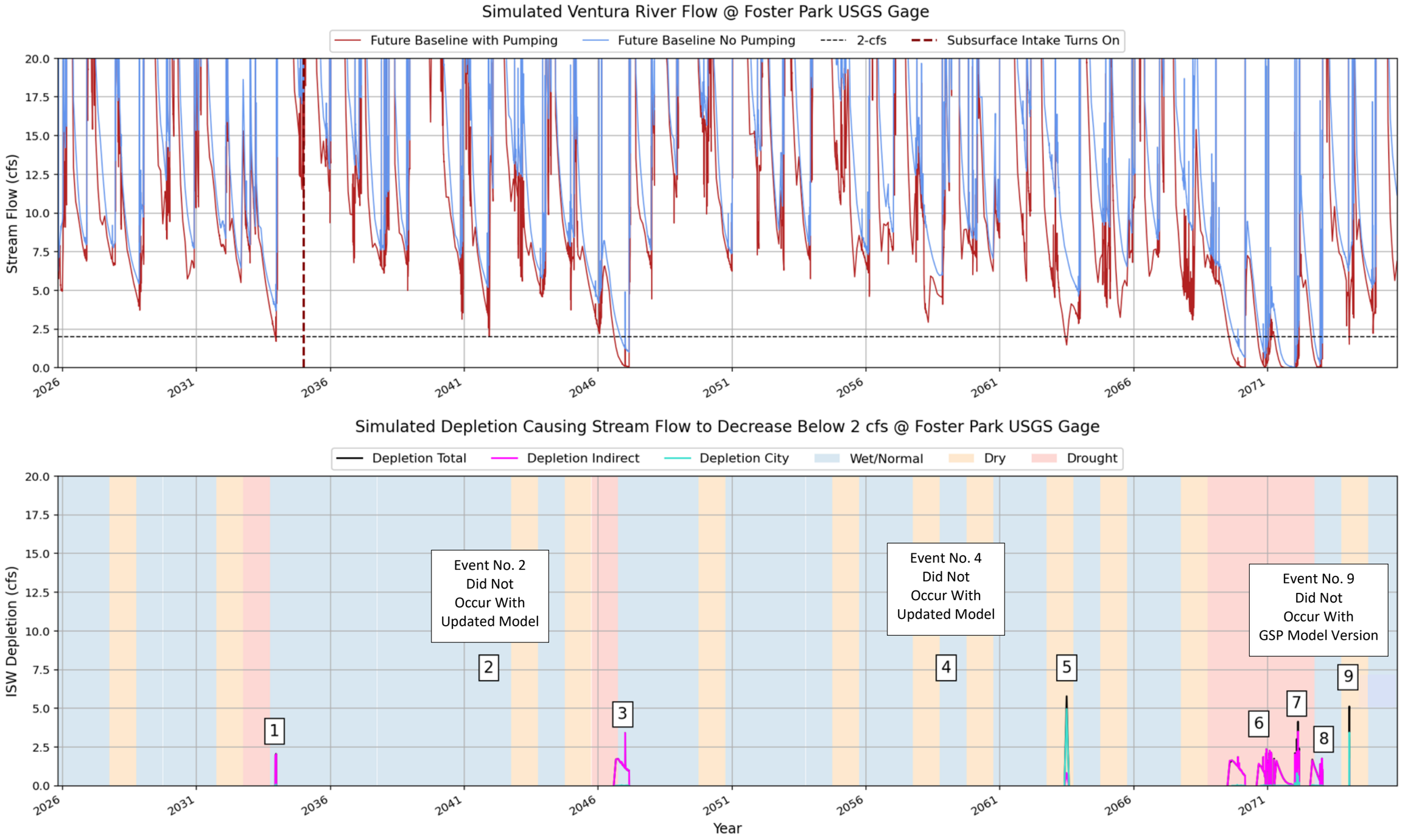
P. Kaiser_ B. Kuebler_ J.Palmer _ E. Ayala_ V. Sedgwick_ J. Tribo _ J. Kentosh_

Attachment A – GSP ISW Depletion Minimum Threshold Exceedance Events Summary Figure

