Sites Project: DSM2 Assumptions and Results

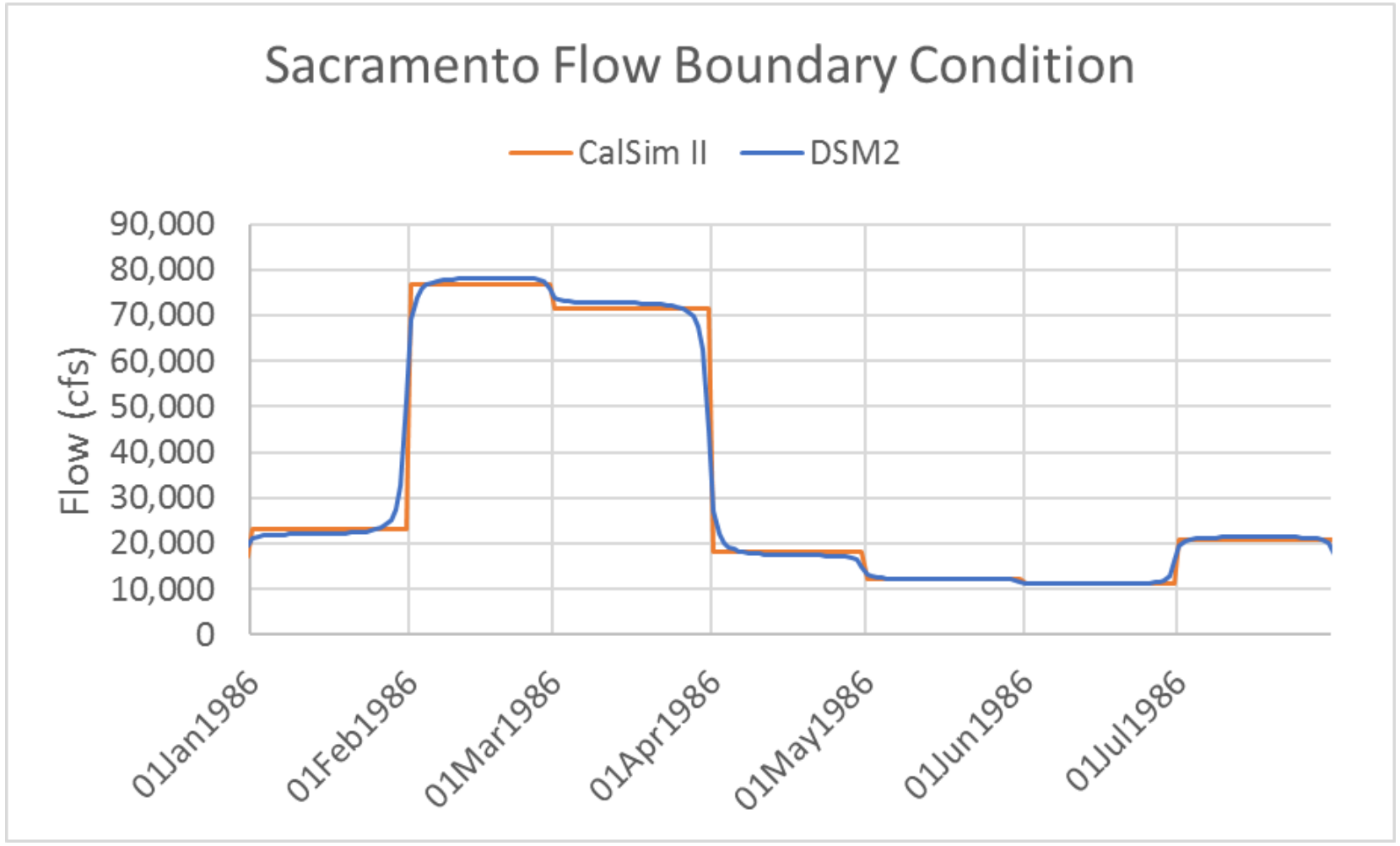
California Department of Fish and Wildlife

July 23, 2019

CalSim II to DSM2

- Monthly CalSim II results are converted to daily DSM2 inputs
  - Daily values equal monthly average
  - Beginning and end of months are splined for continuity
- Main Connections:
  - Sacramento River
  - Yolo Bypass
  - San Joaquin River
  - East Side Streams (Consumnes, Calaveras, and Mokelumne Rivers)
  - Jones and Banks Exports
- Martinez EC is estimated based on Delta Outflow (from CalSim II)

Example of CalSim II to DSM2 Flow



CalSim II to DSM2 – Hydraulic Structures

- Delta Cross Channel Gates
  - Gate operations are consistent with CalSim II operations
- Suisun Marsh Salinity Control Gates
  - May operate from October through March, depending on salinity
- South Delta Temporary Barriers
  - Seasonal operation is a DSM2 input

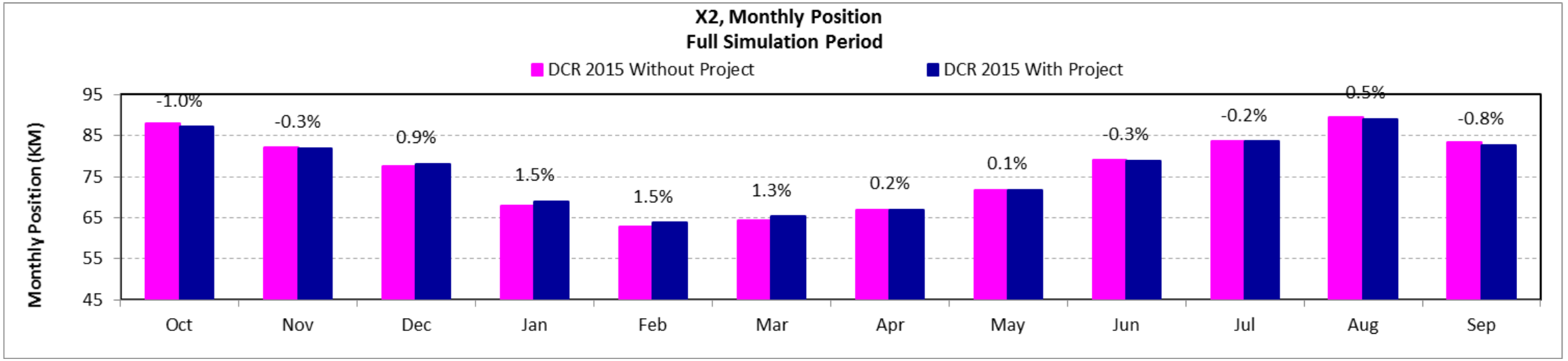
Main Assumptions, per DCR 2015

- D1641
  - All flow requirements
  - Salinity at Emmaton, Jersey Point, Rock Slough, and Collinsville
- Biological Opinions
  - USFWS Delta Smelt BO Actions
  - NMFS BO Salmon Actions
  - Fall X2
  - OMR flows

