

Attachment 5a: X2 Results (CalSim 3)

Appendix 4F

Attachment 5a: X2 Results (CalSim 3)

The following results of the CalSim 3 model are included for X2 position conditions for the following scenarios:

- Baseline Conditions (Updated) (040424)
- Alternative 1 plus CVP Proposed Action, Sacramento and Feather River VAs (102023)
- Alternative 1 plus CVP Proposed Action, Sacramento and Feather River VAs, includes TUCPs (102023)

Title	Model Parameter	Table Numbers	Figure Numbers
X2 Position	X2_PRV	4F-5-1-1a to 4F-5-1-2c	4F-5-1a to 4F-5-1r

Report formats:

- Monthly tables comparing two scenarios (exceedance values, long-term average, and average by water year type).
- Monthly pattern charts (long-term average and average by water year type) including all scenarios.
- Monthly exceedance charts (all months) including all scenarios.

Table 4F-5-1-1a. X2 Position, Baseline Conditions (Updated) 040424, Monthly Distance (Km)

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
10% Exceedance	93.9	92.9	91.0	86.2	78.7	77.3	78.4	81.3	85.3	89.0	91.5	92.7
20% Exceedance	92.2	91.8	89.4	84.4	74.5	71.8	74.6	78.4	82.1	85.6	88.9	91.0
30% Exceedance	91.4	90.5	87.9	80.7	68.2	66.1	70.9	76.6	81.0	85.1	88.0	90.2
40% Exceedance	89.7	89.5	86.8	72.8	66.0	64.6	67.4	72.1	80.4	83.4	86.8	89.0
50% Exceedance	88.7	86.2	83.6	70.0	61.6	62.0	64.5	68.2	77.4	82.7	86.0	87.9
60% Exceedance	80.1	85.2	78.5	64.6	58.2	58.5	61.5	66.1	75.6	80.2	84.0	80.1
70% Exceedance	80.0	84.3	69.4	59.2	54.8	55.8	60.0	63.1	71.5	79.4	82.8	79.9
80% Exceedance	80.0	82.6	63.1	54.3	52.8	53.3	56.6	58.9	63.8	75.0	82.2	79.7
90% Exceedance	79.9	76.1	56.0	52.5	51.8	52.1	53.2	55.4	59.2	73.3	81.0	79.5
Full Simulation Period Average ^a	85.8	85.4	78.0	69.5	63.6	62.9	65.5	68.8	75.0	81.2	85.3	85.4
Wet Water Years (30%)	83.1	80.0	64.8	57.0	53.6	54.5	56.7	59.2	64.9	74.0	80.1	78.2
Above Normal Water Years (11%)	86.3	86.8	79.7	61.8	56.8	56.5	59.8	63.9	71.3	78.5	83.1	79.9
Below Normal Water Years (21%)	85.0	85.3	81.9	72.3	64.8	62.7	64.8	68.4	76.6	82.4	86.0	88.2
Dry Water Years (22%)	86.2	87.6	84.3	78.8	70.3	68.3	71.6	75.4	81.1	85.3	88.3	90.4
Critical Water Years (16%)	90.9	91.5	87.5	81.5	76.3	76.0	78.4	82.0	85.8	89.2	91.7	92.9

Table 4F-5-1-1b. X2 Position, Alternative 1 plus CVP PA Sac Feather VAs 102023, Monthly Distance (Km)

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
10% Exceedance	93.9	92.7	91.3	86.1	78.4	76.2	78.4	82.1	86.0	89.0	91.3	92.7
20% Exceedance	92.3	91.6	90.0	83.9	73.9	71.3	75.1	78.5	81.9	85.3	88.6	91.2
30% Exceedance	91.3	90.3	88.0	80.3	67.4	65.6	70.9	77.5	81.1	84.7	87.9	90.4
40% Exceedance	90.5	89.7	86.9	72.7	65.3	63.9	67.8	73.1	80.2	82.9	86.2	89.5
50% Exceedance	88.9	85.8	83.7	69.7	61.5	61.6	64.9	69.8	77.9	81.7	85.6	88.2
60% Exceedance	80.1	85.1	78.1	64.4	58.2	58.6	61.9	66.8	75.6	80.1	83.5	80.1
70% Exceedance	80.0	84.0	69.4	59.1	54.5	55.7	59.7	63.1	71.3	78.5	82.8	79.9
80% Exceedance	80.0	82.6	63.0	54.2	52.8	53.3	56.3	58.8	63.9	74.8	82.4	79.7
90% Exceedance	79.9	75.7	55.8	52.5	51.8	52.1	53.2	55.6	59.3	72.7	81.8	79.7
Full Simulation Period Average ^a	85.8	85.2	78.0	69.3	63.3	62.5	65.5	69.5	75.0	80.8	85.3	85.7
Wet Water Years (30%)	83.2	79.9	64.6	56.9	53.6	54.5	56.7	59.7	64.9	73.9	80.5	78.6
Above Normal Water Years (11%)	86.4	86.5	80.0	61.8	56.5	56.3	59.4	63.7	71.0	77.3	82.6	79.8
Below Normal Water Years (21%)	85.0	85.1	81.8	71.9	64.4	61.9	64.9	69.7	76.6	81.5	85.6	88.4
Dry Water Years (22%)	86.2	87.5	84.4	78.6	70.1	67.7	71.3	75.8	80.9	84.9	88.0	90.6
Critical Water Years (16%)	91.0	91.4	87.8	81.4	75.5	75.6	79.1	83.2	86.6	89.5	91.8	92.9

Table 4F-5-1-1c. X2 Position, Alternative 1 plus CVP PA Sac Feather VAs 102023 minus Baseline Conditions (Updated) 040424, Monthly Distance (Km)

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
10% Exceedance	-0.1	-0.2	0.3	-0.1	-0.4	-1.1	-0.1	0.8	0.7	-0.1	-0.2	0.0
20% Exceedance	0.1	-0.2	0.6	-0.5	-0.6	-0.5	0.6	0.2	-0.2	-0.3	-0.3	0.3
30% Exceedance	-0.1	-0.2	0.2	-0.4	-0.8	-0.4	0.0	0.9	0.1	-0.4	-0.1	0.2
40% Exceedance	0.8	0.2	0.1	-0.1	-0.7	-0.7	0.4	0.9	-0.2	-0.4	-0.6	0.5
50% Exceedance	0.2	-0.4	0.1	-0.3	-0.1	-0.4	0.4	1.6	0.4	-1.0	-0.4	0.4
60% Exceedance	0.0	-0.1	-0.5	-0.2	0.0	0.0	0.4	0.8	0.0	0.0	-0.5	0.0
70% Exceedance	0.0	-0.3	0.0	-0.1	-0.3	-0.1	-0.3	0.0	-0.3	-0.9	0.1	0.0
80% Exceedance	0.0	0.0	-0.1	-0.1	-0.1	0.0	-0.3	0.0	0.1	-0.1	0.2	0.0
90% Exceedance	-0.1	-0.3	-0.3	0.0	0.0	0.0	-0.1	0.2	0.1	-0.6	0.8	0.1
Full Simulation Period Average ^a	0.1	-0.1	0.0	-0.2	-0.3	-0.4	0.0	0.7	0.0	-0.4	-0.1	0.2
Wet Water Years (30%)	0.1	-0.1	-0.2	-0.1	0.0	0.0	0.0	0.5	0.0	-0.1	0.4	0.4
Above Normal Water Years (11%)	0.1	-0.3	0.3	0.0	-0.2	-0.2	-0.5	-0.2	-0.4	-1.2	-0.5	0.0
Below Normal Water Years (21%)	0.0	-0.2	-0.1	-0.4	-0.4	-0.8	0.1	1.3	0.0	-0.9	-0.5	0.2
Dry Water Years (22%)	0.0	-0.1	0.0	-0.2	-0.1	-0.7	-0.3	0.4	-0.2	-0.5	-0.2	0.2
Critical Water Years (16%)	0.1	0.0	0.2	-0.1	-0.7	-0.4	0.7	1.3	0.8	0.3	0.1	0.0

^a Based on the 100-year simulation period.

* All scenarios are simulated at current climate condition and 0 cm sea level rise.

* Water Year Types defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

* Water Year Types results are displayed with water year - year type sorting.

Table 4F-5-1-2a. X2 Position, Baseline Conditions (Updated) 040424, Monthly Distance (Km)

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
10% Exceedance	93.9	92.9	91.0	86.2	78.7	77.3	78.4	81.3	85.3	89.0	91.5	92.7
20% Exceedance	92.2	91.8	89.4	84.4	74.5	71.8	74.6	78.4	82.1	85.6	88.9	91.0
30% Exceedance	91.4	90.5	87.9	80.7	68.2	66.1	70.9	76.6	81.0	85.1	88.0	90.2
40% Exceedance	89.7	89.5	86.8	72.8	66.0	64.6	67.4	72.1	80.4	83.4	86.8	89.0
50% Exceedance	88.7	86.2	83.6	70.0	61.6	62.0	64.5	68.2	77.4	82.7	86.0	87.9
60% Exceedance	80.1	85.2	78.5	64.6	58.2	58.5	61.5	66.1	75.6	80.2	84.0	80.1
70% Exceedance	80.0	84.3	69.4	59.2	54.8	55.8	60.0	63.1	71.5	79.4	82.8	79.9
80% Exceedance	80.0	82.6	63.1	54.3	52.8	53.3	56.6	58.9	63.8	75.0	82.2	79.7
90% Exceedance	79.9	76.1	56.0	52.5	51.8	52.1	53.2	55.4	59.2	73.3	81.0	79.5
Full Simulation Period Average ^a	85.8	85.4	78.0	69.5	63.6	62.9	65.5	68.8	75.0	81.2	85.3	85.4
Wet Water Years (30%)	83.1	80.0	64.8	57.0	53.6	54.5	56.7	59.2	64.9	74.0	80.1	78.2
Above Normal Water Years (11%)	86.3	86.8	79.7	61.8	56.8	56.5	59.8	63.9	71.3	78.5	83.1	79.9
Below Normal Water Years (21%)	85.0	85.3	81.9	72.3	64.8	62.7	64.8	68.4	76.6	82.4	86.0	88.2
Dry Water Years (22%)	86.2	87.6	84.3	78.8	70.3	68.3	71.6	75.4	81.1	85.3	88.3	90.4
Critical Water Years (16%)	90.9	91.5	87.5	81.5	76.3	76.0	78.4	82.0	85.8	89.2	91.7	92.9

Table 4F-5-1-2b. X2 Position, Alternative 1 plus CVP PA Sac Feather VAs w/TUCPs 102023, Monthly Distance (Km)