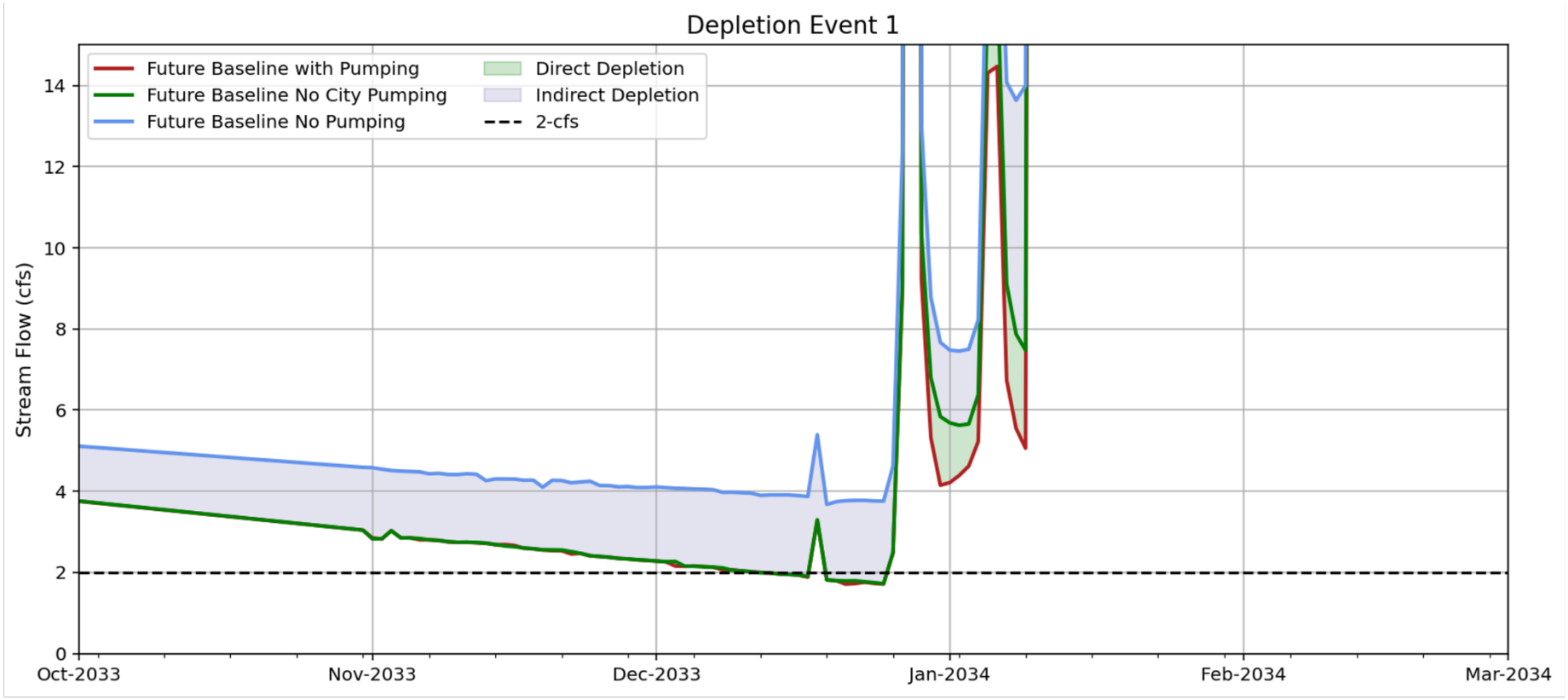




Attachment B – GSP ISW Depletion Minimum Threshold Exceedance Events Summary Figure - DRAFT



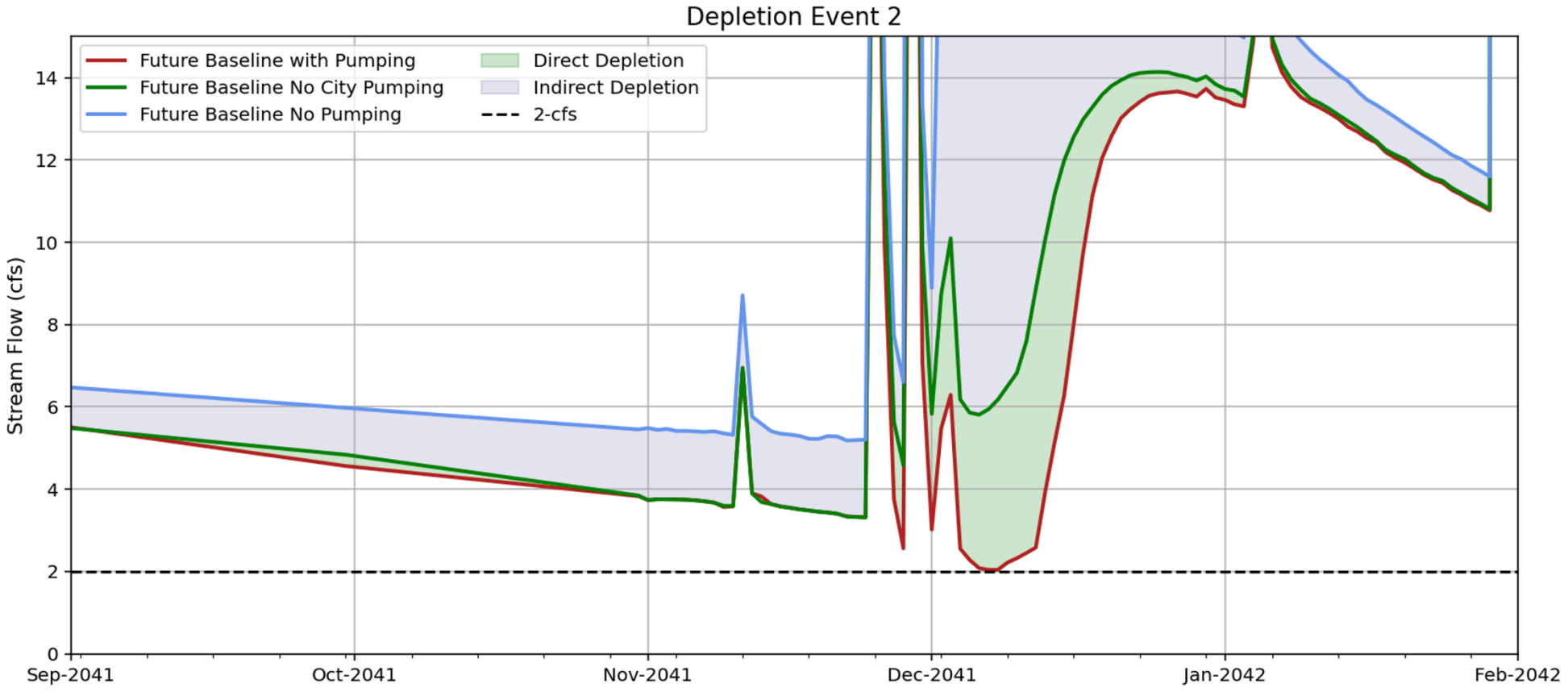
Attachment C – Minimum Threshold Exceedance Event Detailed Graphs - DRAFT