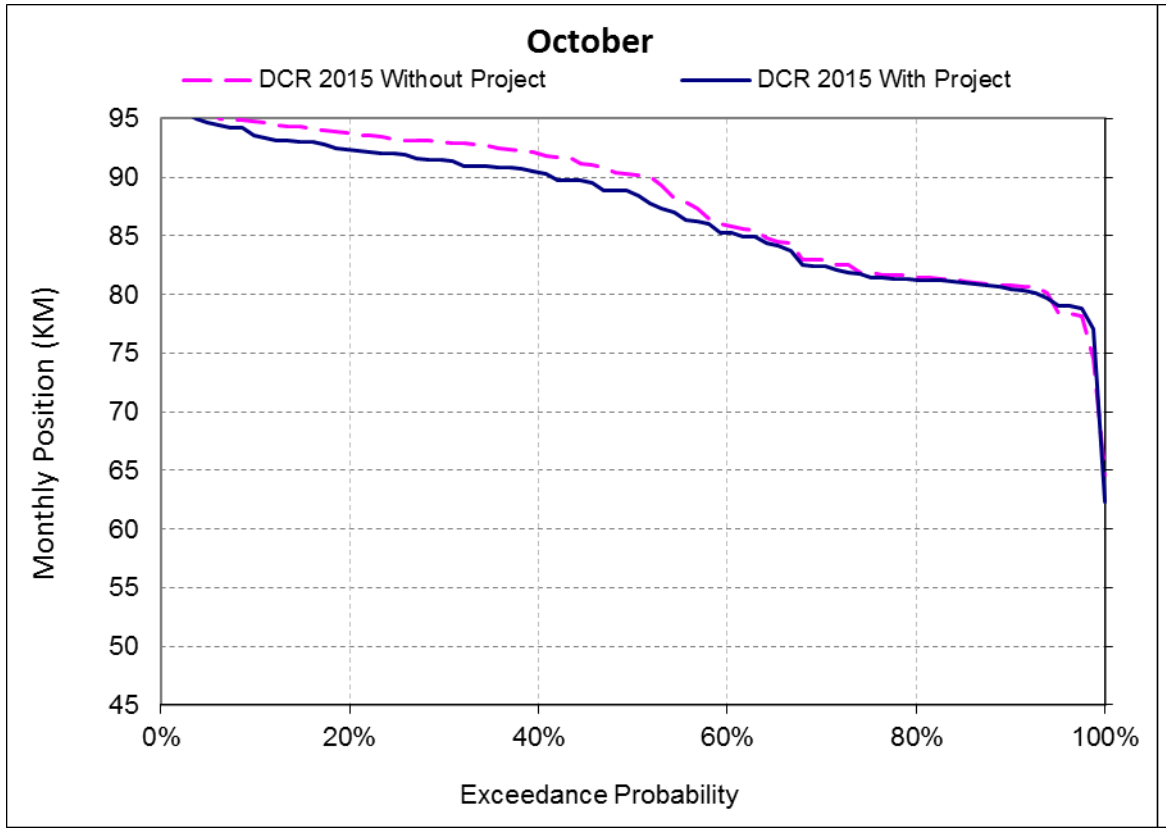
CalSim II Artificial Neural Network

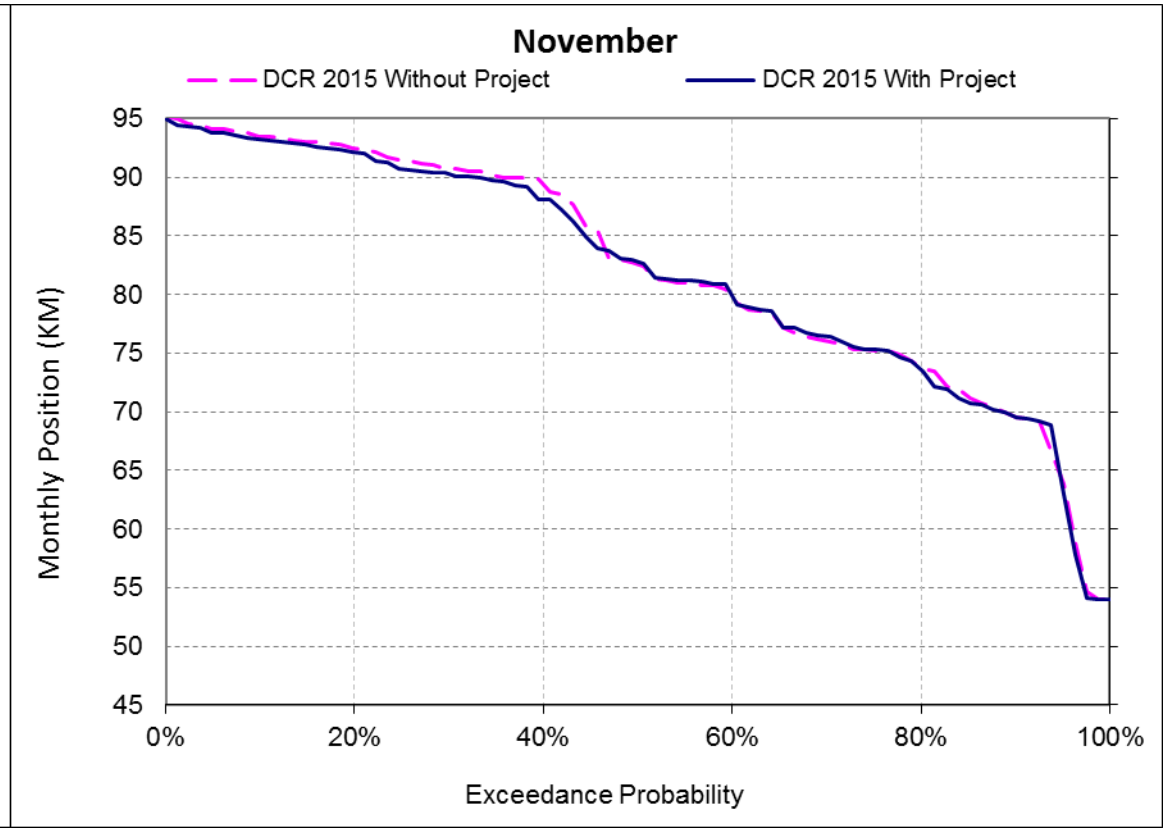
- Salinity requirements are met by CalSim II
- CalSim II estimates EC at control points using an artificial neural network (ANN)
- The ANN must be re-trained when physical conditions cause EC response to flow changes
  - Climate condition, sea level rise, or restoration opportunity areas