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
10% Exceedance	93.6	92.7	91.2	86.1	78.4	76.6	79.0	82.4	86.0	89.0	91.4	92.6
20% Exceedance	92.1	91.6	89.9	83.9	73.9	71.6	75.4	78.5	81.9	85.4	88.6	91.2
30% Exceedance	91.3	90.3	88.2	79.9	67.4	65.6	70.9	77.5	81.1	84.7	87.9	90.4
40% Exceedance	90.3	89.7	87.1	72.7	65.2	63.9	67.8	73.1	80.4	82.9	86.2	89.5
50% Exceedance	88.7	85.8	83.7	69.7	61.5	61.6	64.9	69.8	77.9	81.6	85.6	88.2
60% Exceedance	80.1	85.1	78.0	64.4	58.2	58.5	61.9	66.6	75.6	80.1	83.5	80.1
70% Exceedance	80.0	84.0	69.4	59.1	54.4	55.7	59.7	63.1	71.2	78.5	82.8	79.9
80% Exceedance	80.0	82.6	63.0	54.2	52.7	53.3	56.3	58.8	63.9	74.8	82.4	79.7
90% Exceedance	79.9	75.7	55.8	52.5	51.8	52.1	53.2	55.6	59.3	72.7	81.8	79.7
Full Simulation Period Average ^a	85.8	85.2	78.0	69.2	63.3	62.6	65.7	69.6	75.1	80.9	85.4	85.6
Wet Water Years (30%)	83.2	79.9	64.6	56.9	53.6	54.5	56.7	59.7	64.9	73.9	80.5	78.6
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Below Normal Water Years (21%)	85.0	85.0	81.9	71.9	64.4	61.9	64.9	69.6	76.6	81.5	85.6	88.4
Dry Water Years (22%)	86.2	87.5	84.4	78.6	70.1	67.7	71.3	75.7	80.9	84.9	88.0	90.6
Critical Water Years (16%)	90.9	91.3	87.7	81.1	75.5	76.3	80.5	84.0	87.4	90.7	92.6	92.8

Table 4F-5-1-2c. X2 Position, Alternative 1 plus CVP PA Sac Feather VAs w/TUCPs 102023 minus Baseline Conditions (Updated) 040424, Monthly Distance (Km)

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
10% Exceedance	-0.3	-0.2	0.3	-0.1	-0.4	-0.7	0.6	1.0	0.7	-0.1	-0.1	-0.1
20% Exceedance	0.0	-0.2	0.6	-0.5	-0.6	-0.2	0.8	0.2	-0.2	-0.2	-0.3	0.3
30% Exceedance	-0.1	-0.2	0.4	-0.8	-0.8	-0.5	0.0	0.9	0.1	-0.3	-0.1	0.2
40% Exceedance	0.6	0.2	0.4	-0.1	-0.8	-0.7	0.4	0.9	0.0	-0.4	-0.6	0.5
50% Exceedance	0.0	-0.4	0.1	-0.4	-0.1	-0.4	0.4	1.6	0.4	-1.1	-0.4	0.4
60% Exceedance	0.0	-0.1	-0.5	-0.2	0.0	0.0	0.4	0.5	0.0	0.0	-0.5	0.0
70% Exceedance	0.0	-0.3	0.0	-0.1	-0.4	-0.1	-0.3	0.0	-0.3	-0.9	0.1	0.0
80% Exceedance	0.0	0.0	-0.1	-0.1	-0.1	0.0	-0.3	0.0	0.1	-0.1	0.2	0.0
90% Exceedance	-0.1	-0.3	-0.3	-0.1	0.0	0.0	-0.1	0.2	0.1	-0.6	0.8	0.1
Full Simulation Period Average ^a	0.0	-0.2	0.0	-0.2	-0.3	-0.3	0.2	0.8	0.1	-0.2	0.0	0.2
Wet Water Years (30%)	0.1	-0.1	-0.2	-0.1	0.0	0.0	0.0	0.5	0.0	-0.1	0.4	0.4
Above Normal Water Years (11%)	0.1	-0.3	0.5	-0.1	-0.2	-0.2	-0.4	-0.2	-0.5	-1.3	-0.5	0.0
Below Normal Water Years (21%)	-0.1	-0.2	-0.1	-0.4	-0.4	-0.8	0.1	1.3	0.0	-0.9	-0.5	0.2
Dry Water Years (22%)	0.0	-0.1	0.0	-0.2	-0.2	-0.7	-0.3	0.4	-0.2	-0.5	-0.2	0.2
Critical Water Years (16%)	0.0	-0.1	0.1	-0.4	-0.8	0.3	2.1	2.1	1.5	1.4	0.9	0.0

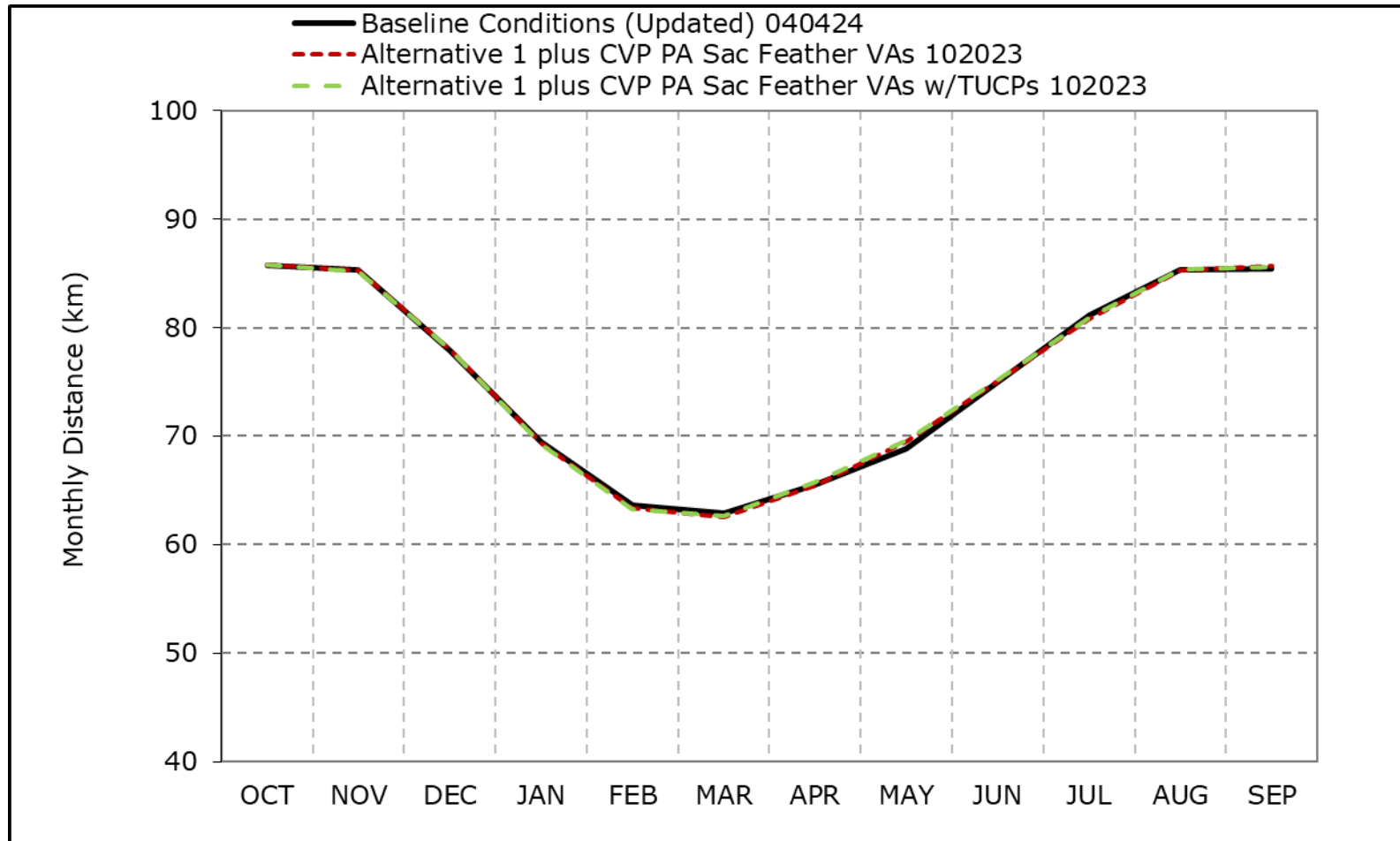
^a Based on the 100-year simulation period.

* All scenarios are simulated at current climate condition and 0 cm sea level rise.

* Water Year Types defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

* Water Year Types results are displayed with water year - year type sorting.