Comparison of Minimum Threshold Exceedance Event Characteristics

Model	Duration (days)	Peak Depletion Rate (cfs)	Depletion Volume (acre-ft)
Updated	12	0.29	4.0
GSP	8	0.19	1.55

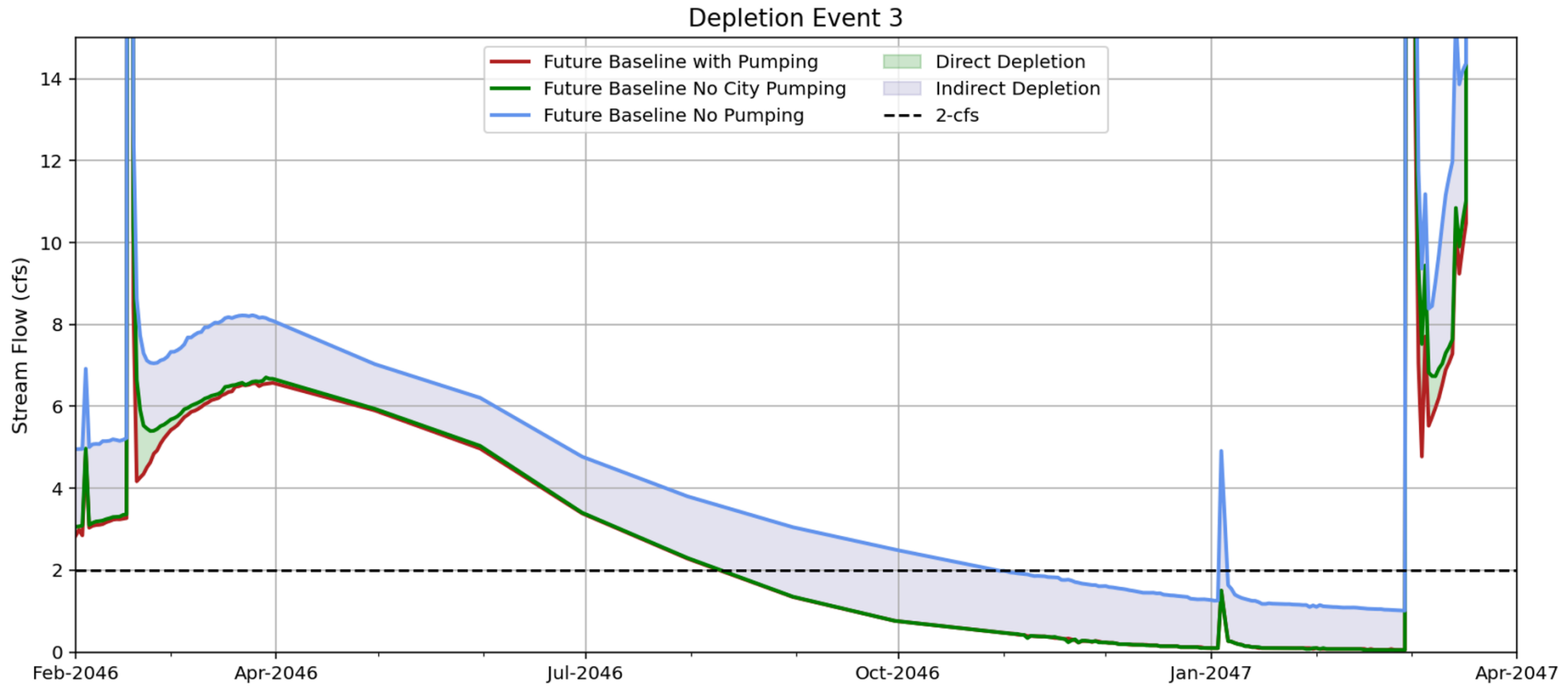
Attachment C – Minimum Threshold Exceedance Event Detailed Graphs - DRAFT