DSM2 Results – X2

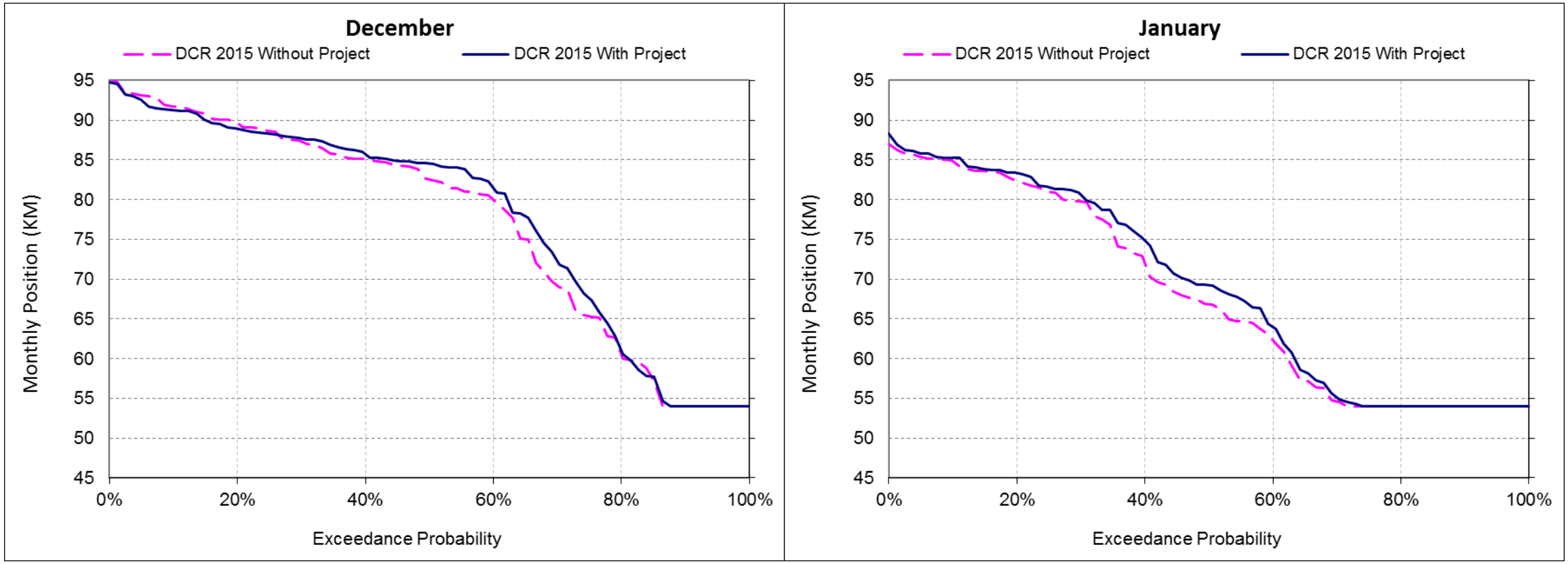


DSM2 Results – X2 – Oct-Nov

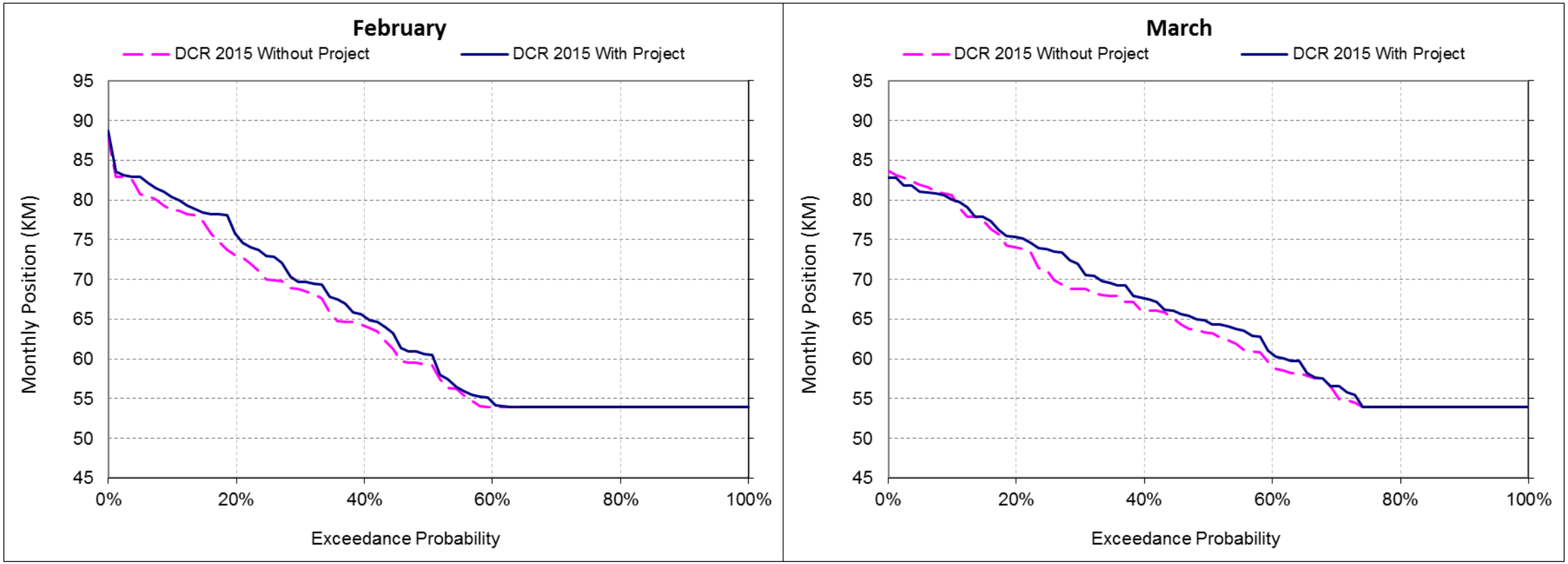




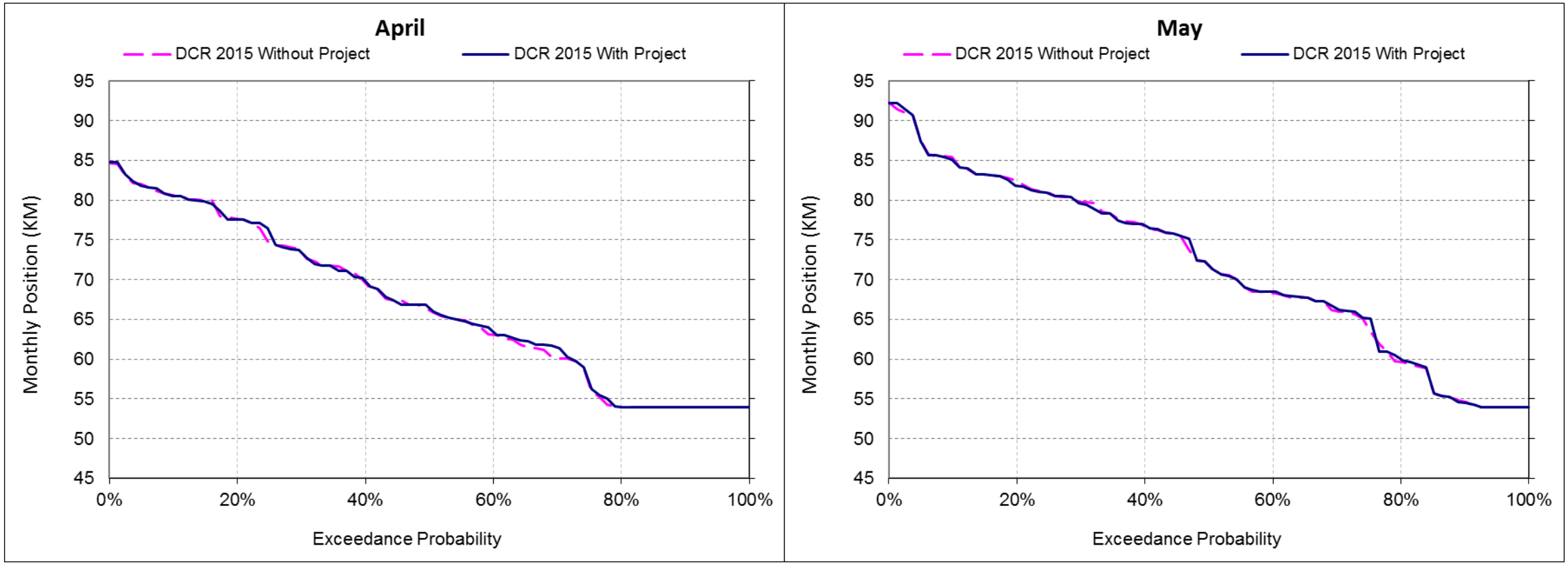
DSM2 Results – X2 – Dec-Jan



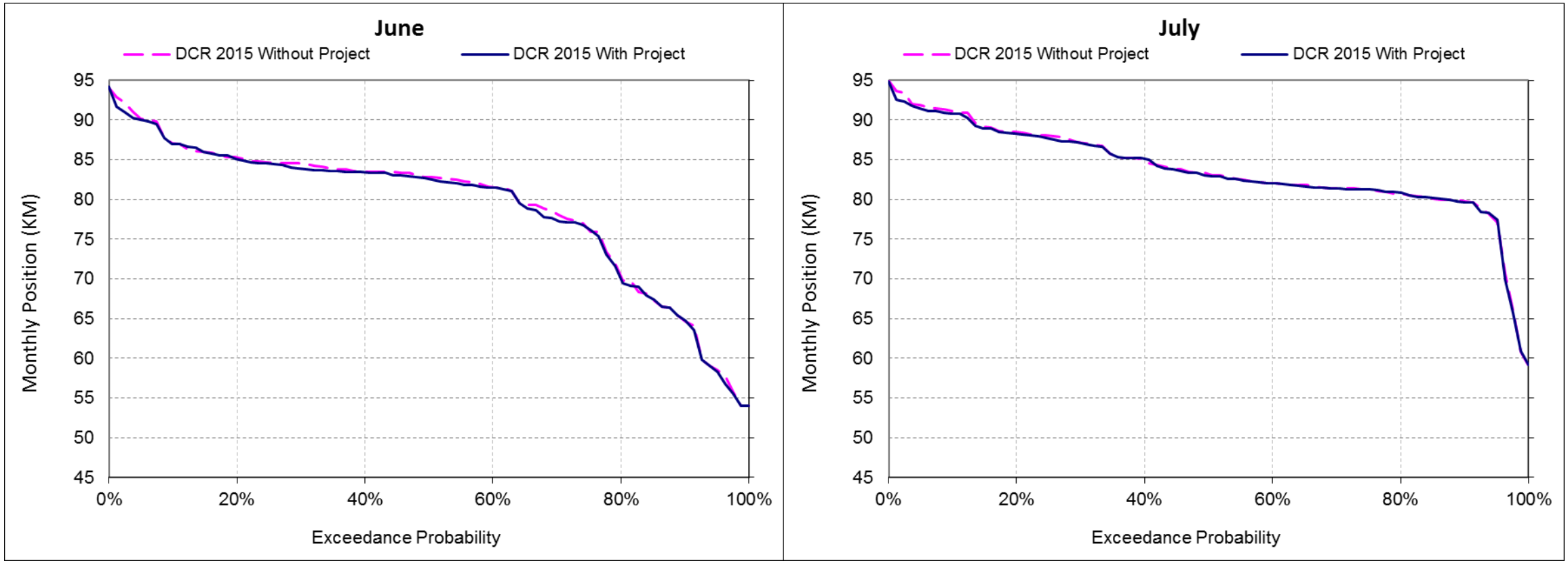
DSM2 Results – X2 – Feb-Mar



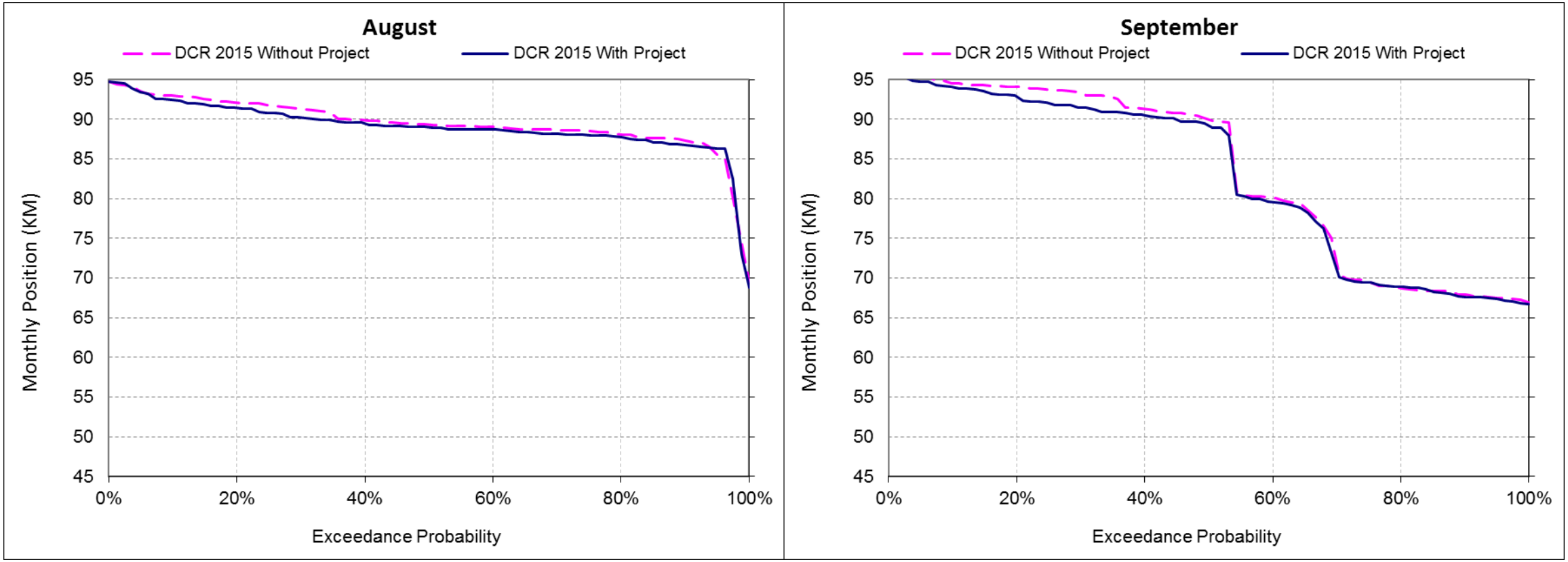
DSM2 Results – X2 – Apr-May



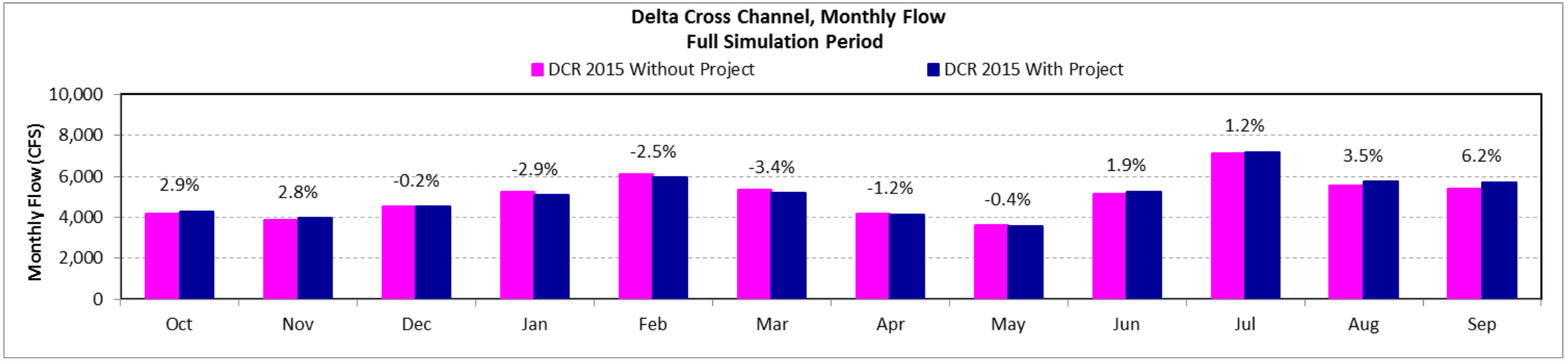
DSM2 Results – X2 – Jun-Jul