Figure 4F-5-1a. X2 Position, Long-Term Average Distance

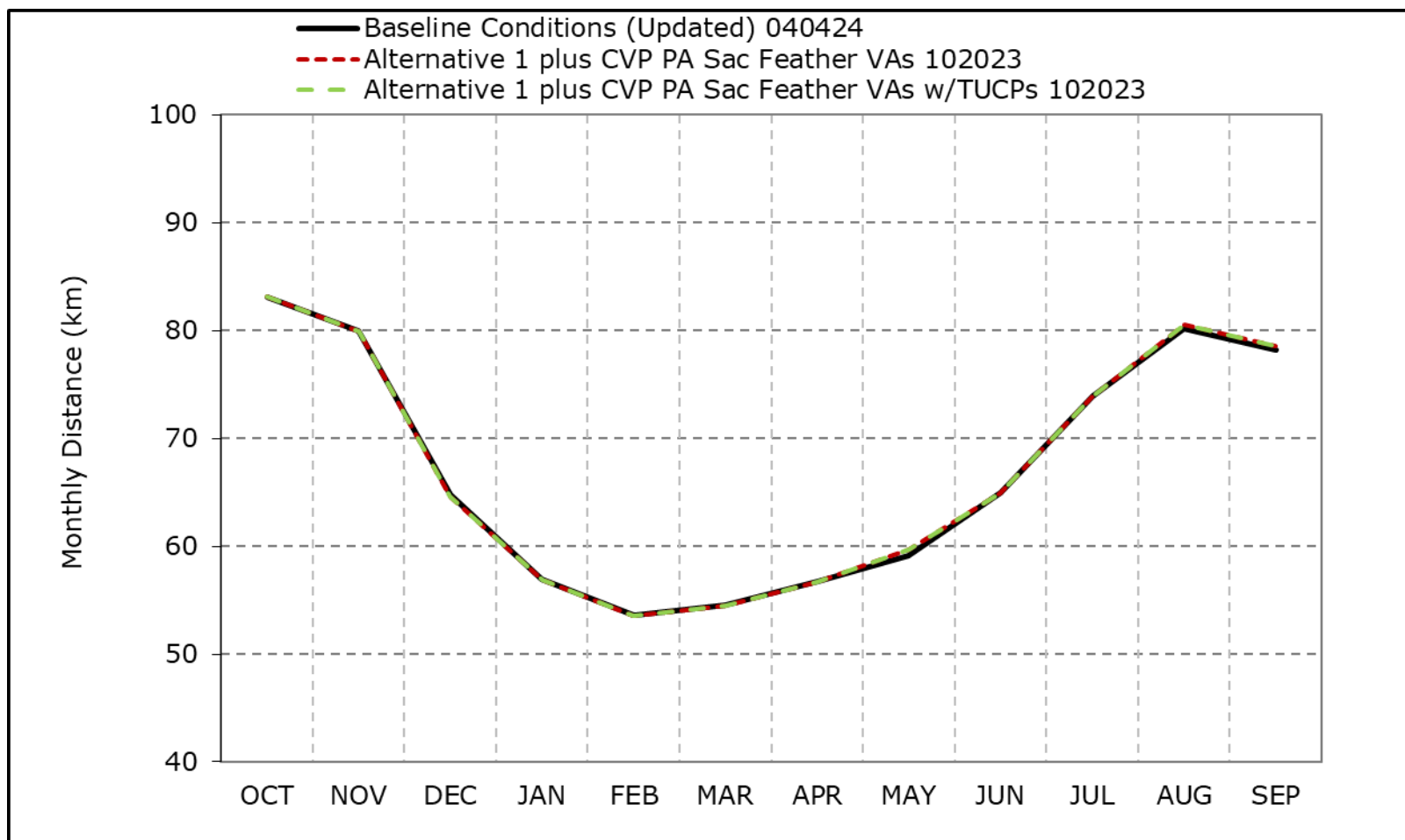


*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

*These results are displayed with water year - year type sorting.

*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1b. X2 Position, Wet Year Average Distance

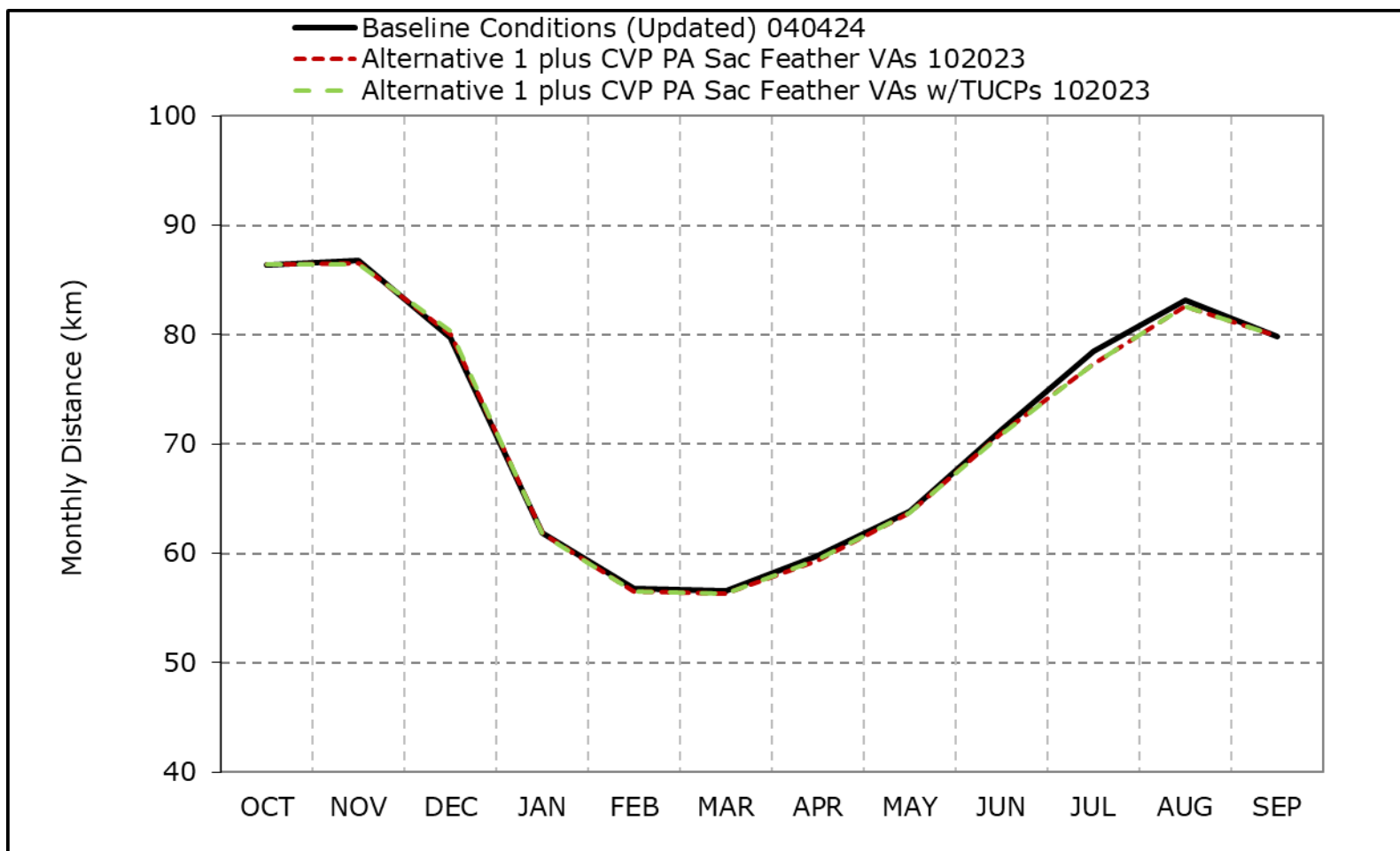


*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

*These results are displayed with water year - year type sorting.

*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1c. X2 Position, Above Normal Year Average Distance

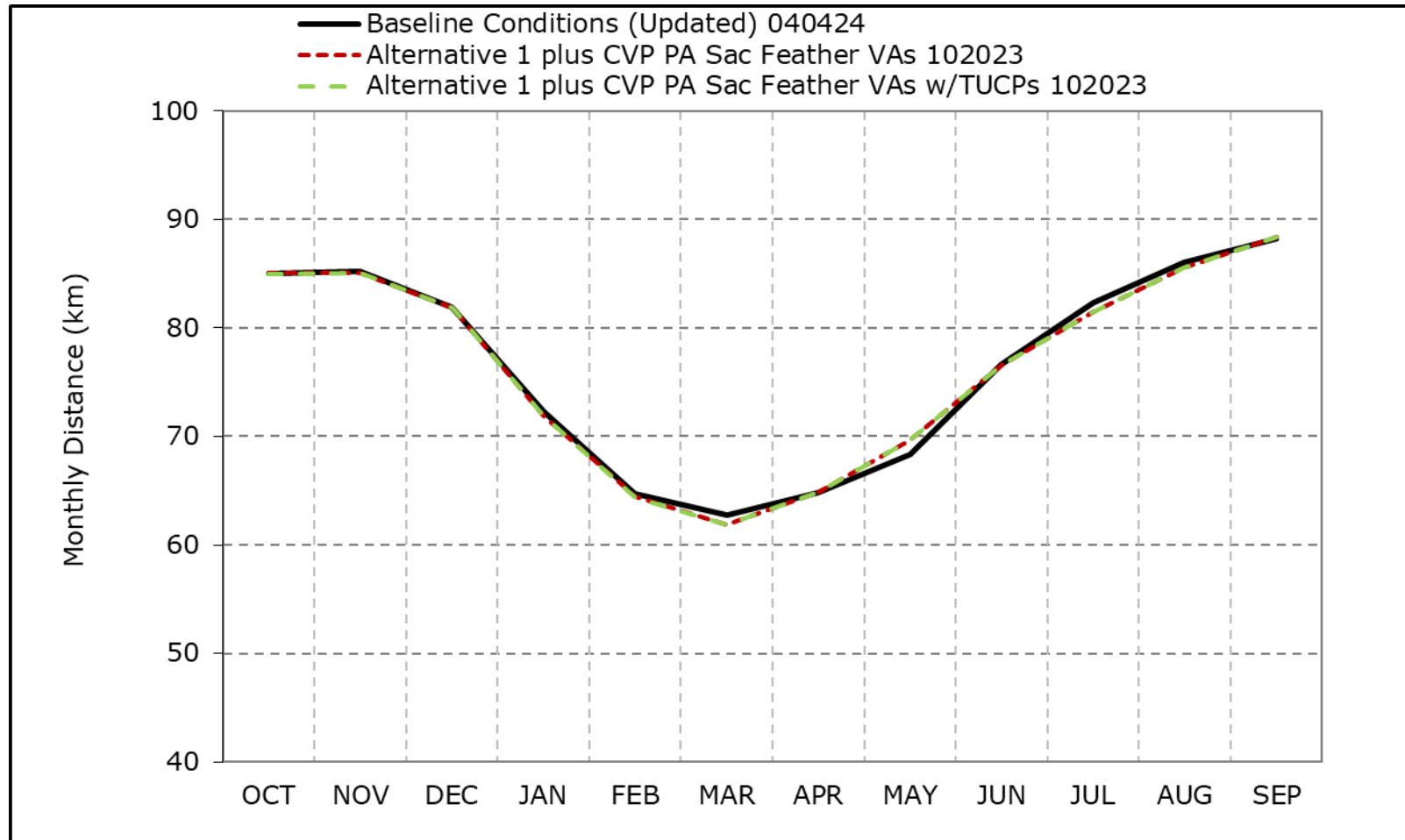


*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

*These results are displayed with water year - year type sorting.