Comparison of Minimum Threshold Exceedance Event Characteristics

Model	Duration (days)	Peak Depletion Rate (cfs)	Depletion Volume (acre-ft)
Updated	NA	NA	NA
GSP	86	1.77	290

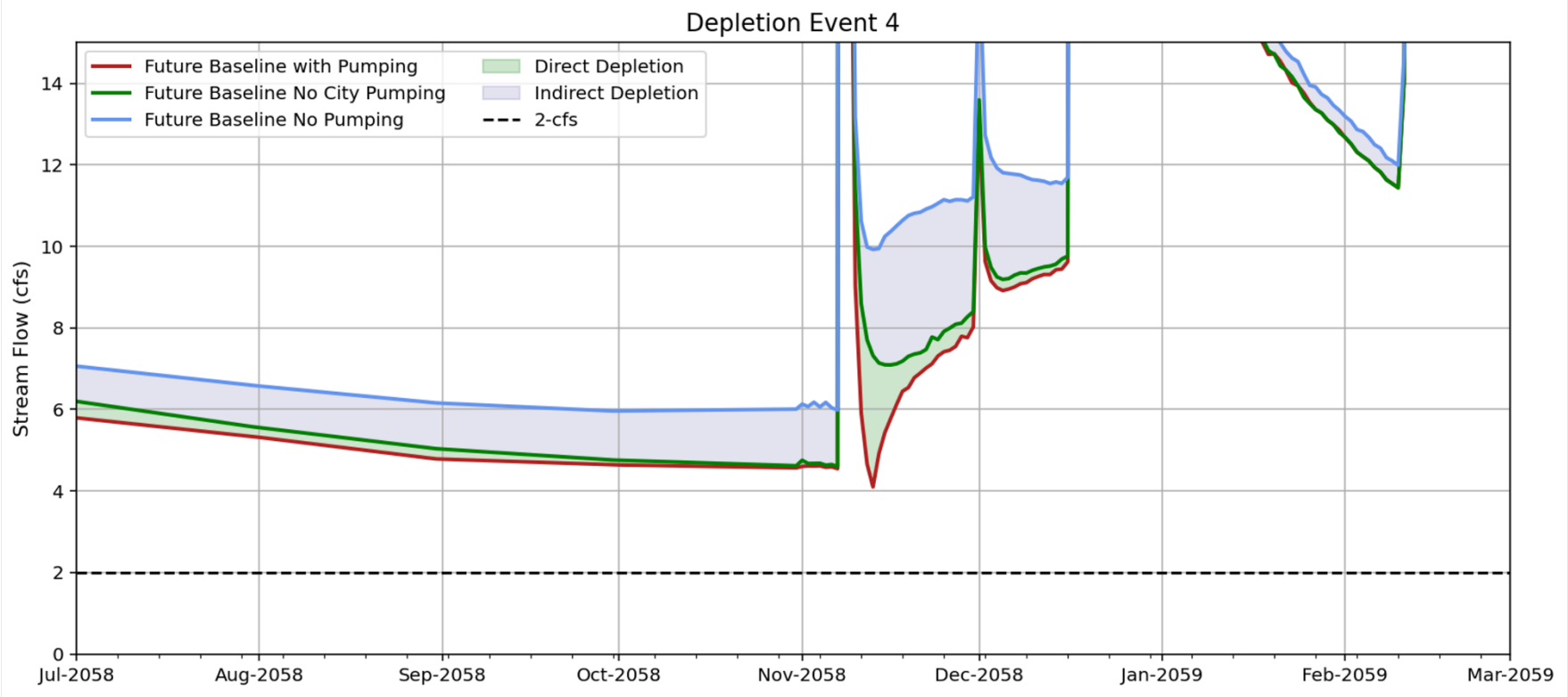
Attachment C – Minimum Threshold Exceedance Event Detailed Graphs - DRAFT



Comparison of Minimum Threshold Exceedance Event Characteristics

Model	Duration (days)	Peak Depletion Rate (cfs)	Depletion Volume (acre-ft)
Updated	202	1.52	443
GSP	342	2.00	1015