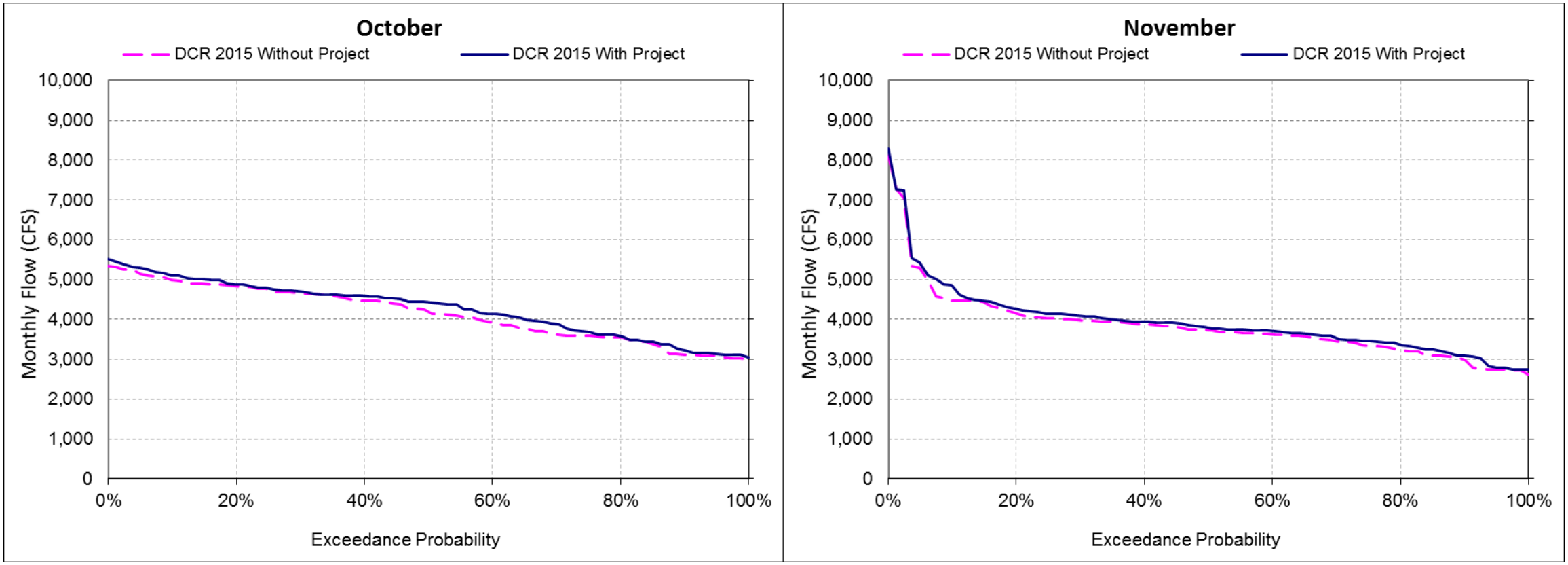
DSM2 Results – X2 – Aug-Sep



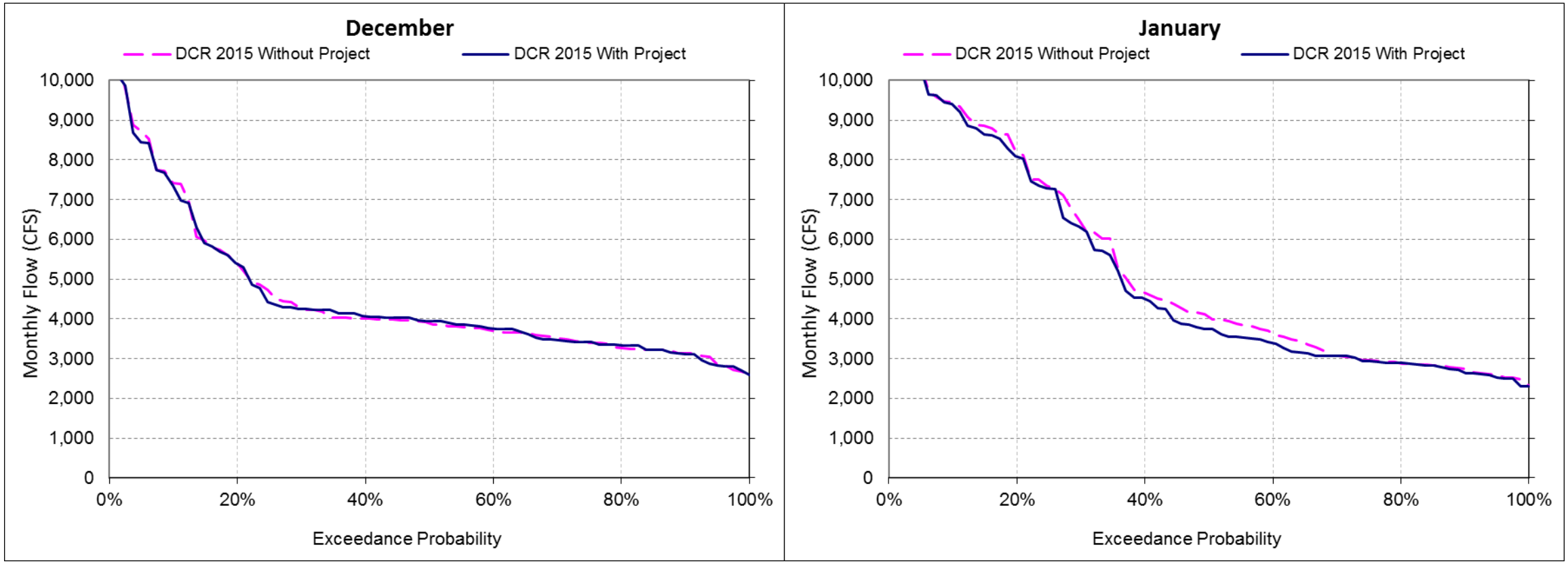
DSM2 Results – DCC Flow



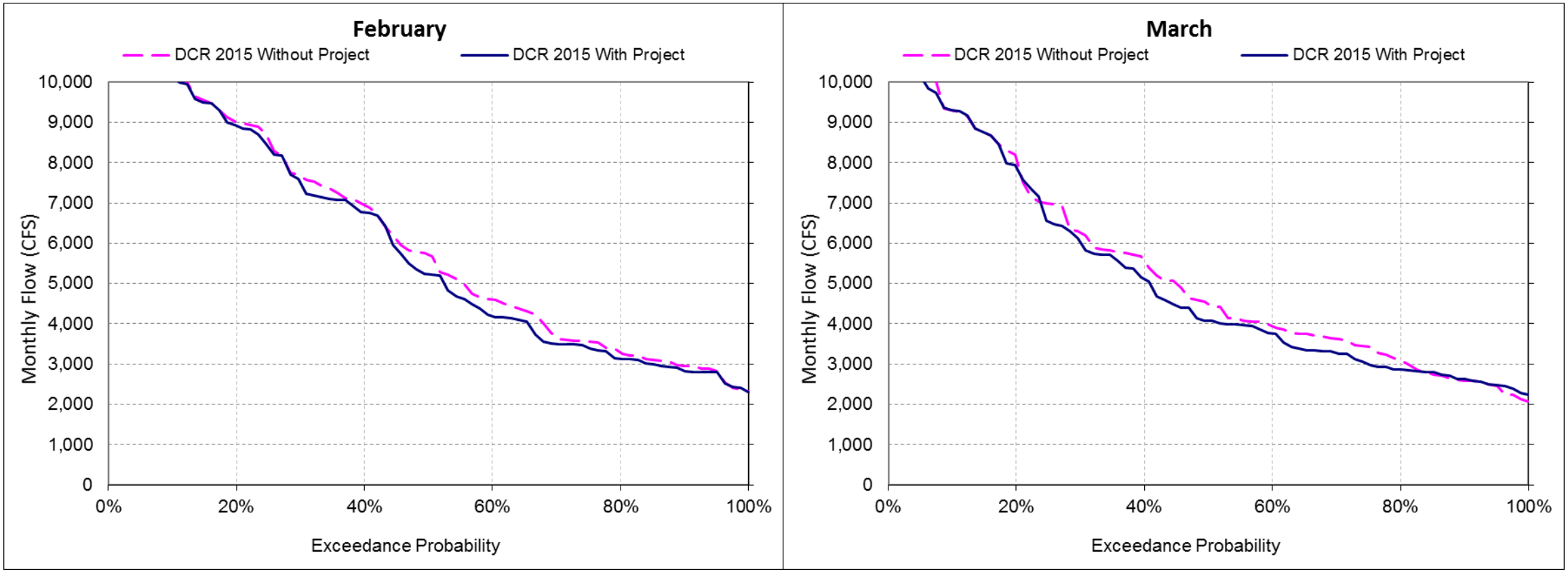
DSM2 Results – DCC Flow – Oct-Nov



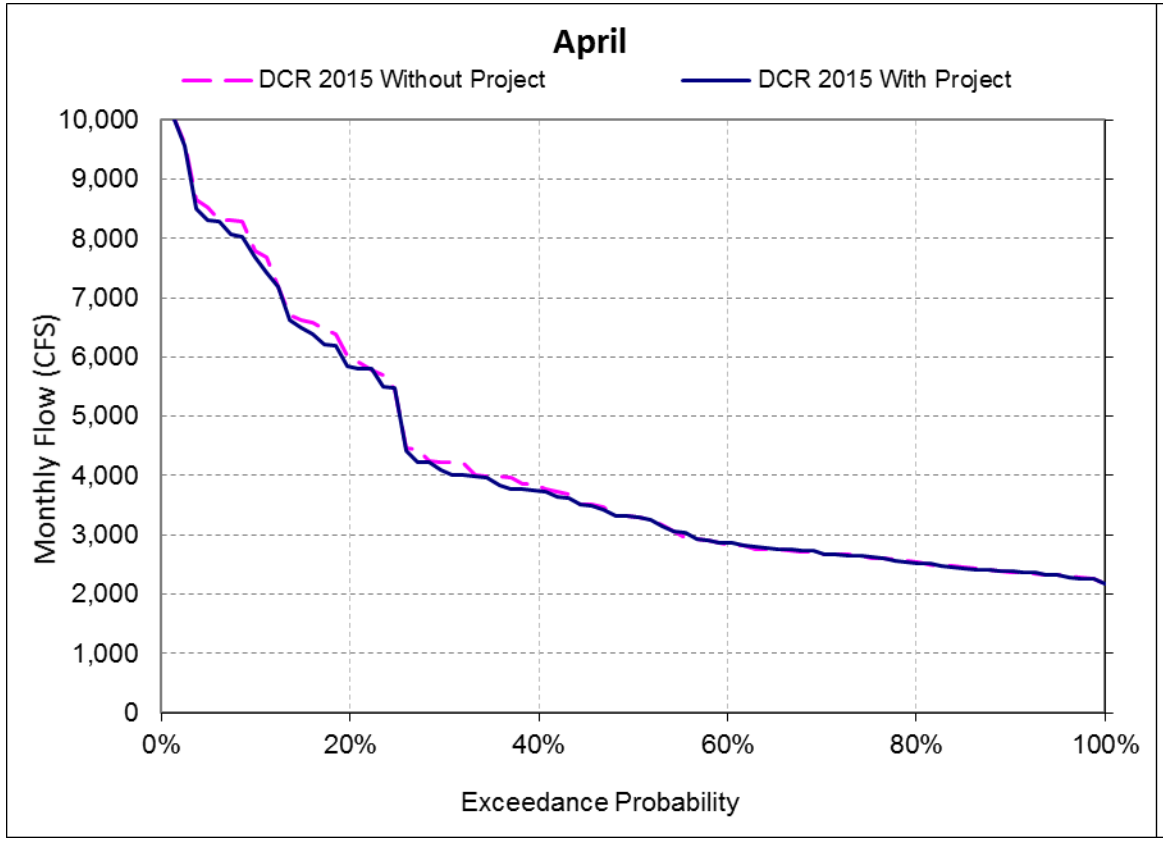
DSM2 Results – DCC Flow – Dec-Jan

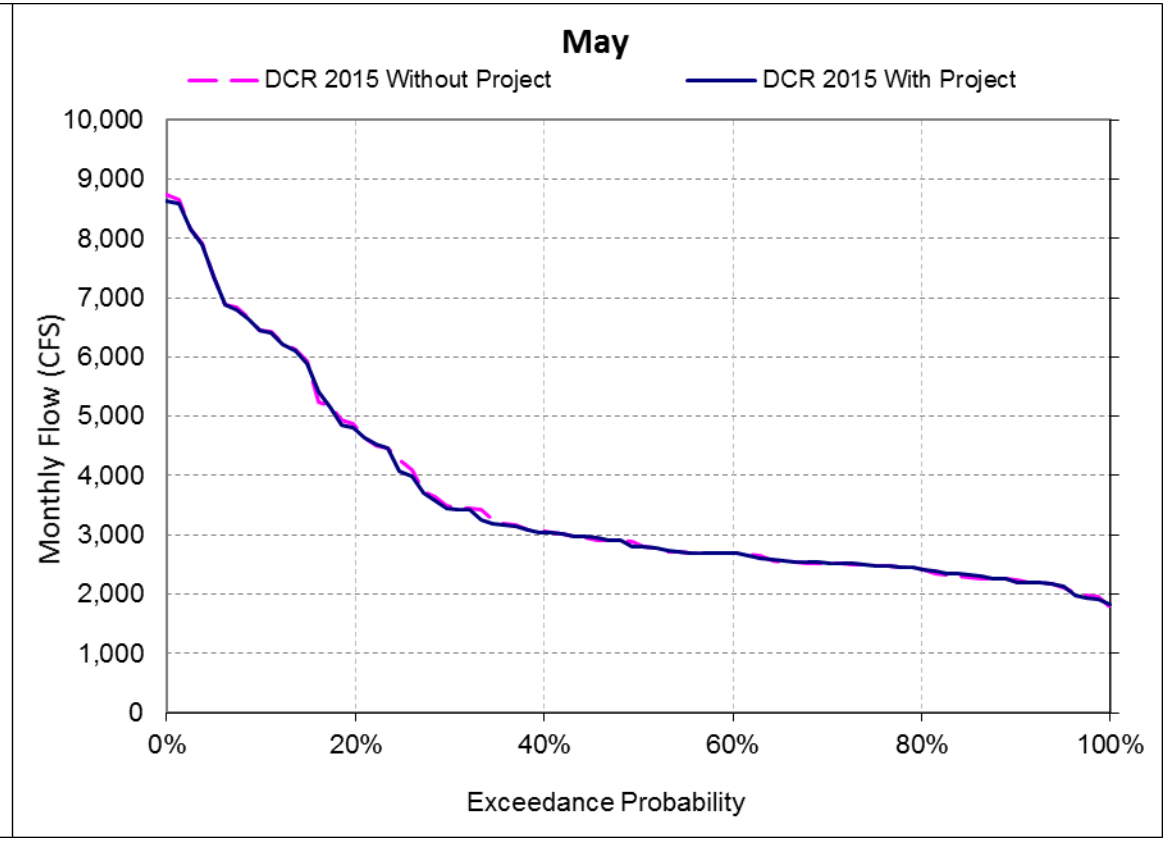


DSM2 Results – DCC Flow – Feb-Mar

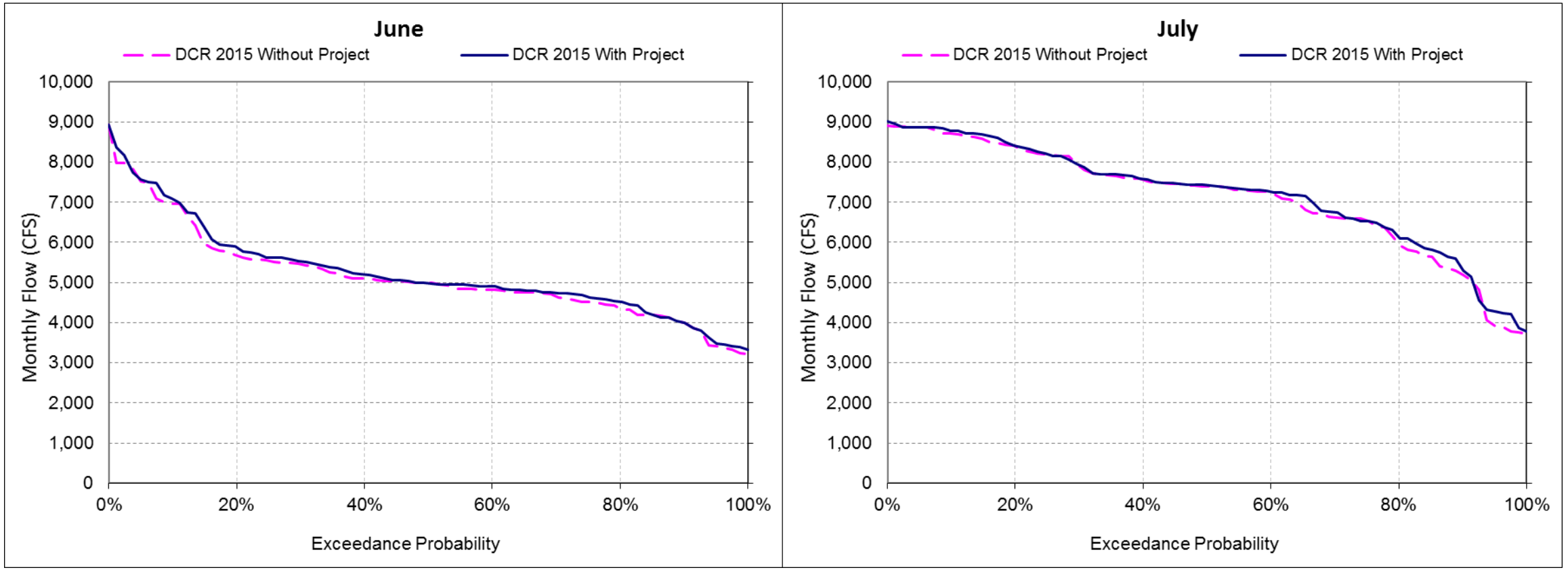