*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1d. X2 Position, Below Normal Year Average Distance

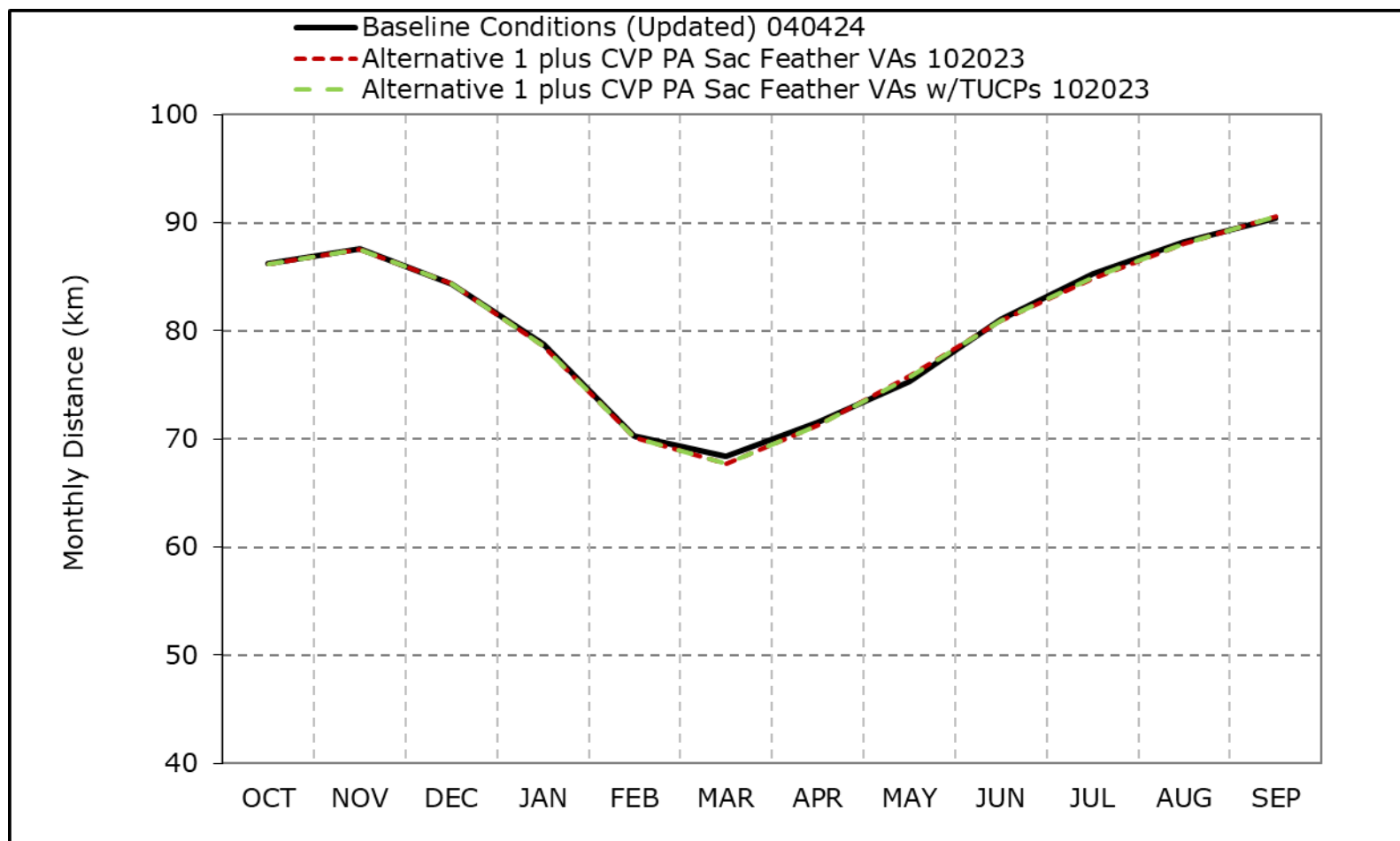


*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

*These results are displayed with water year - year type sorting.

*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1e. X2 Position, Dry Year Average Distance

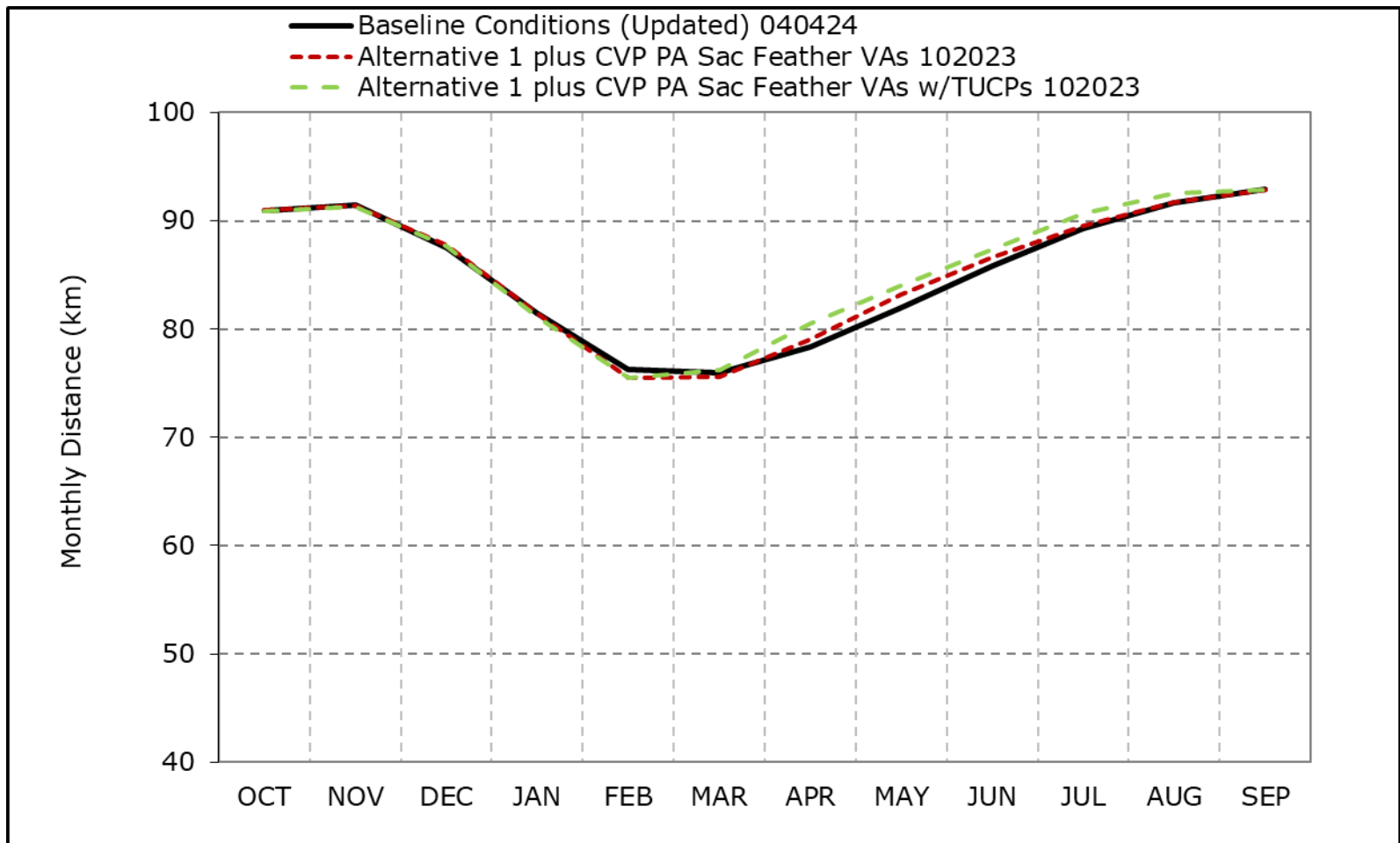


*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

*These results are displayed with water year - year type sorting.

*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1f. X2 Position, Critical Year Average Distance

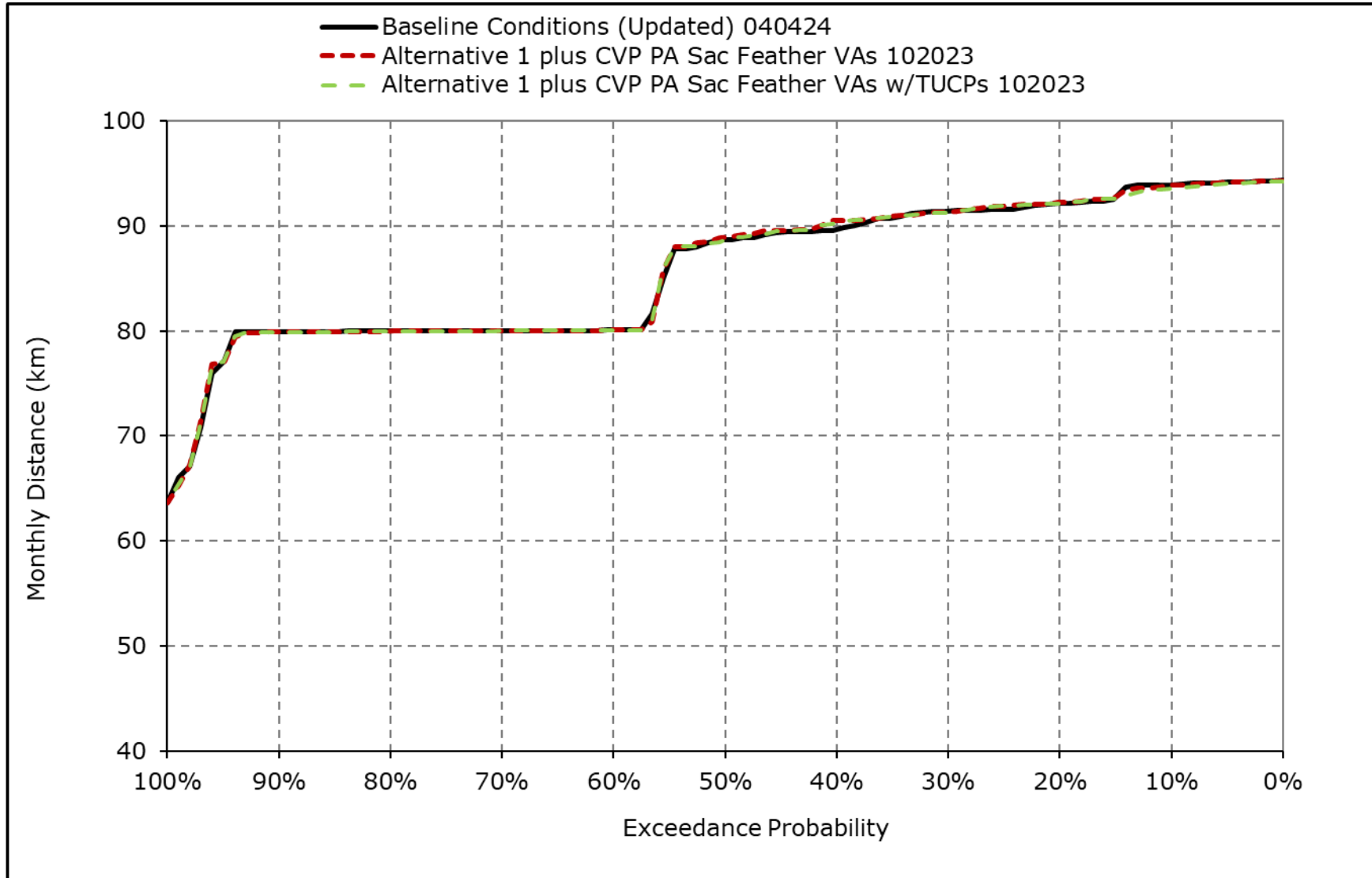


*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

*These results are displayed with water year - year type sorting.