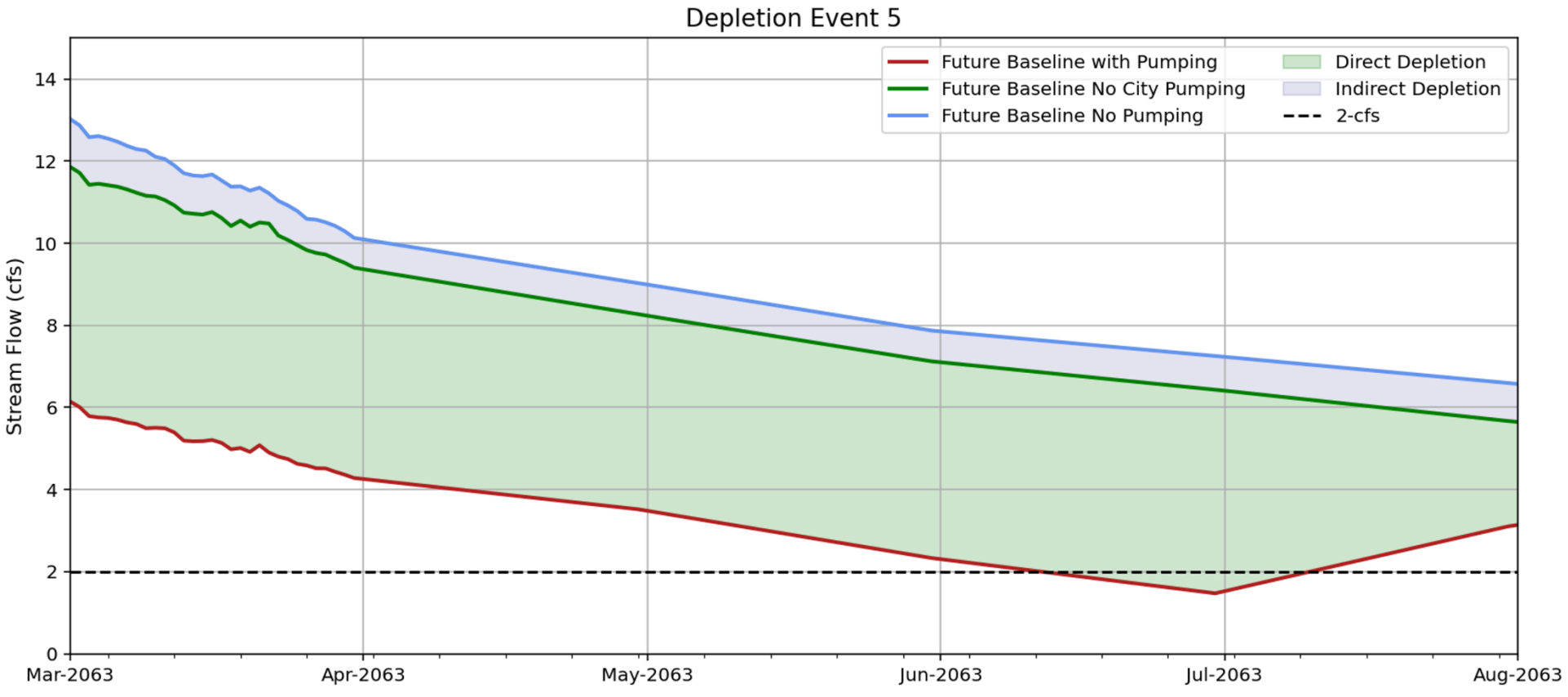
Attachment C – Minimum Threshold Exceedance Event Detailed Graphs - DRAFT



Comparison of Minimum Threshold Exceedance Event Characteristics

Model	Duration (days)	Peak Depletion Rate (cfs)	Depletion Volume (acre-ft)
Updated	NA	NA	NA
GSP	6	0.37	2.29