DSM2 Results – DCC Flow – Apr-May

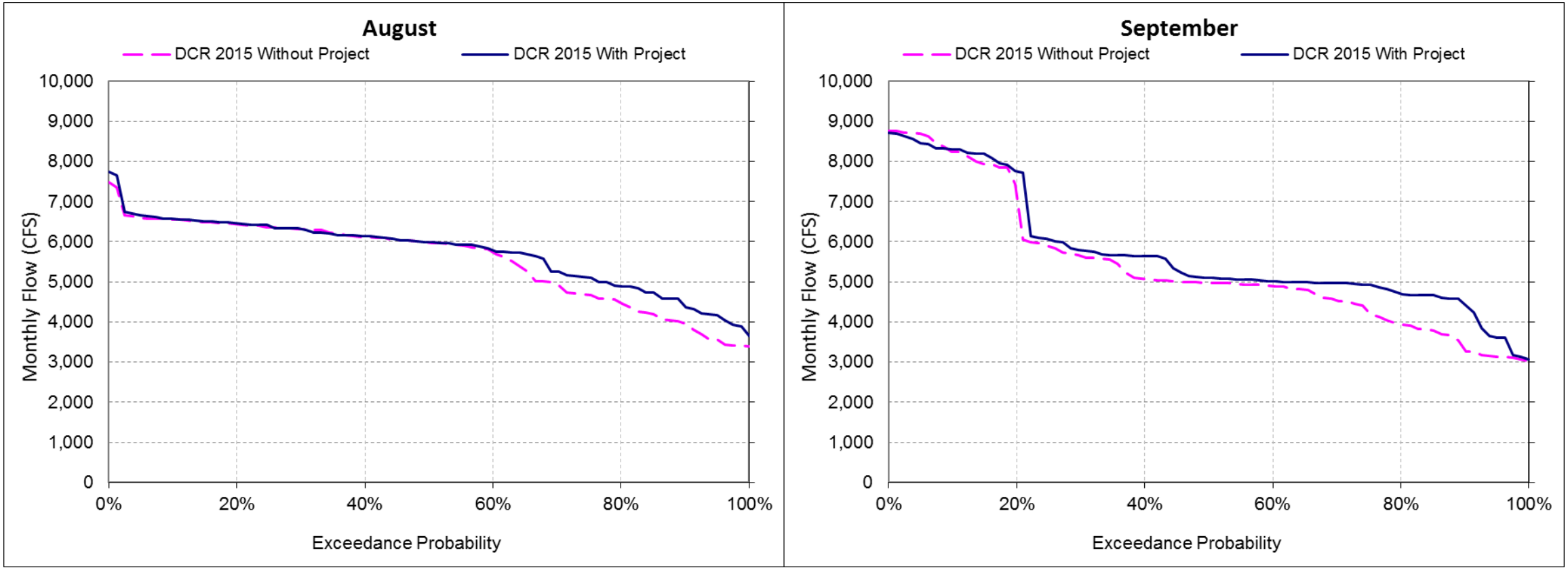




DSM2 Results – DCC Flow – Jun-Jul



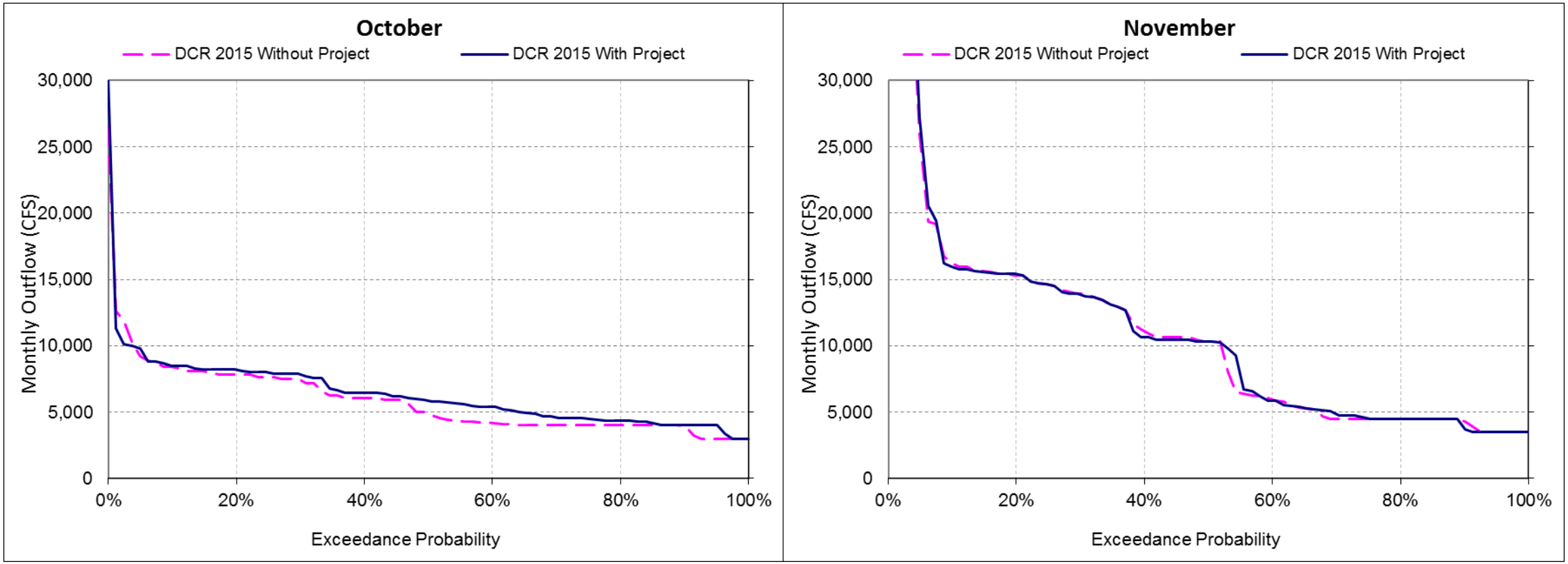
DSM2 Results – DCC Flow – Aug-Sep



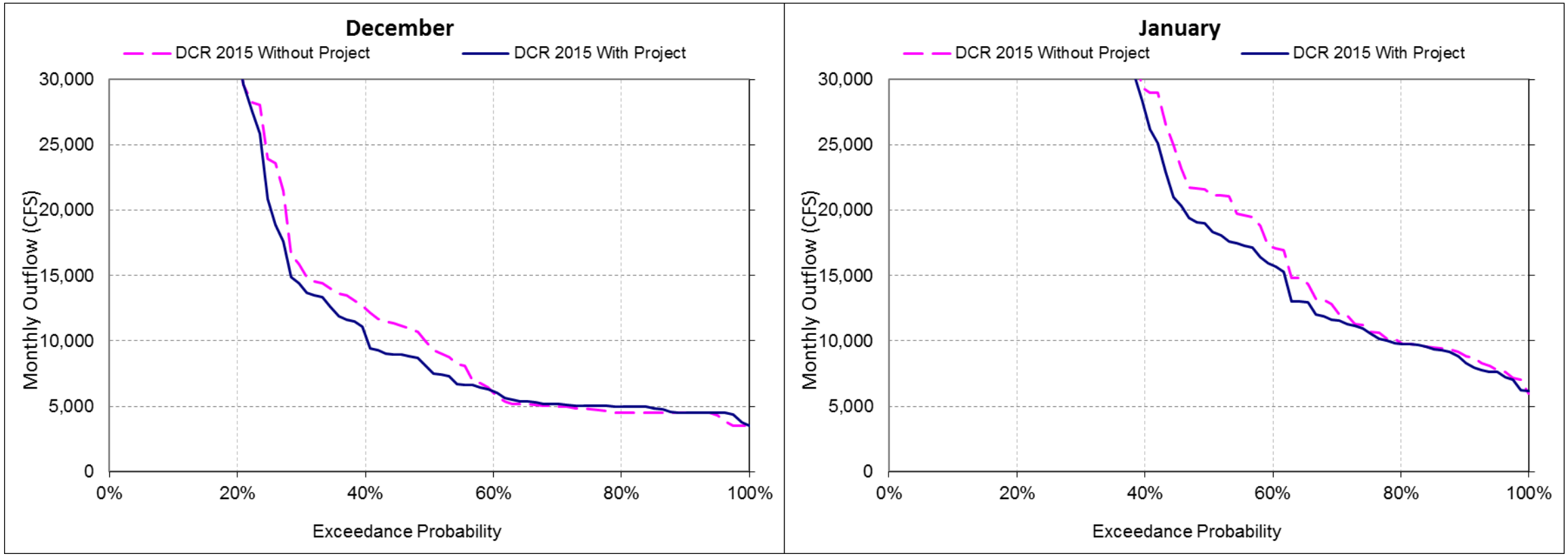
DSM2 Results – Delta Outflow

Long-term Average and Average by Water Year Type												
Analysis Period	Monthly Outflow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-term												
Full Simulation Period[1]												
DCR 2015 Without Project	5,942	11,480	20,871	41,889	52,430	42,330	30,953	21,902	12,373	7,887	4,343	9,712
DCR 2015 With Project	6,446	11,581	20,055	40,312	51,190	40,594	30,492	21,779	12,611	7,915	4,489	10,064
Difference	503	101	-816	-1,577	-1,240	-1,736	-461	-123	237	29	146	351
Percent Difference[3]	8.5%	0.9%	-3.9%	-3.8%	-2.4%	-4.1%	-1.5%	-0.6%	1.9%	0.4%	3.4%	3.6%