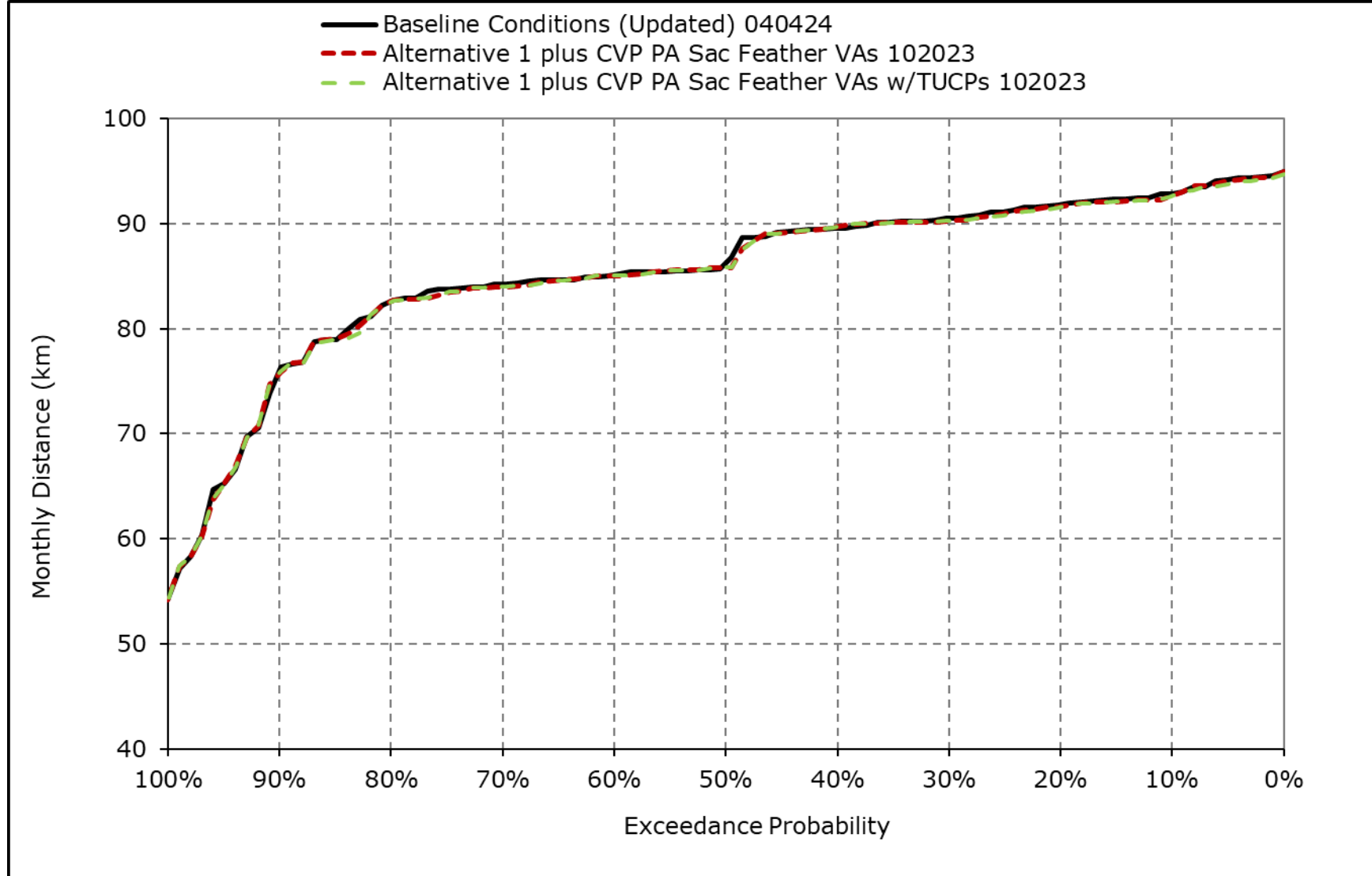
*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1g. X2 Position, October



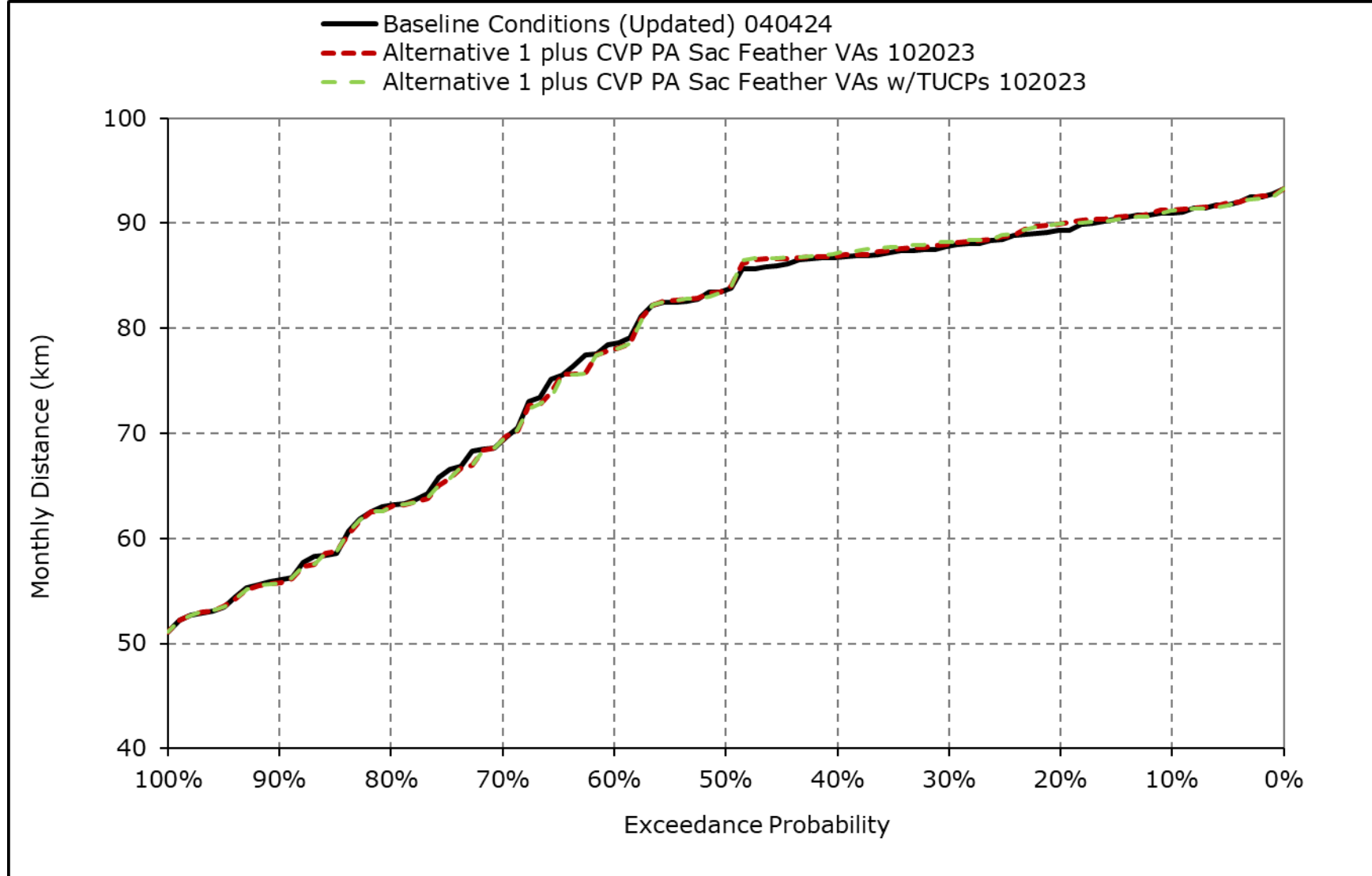
*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1h. X2 Position, November



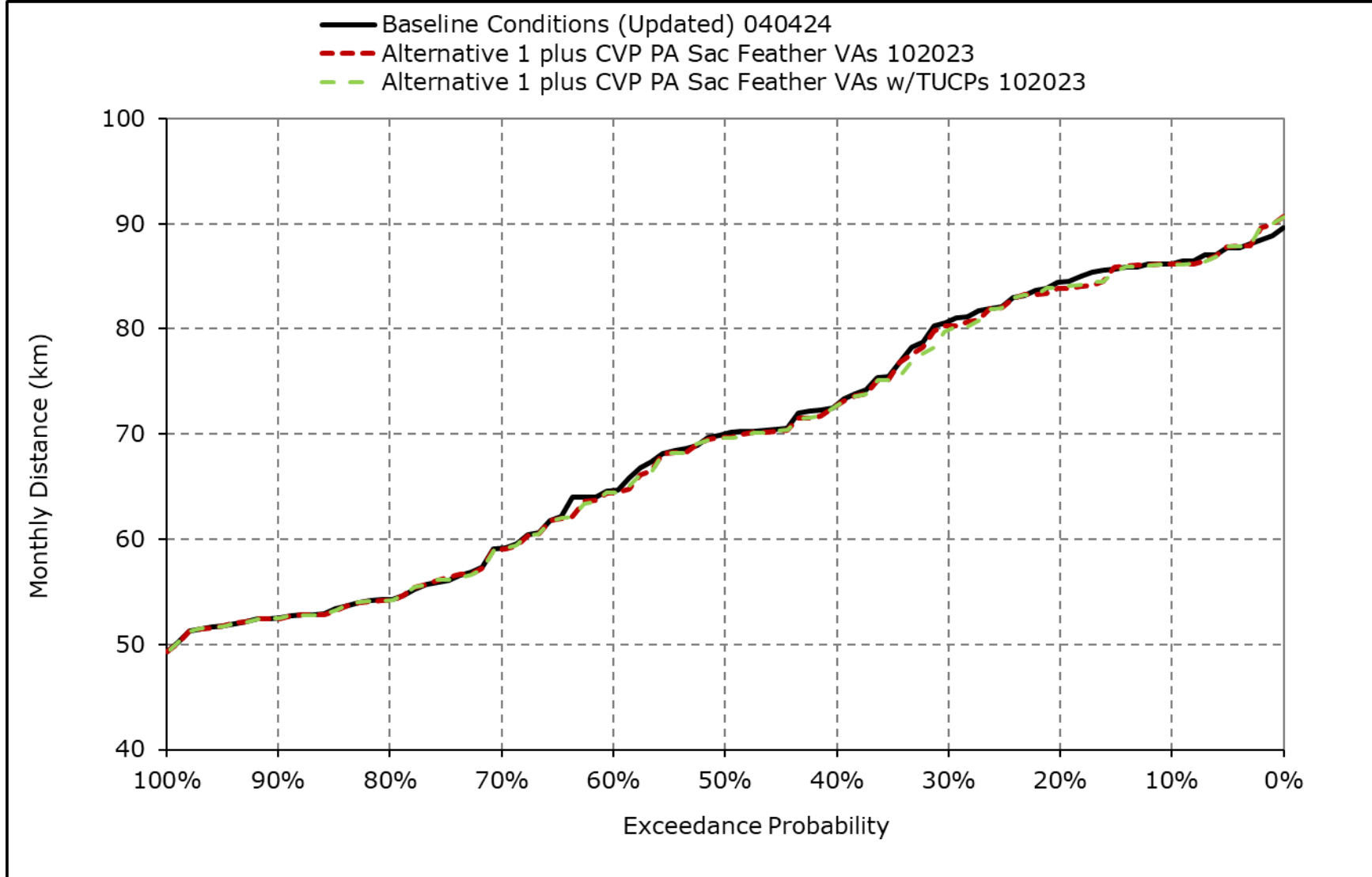
*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1i. X2 Position, December