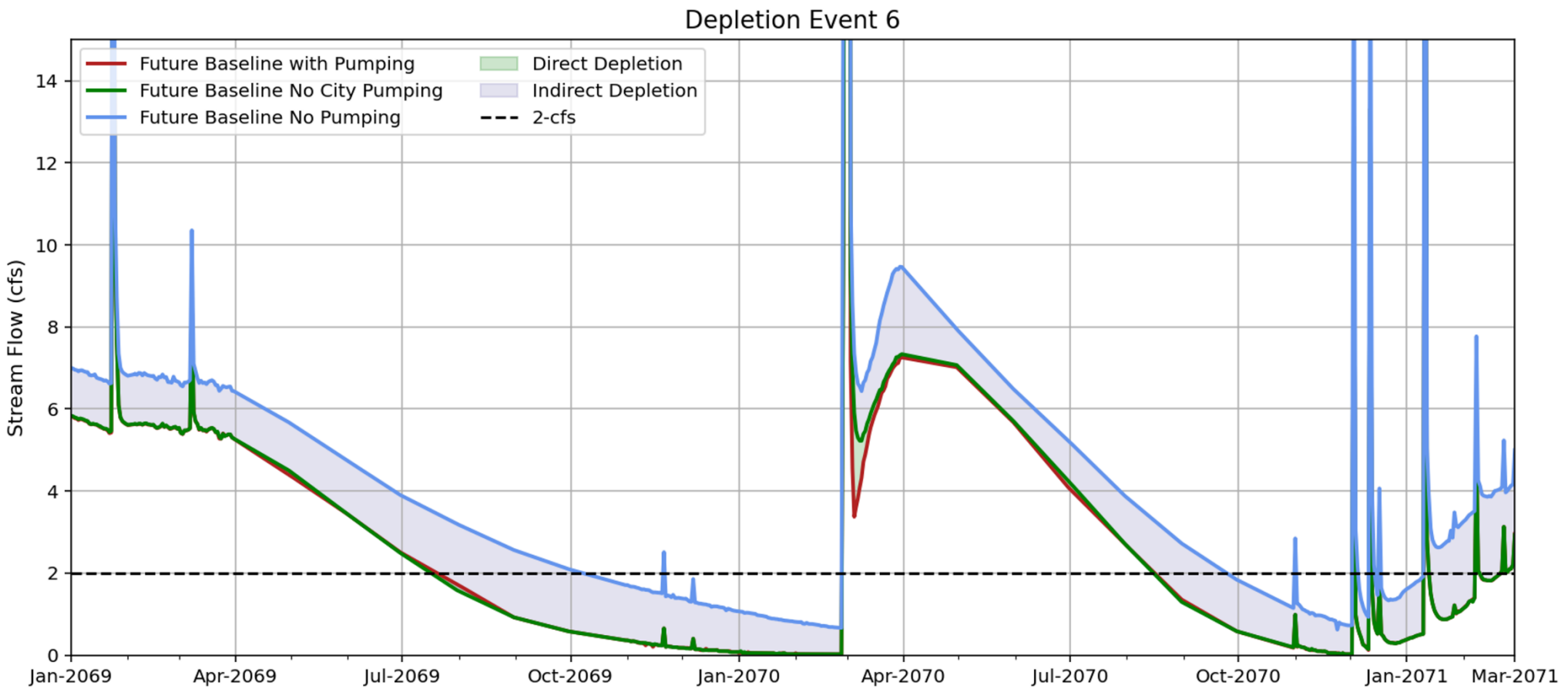
Attachment C – Minimum Threshold Exceedance Event Detailed Graphs - DRAFT



Comparison of Minimum Threshold Exceedance Event Characteristics

Model	Duration (days)	Peak Depletion Rate (cfs)	Depletion Volume (acre-ft)
Updated	28	0.53	14.8
GSP	1	0.02	0.04

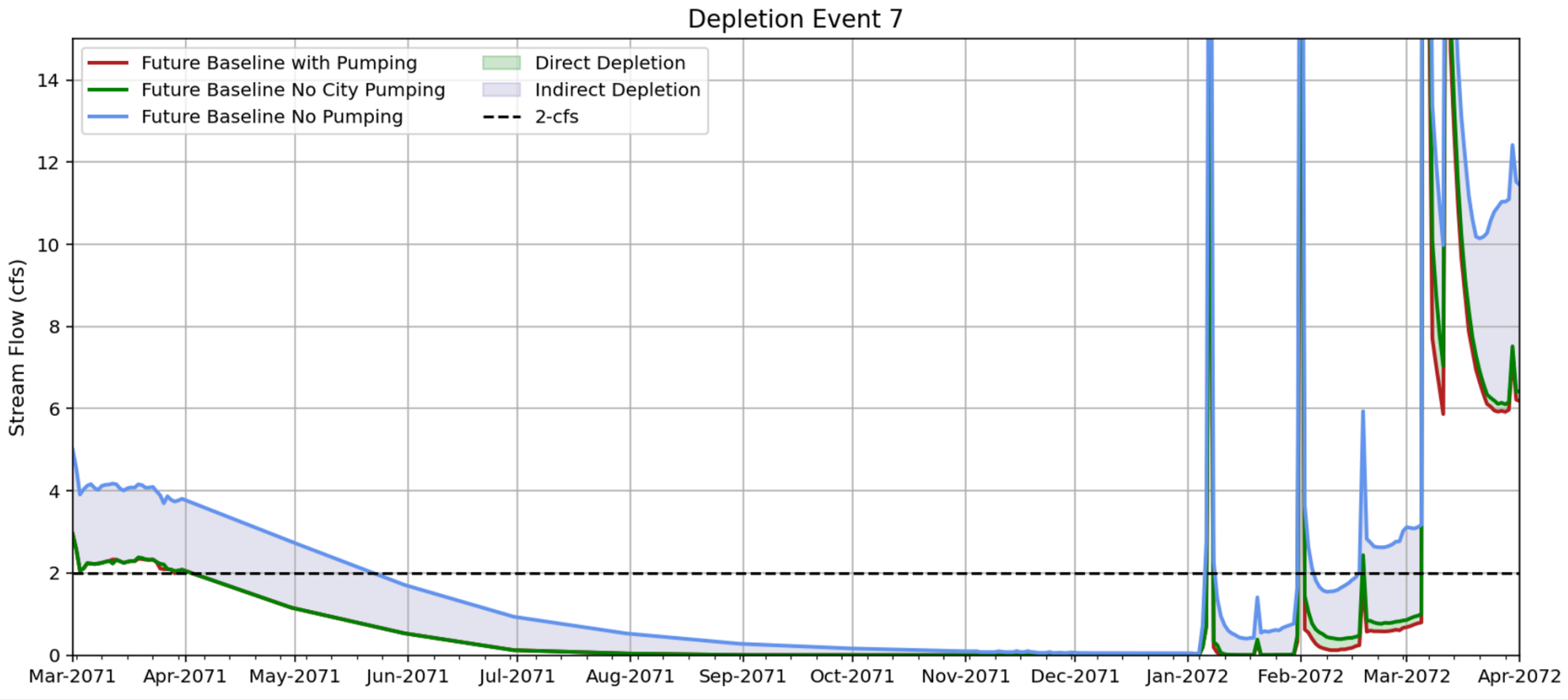
Attachment C – Minimum Threshold Exceedance Event Detailed Graphs - DRAFT