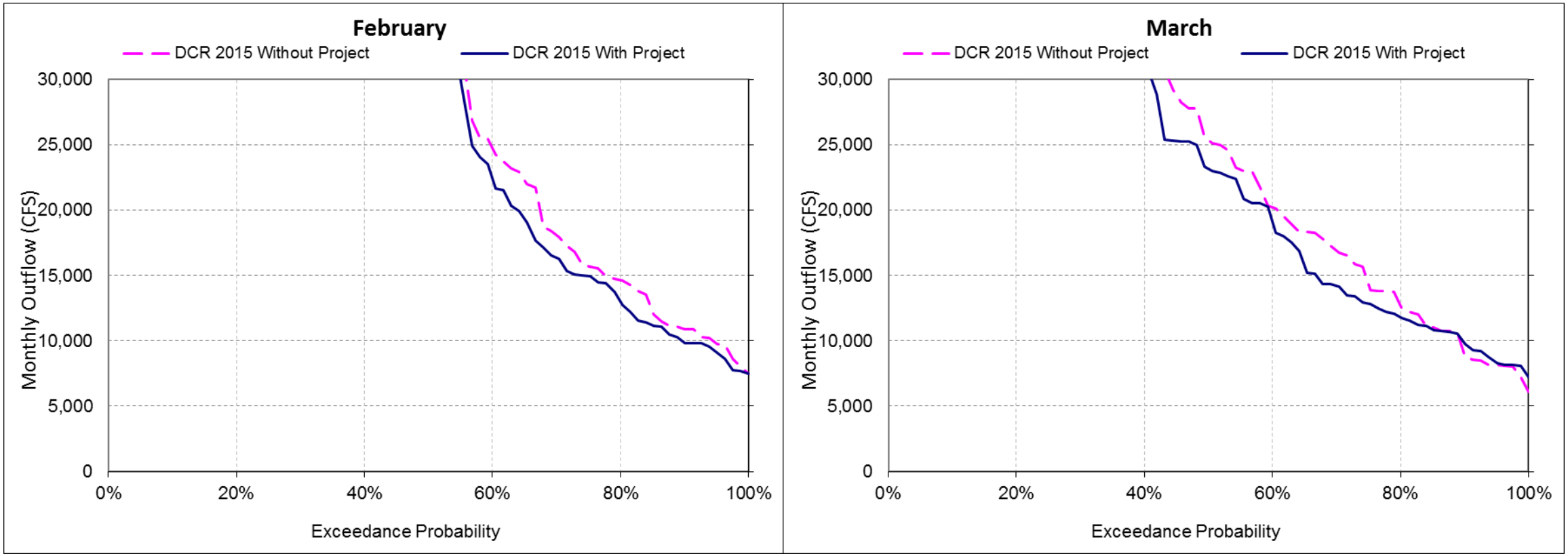
DSM2 Results – Delta Outflow – Oct-Nov



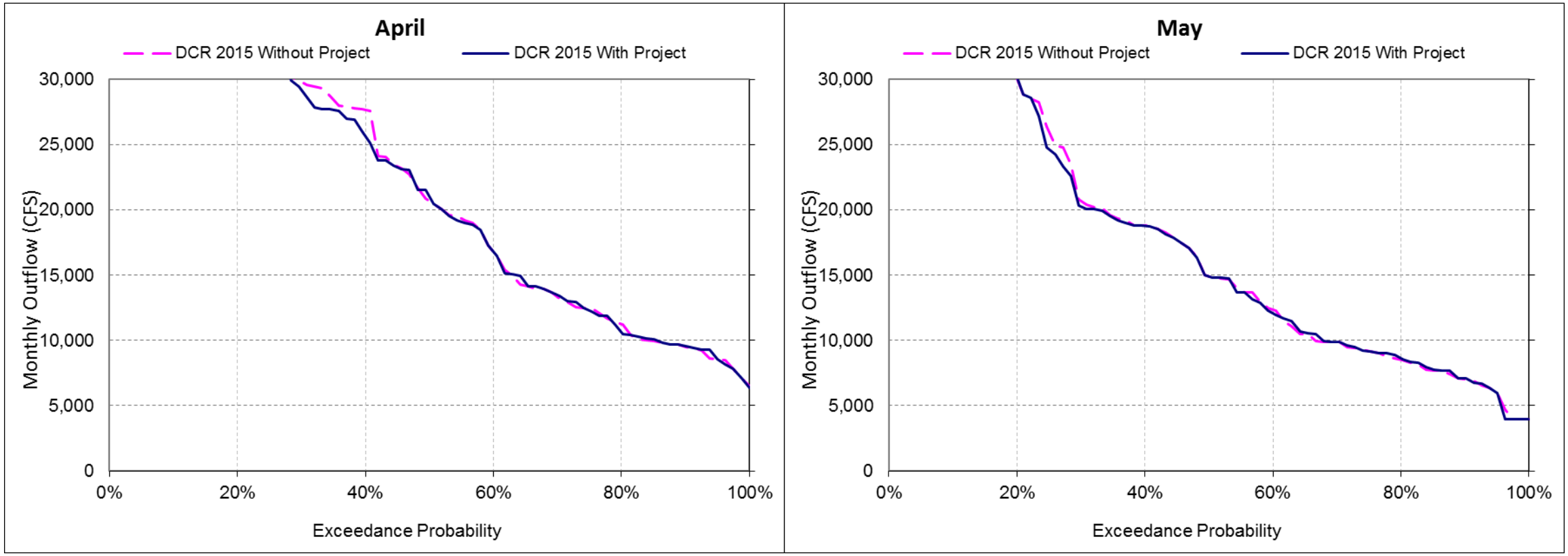
DSM2 Results – Delta Outflow – Dec-Jan



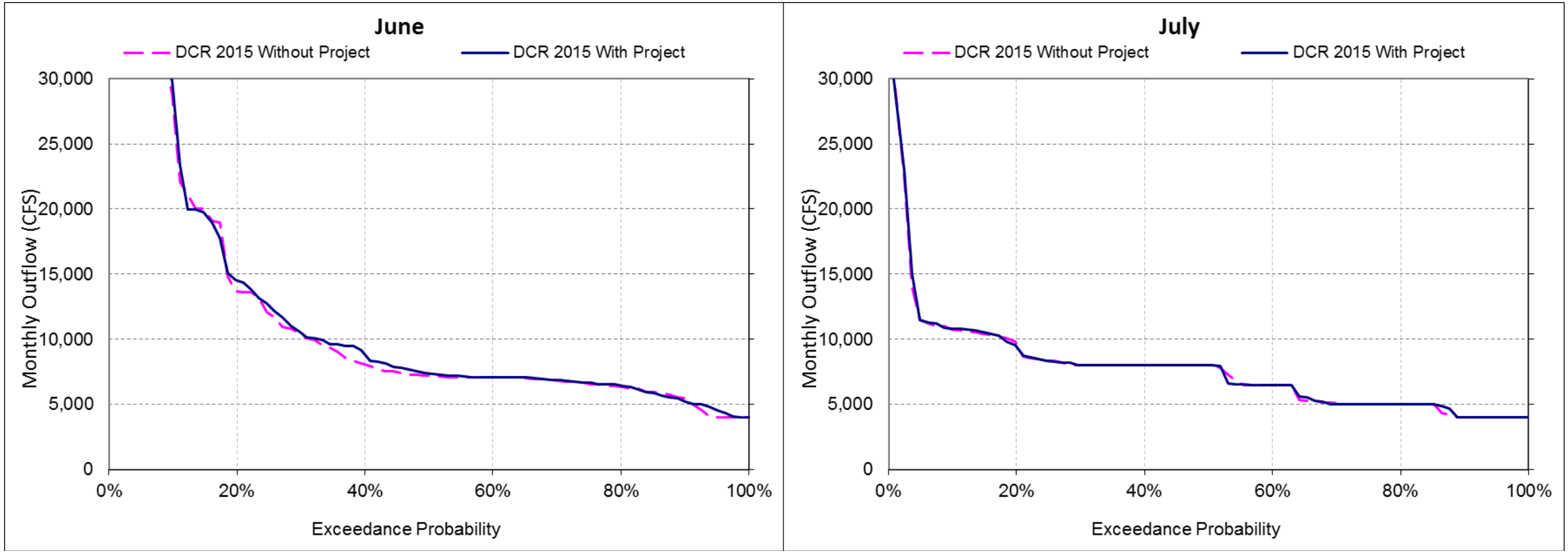
DSM2 Results – Delta Outflow – Feb-Mar



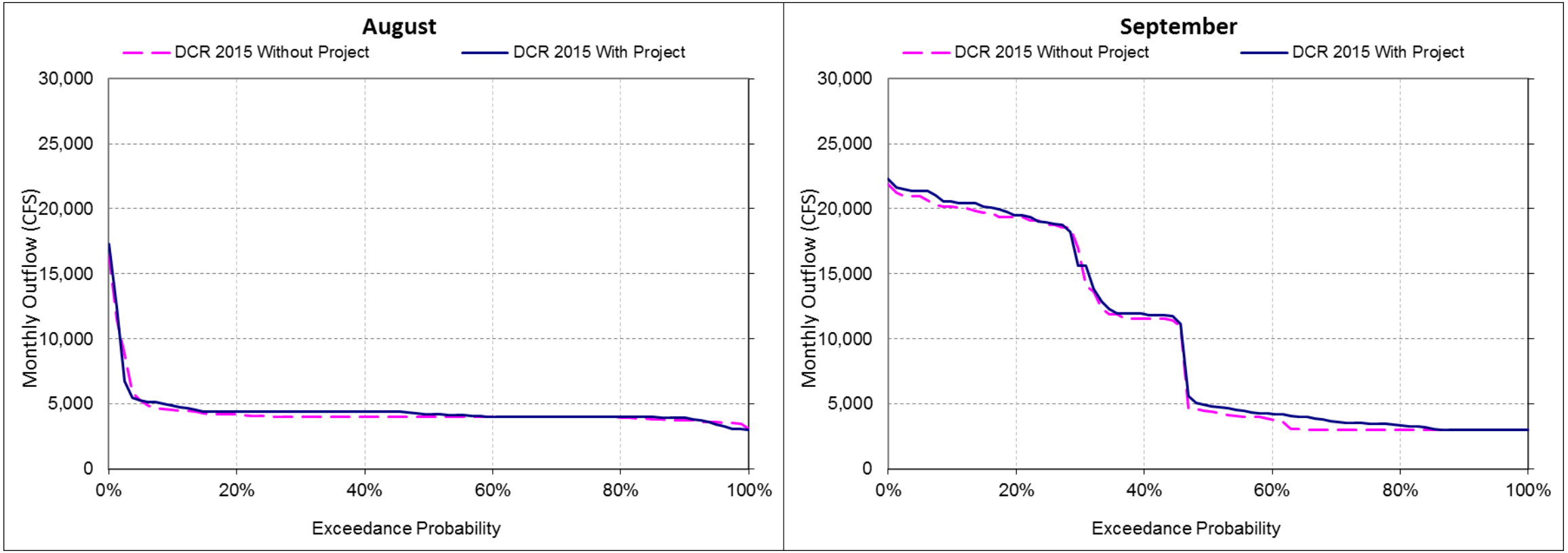
DSM2 Results – Delta Outflow – Apr-May



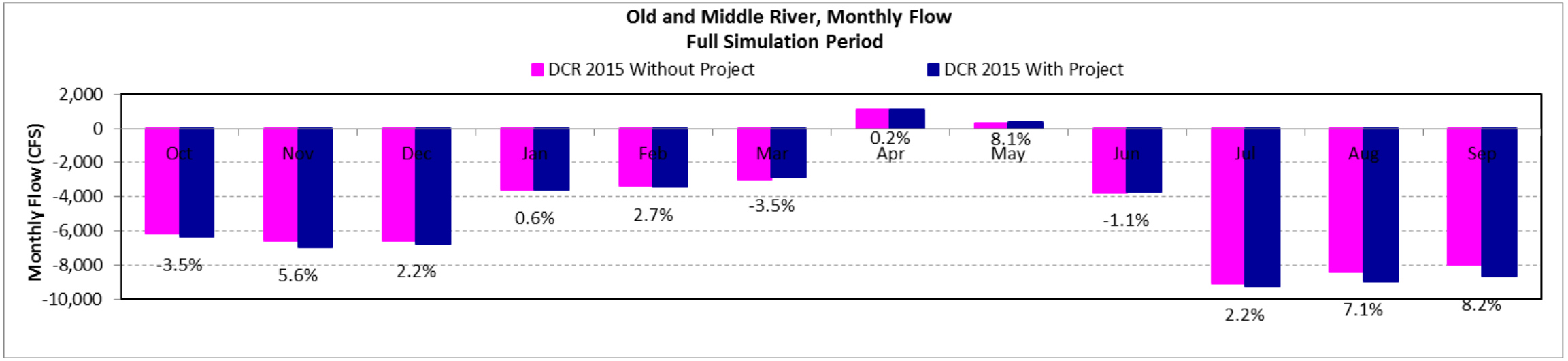
DSM2 Results – Delta Outflow – Jun-Jul



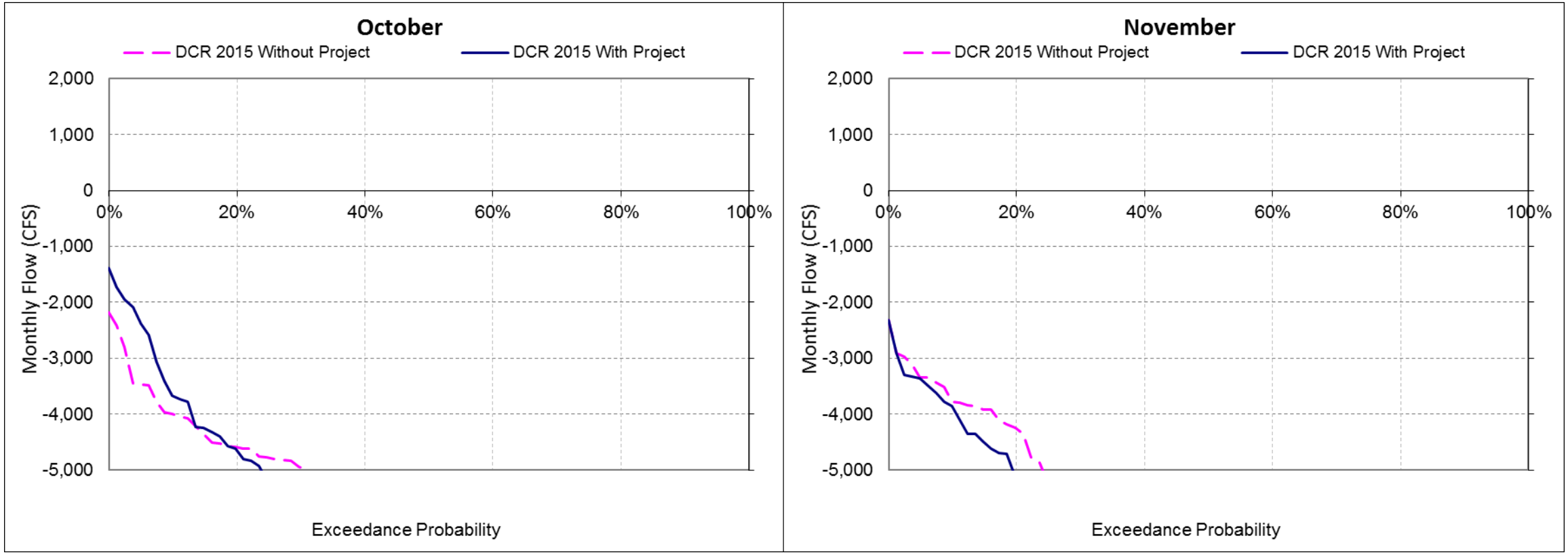