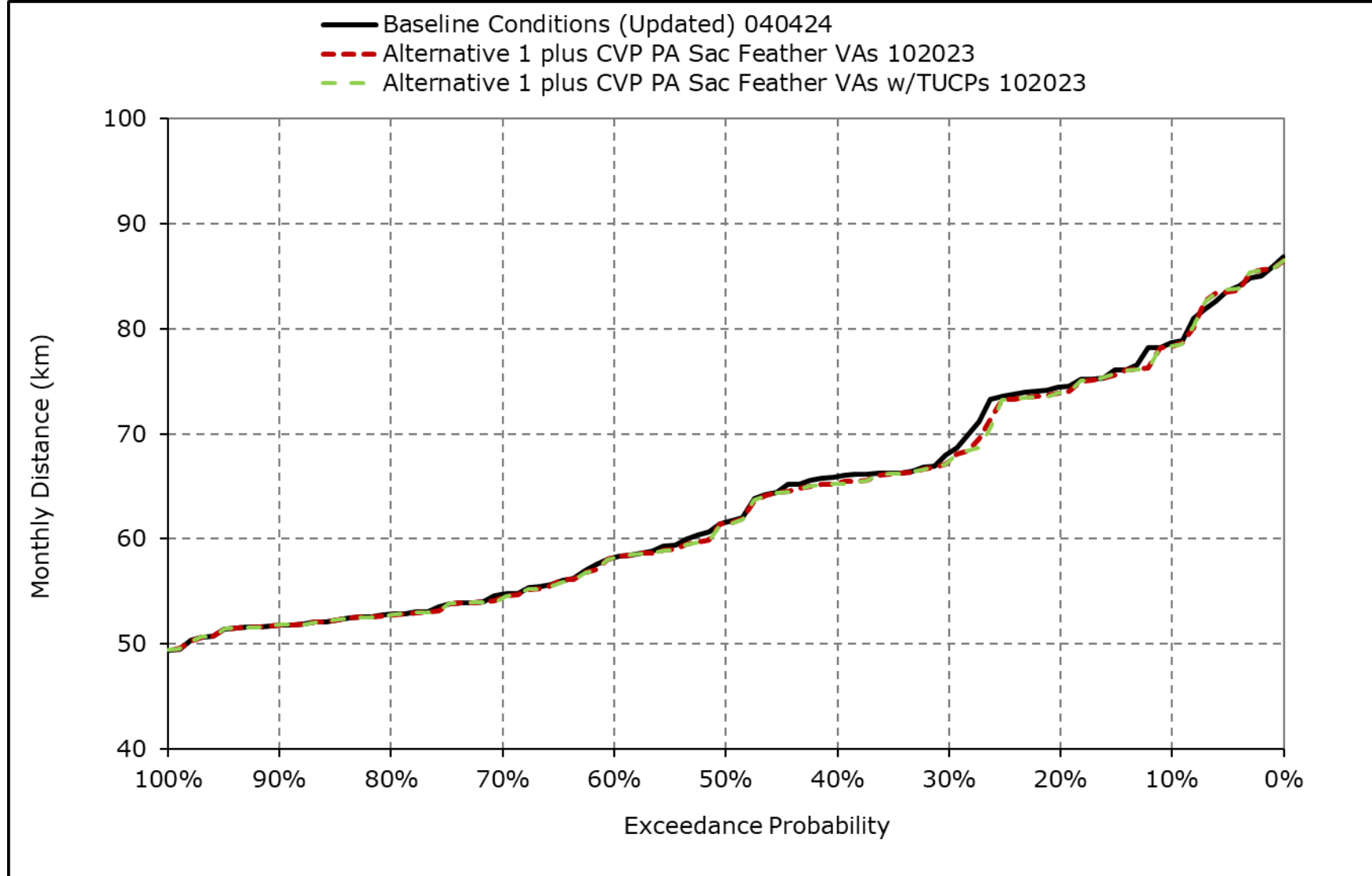
*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1j. X2 Position, January



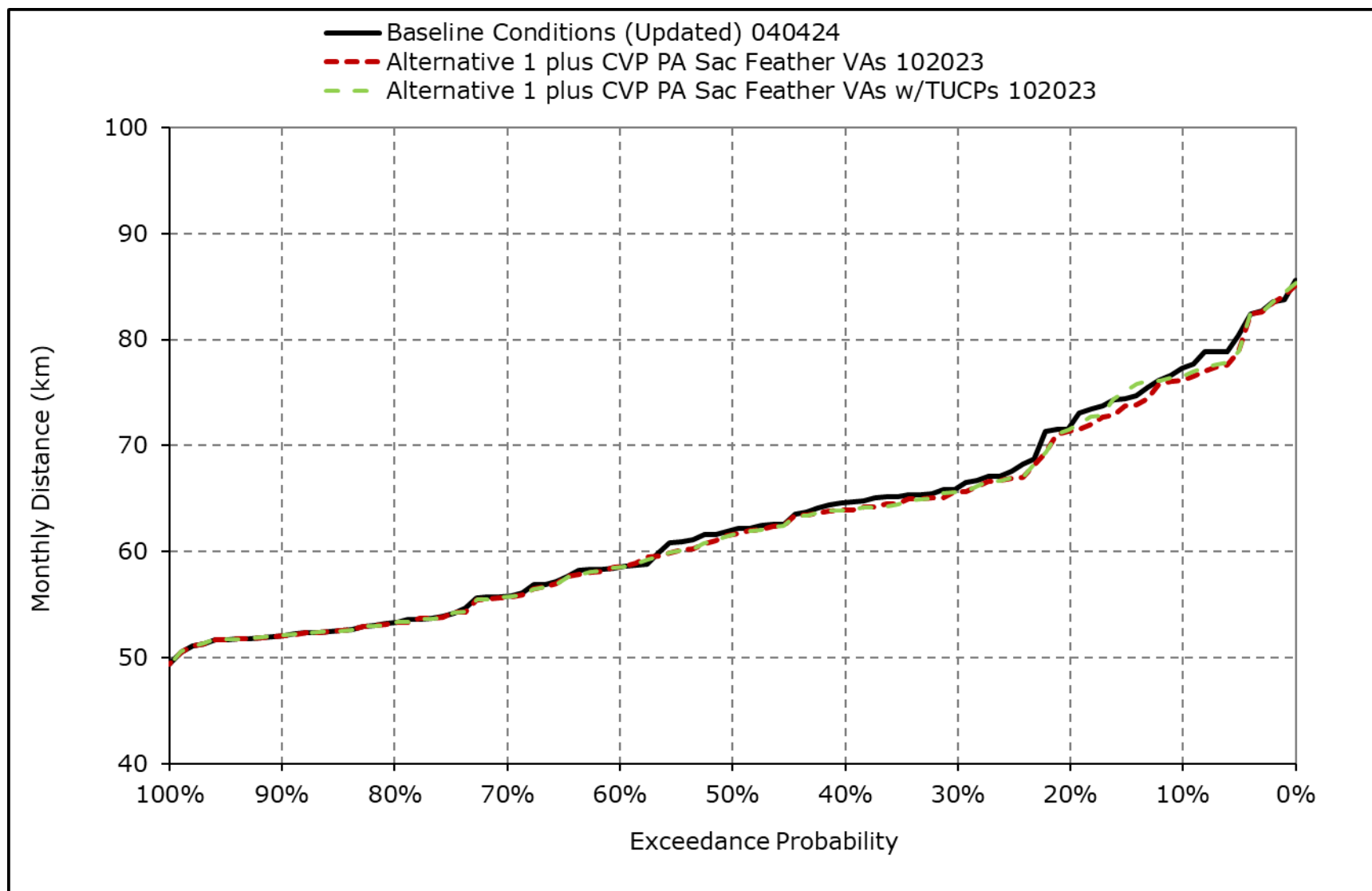
*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1k. X2 Position, February



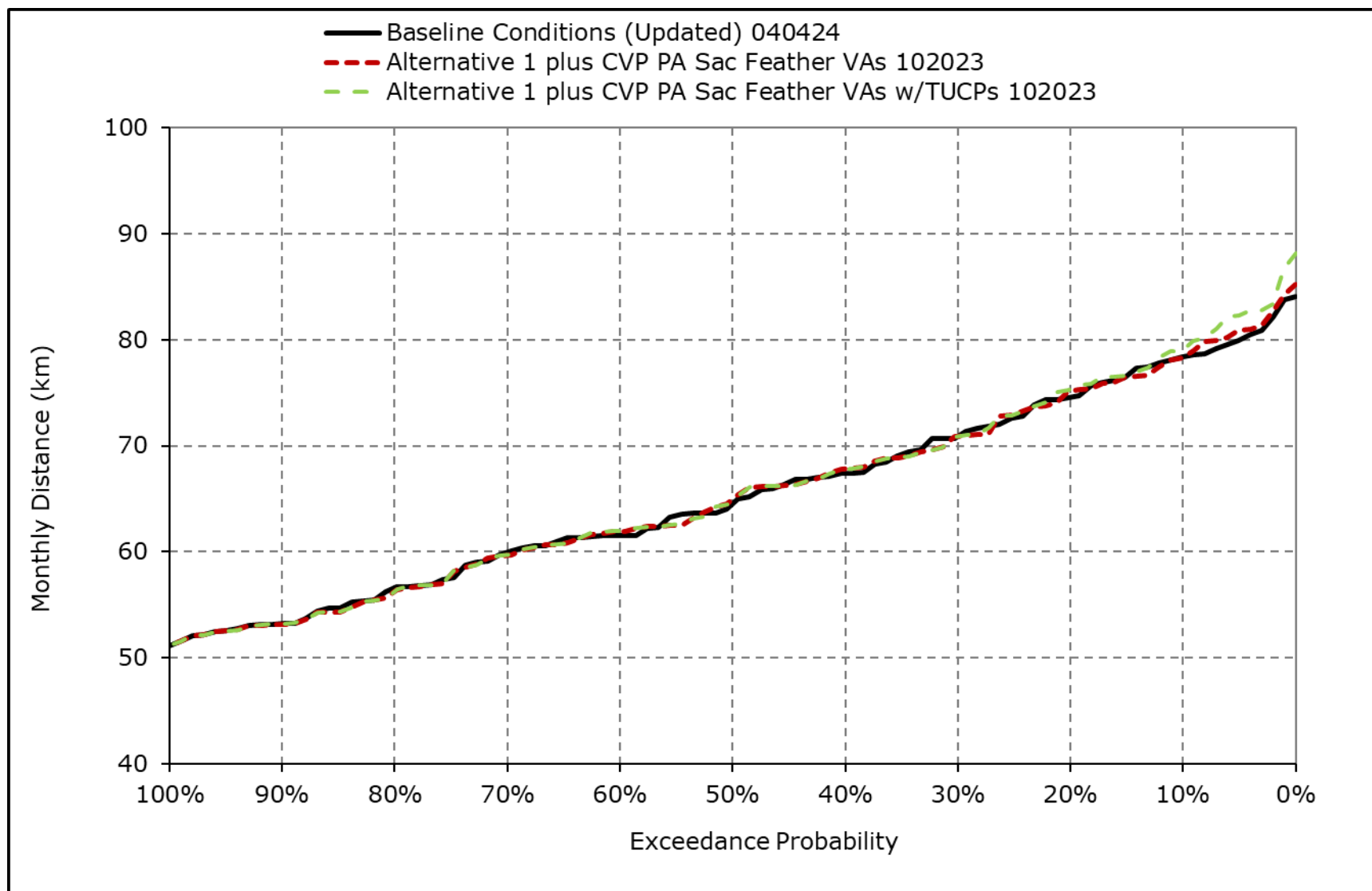
*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1I. X2 Position, March