Comparison of Minimum Threshold Exceedance Event Characteristics

Model	Duration (days)	Peak Depletion Rate (cfs)	Depletion Volume (acre-ft)
Updated	403	1.47	762
GSP	643	1.99	1773

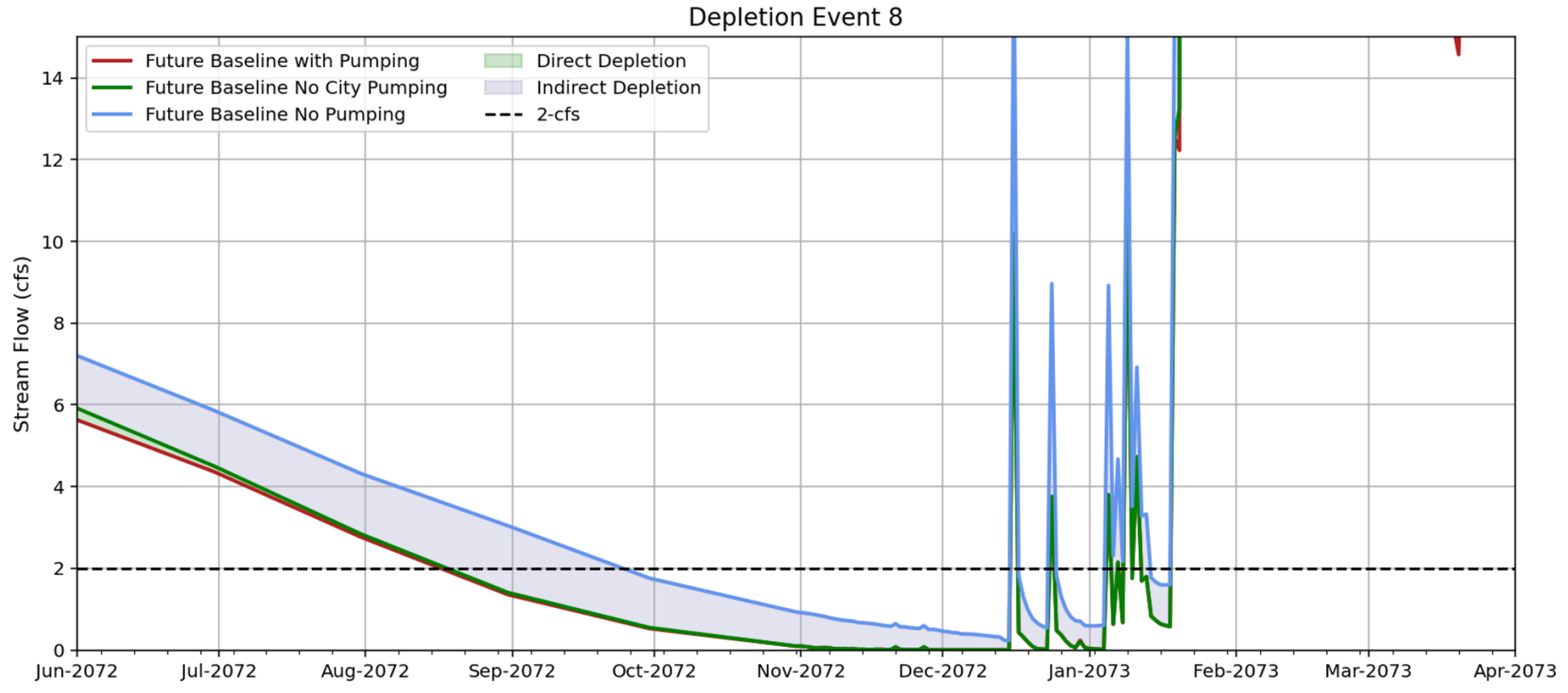
Attachment C – Minimum Threshold Exceedance Event Detailed Graphs - DRAFT