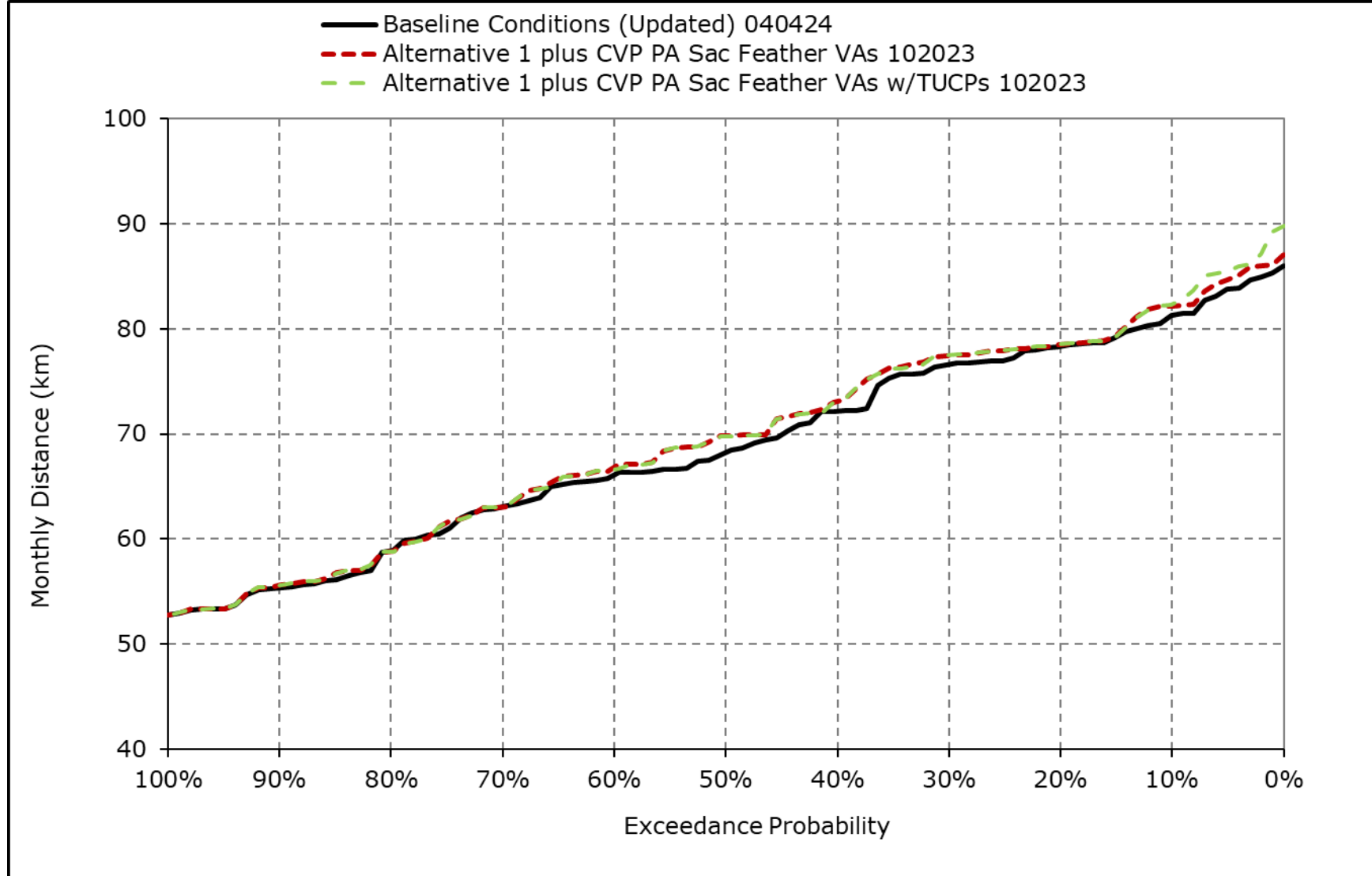
*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1m. X2 Position, April



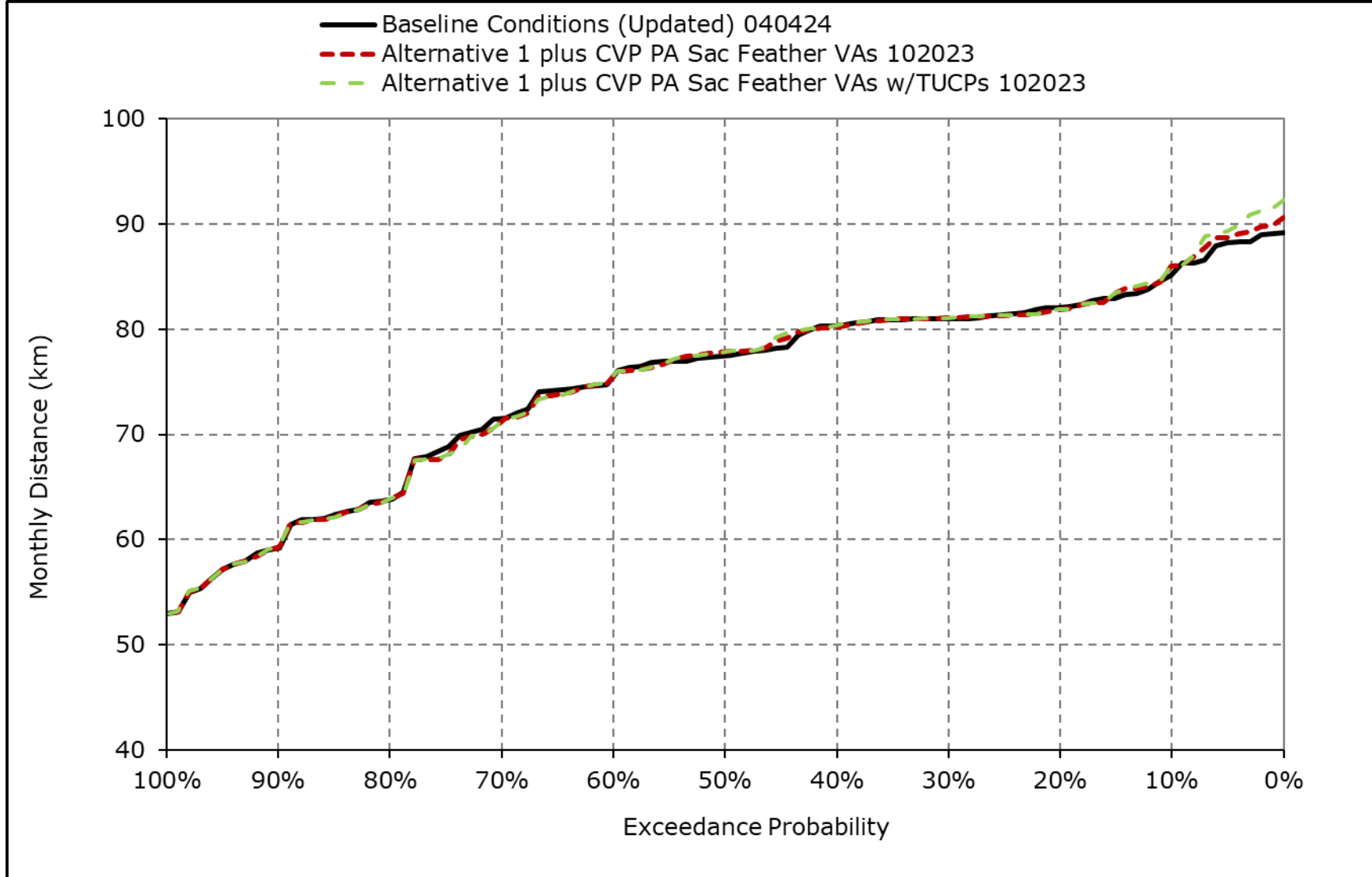
*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1n. X2 Position, May