Comparison of Minimum Threshold Exceedance Event Characteristics

Model	Duration (days)	Peak Depletion Rate (cfs)	Depletion Volume (acre-ft)
Updated	337	1.81	373
GSP	371	2.00	891

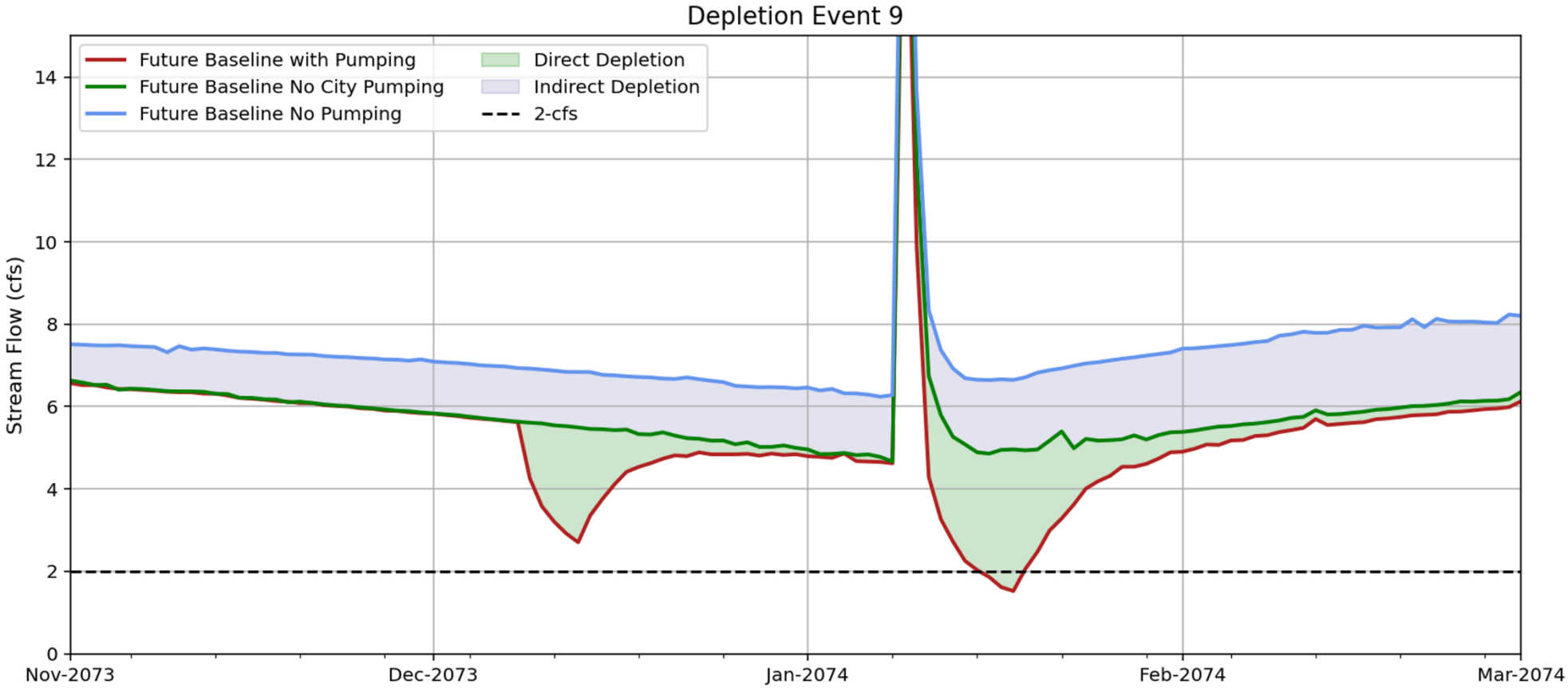
Attachment C – Minimum Threshold Exceedance Event Detailed Graphs - DRAFT



Comparison of Minimum Threshold Exceedance Event Characteristics

Model	Duration (days)	Peak Depletion Rate (cfs)	Depletion Volume (acre-ft)
Updated	149	1.39	227
GSP	232	1.98	737

Attachment C – Minimum Threshold Exceedance Event Detailed Graphs - DRAFT



Comparison of Minimum Threshold Exceedance Event Characteristics

Model	Duration (days)	Peak Depletion Rate (cfs)	Depletion Volume (acre-ft)
Updated	3	0.48	2.0
GSP	NA	NA	NA