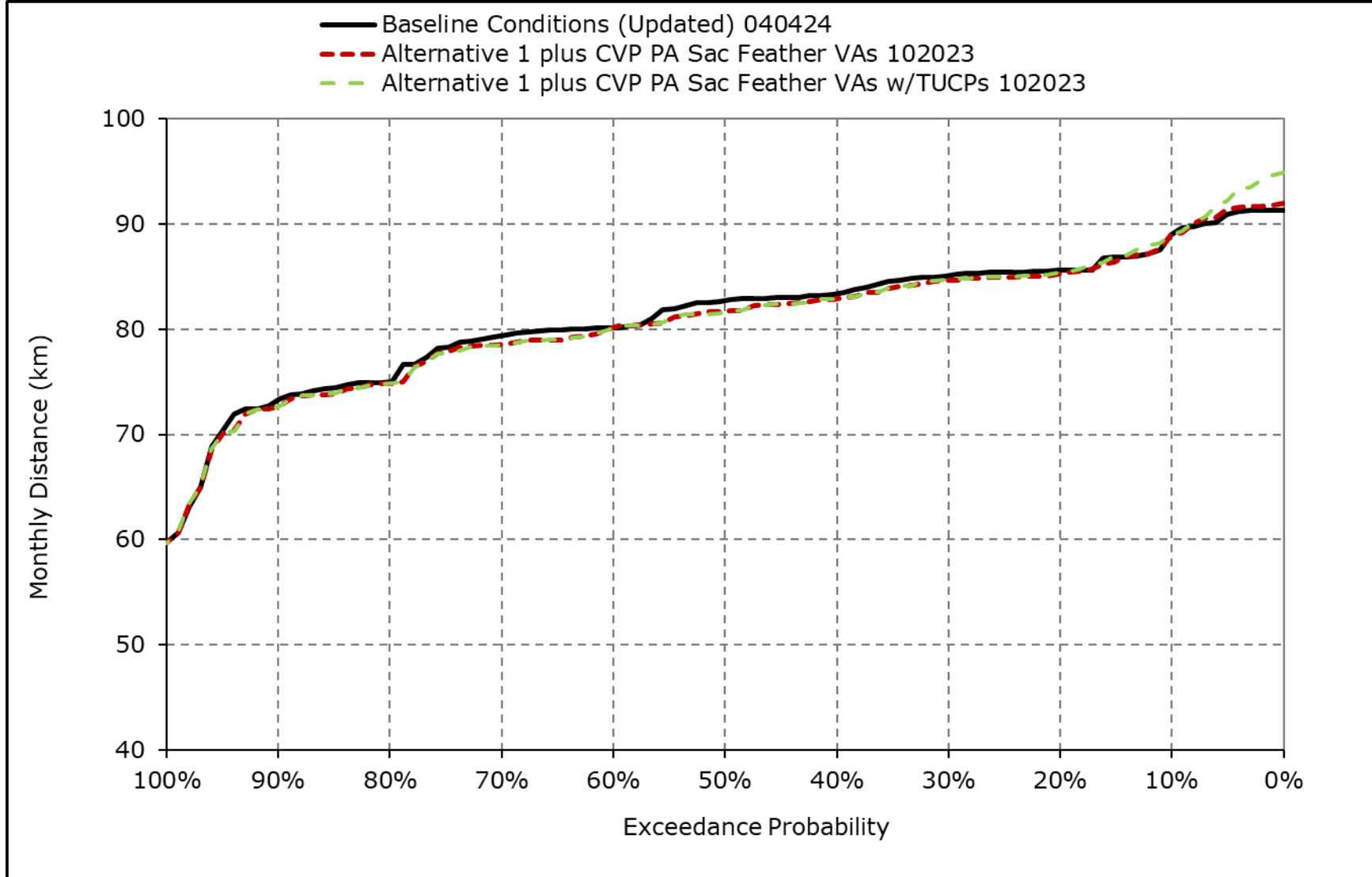
*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1o. X2 Position, June



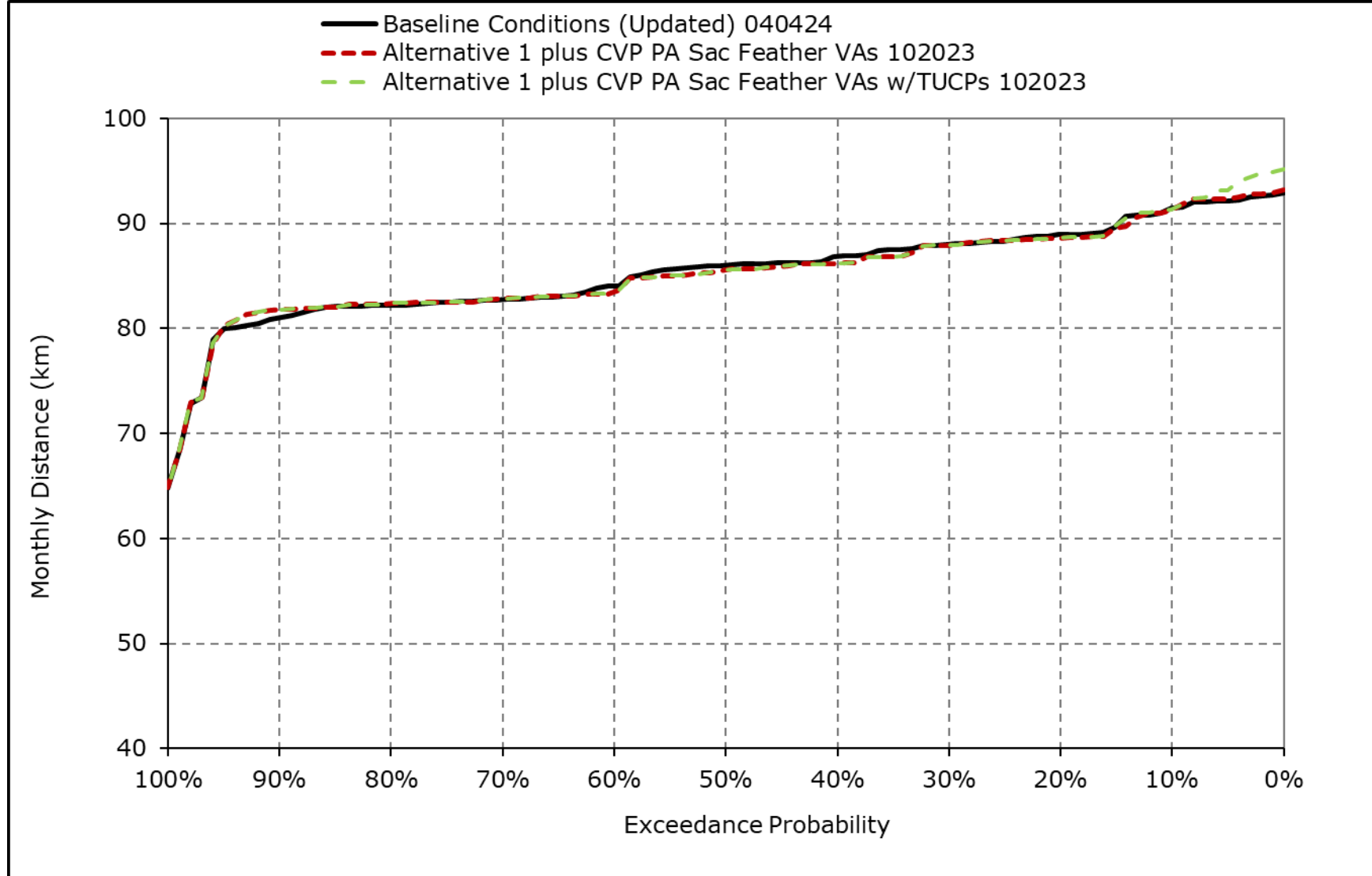
*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1p. X2 Position, July



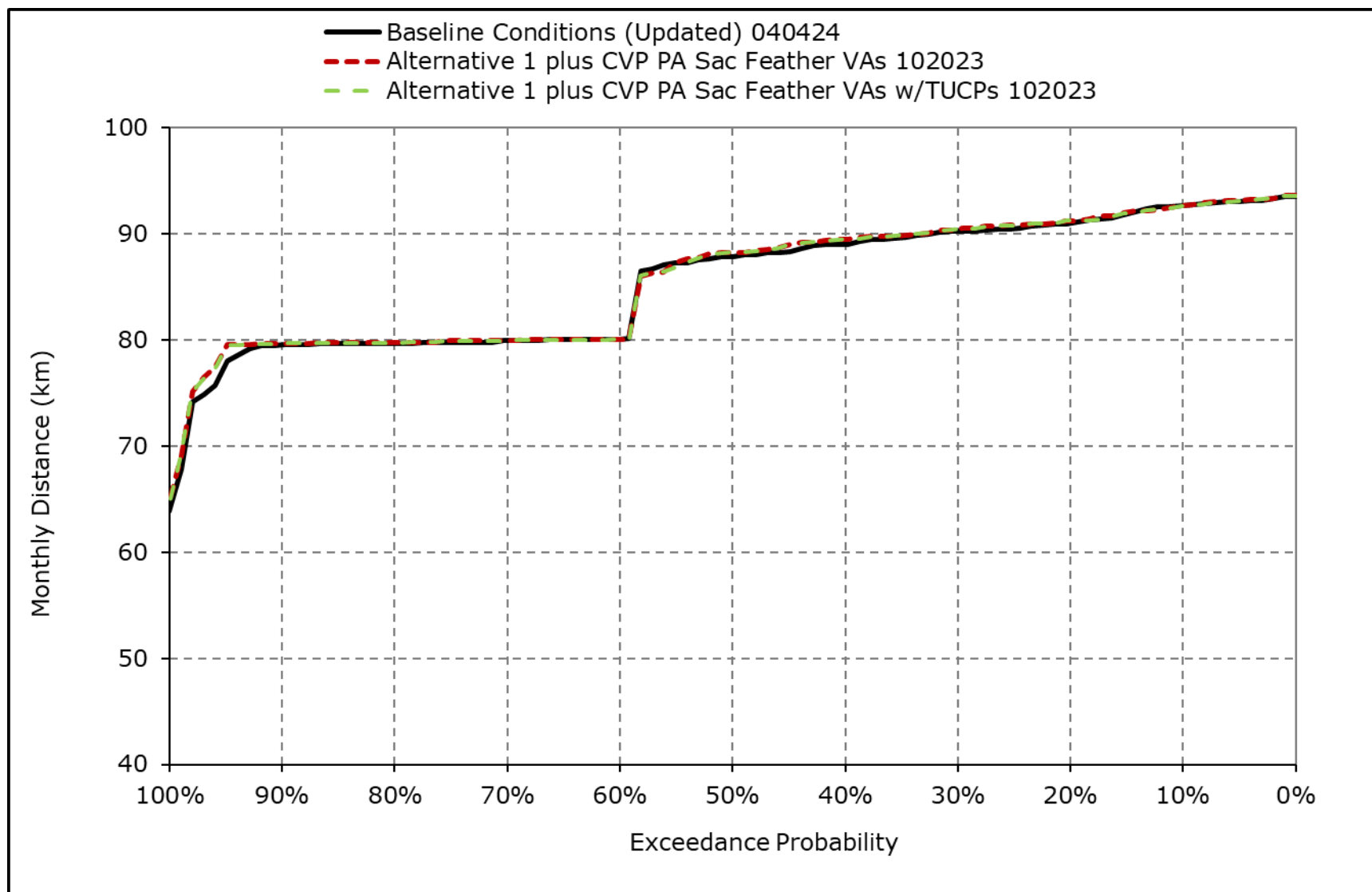
*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1q. X2 Position, August



*All scenarios are simulated at current climate condition and 0 cm sea level rise.

Figure 4F-5-1r. X2 Position, September



*All scenarios are simulated at current climate condition and 0 cm sea level rise.