DSM2 Results – Delta Outflow – Aug-Sep



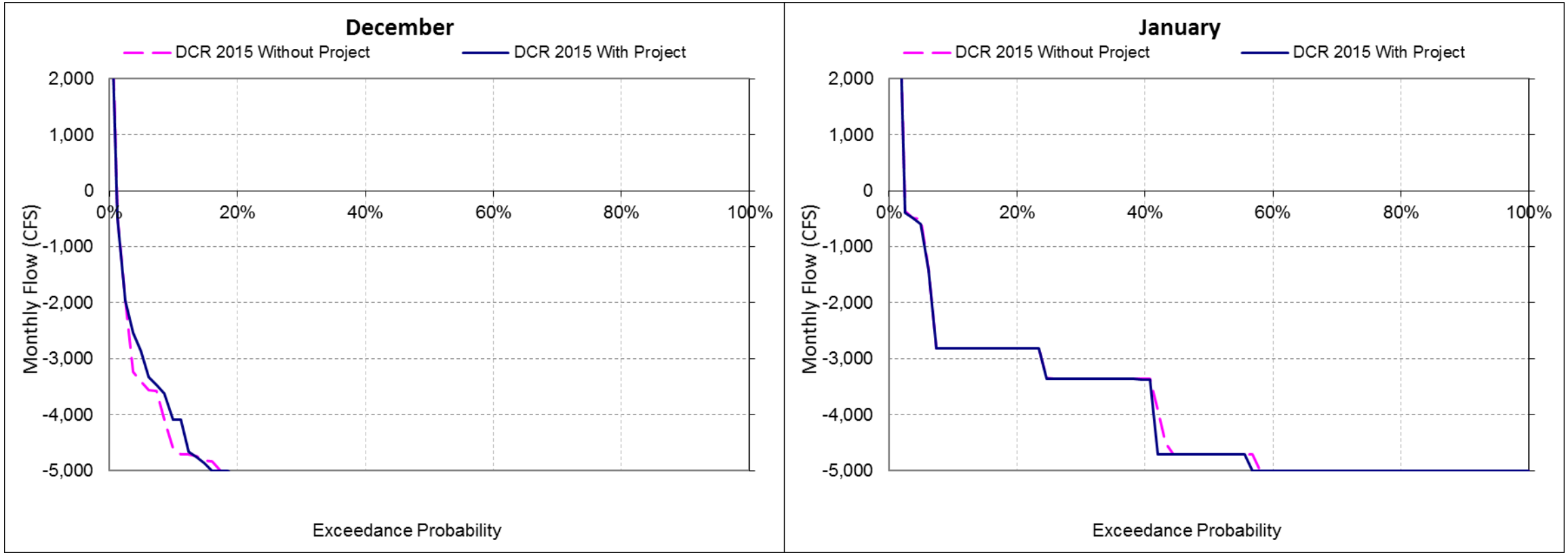
DSM2 Results – OMR



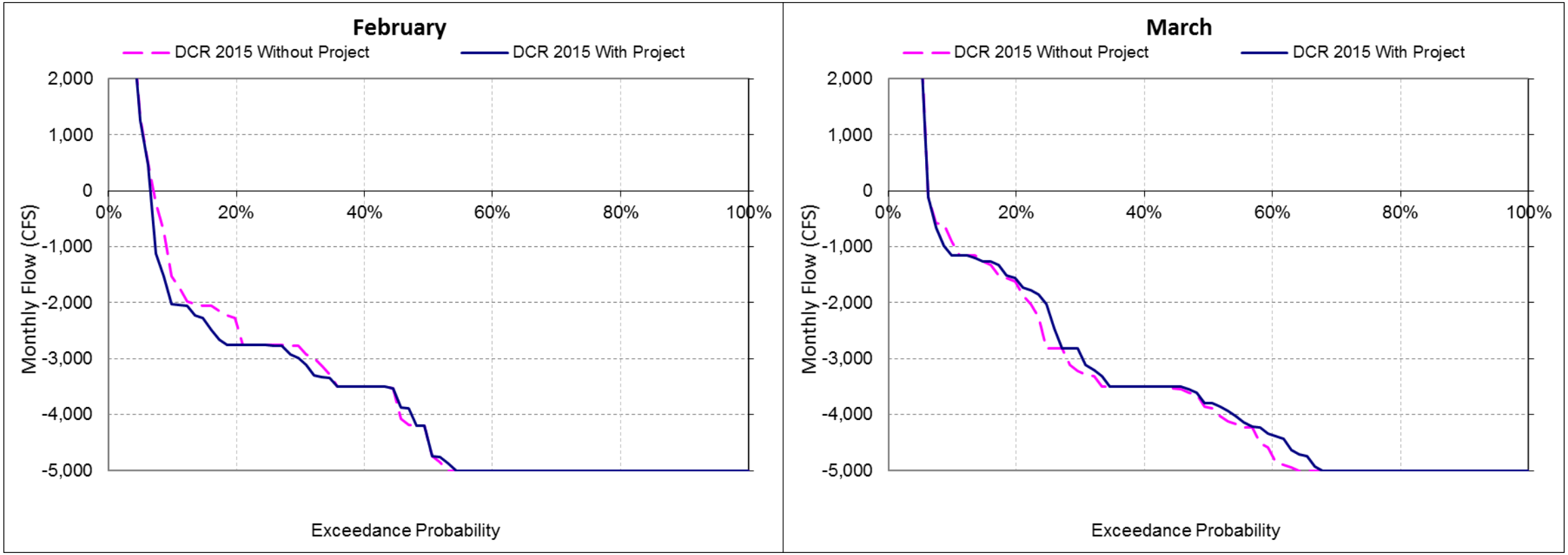
DSM2 Results – OMR – Oct-Nov



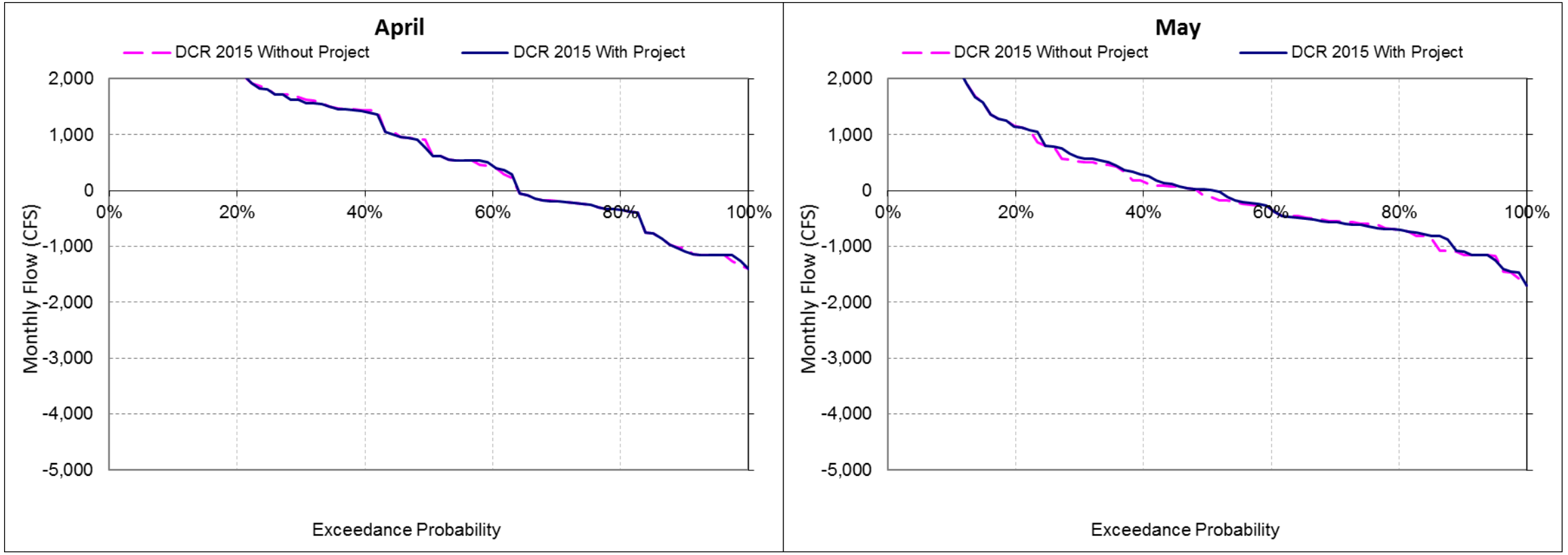
DSM2 Results – OMR – Dec-Jan



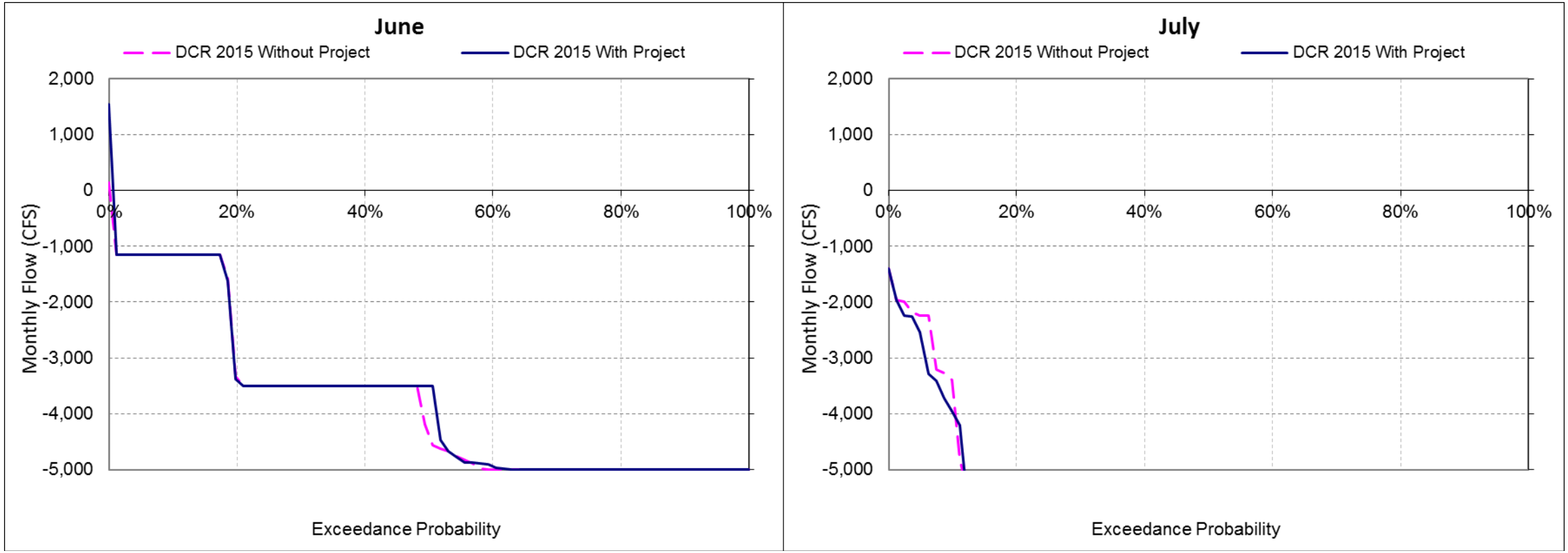
DSM2 Results – OMR – Feb-Mar



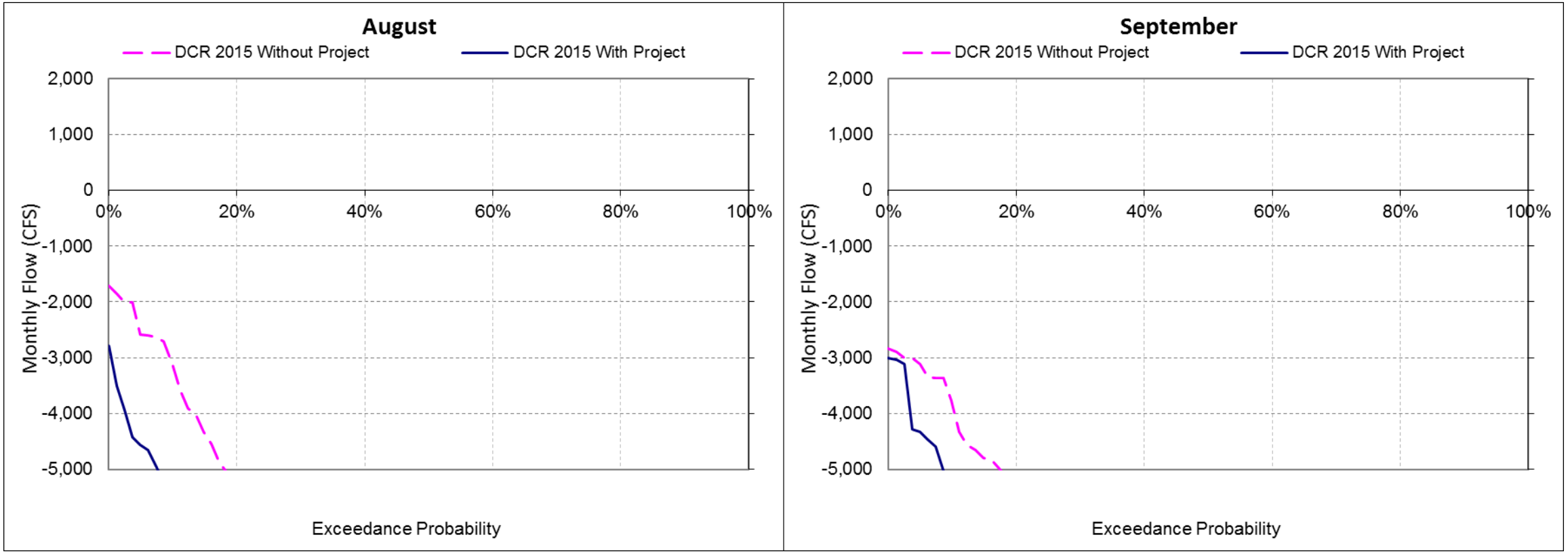
DSM2 Results – OMR – Apr-May



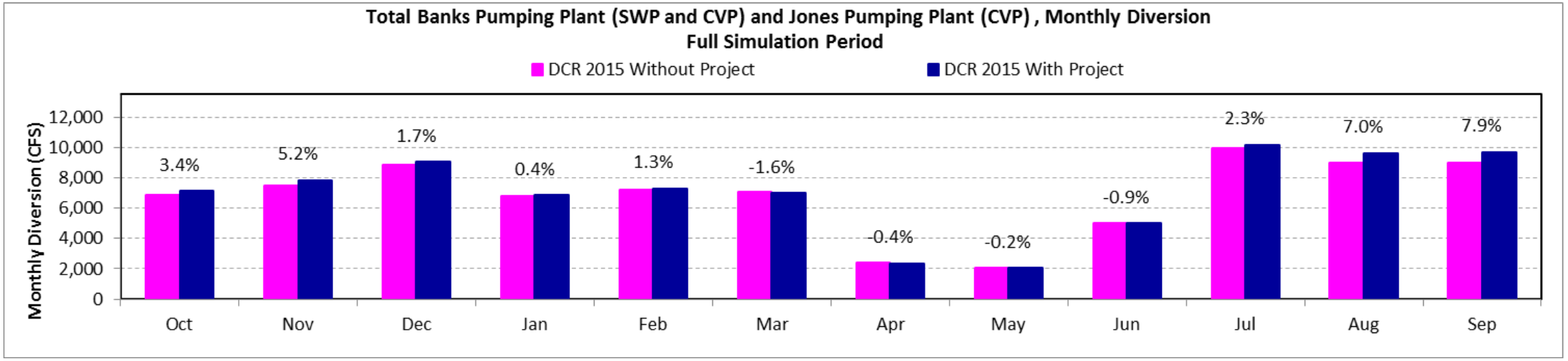
DSM2 Results – OMR – Jun-Jul



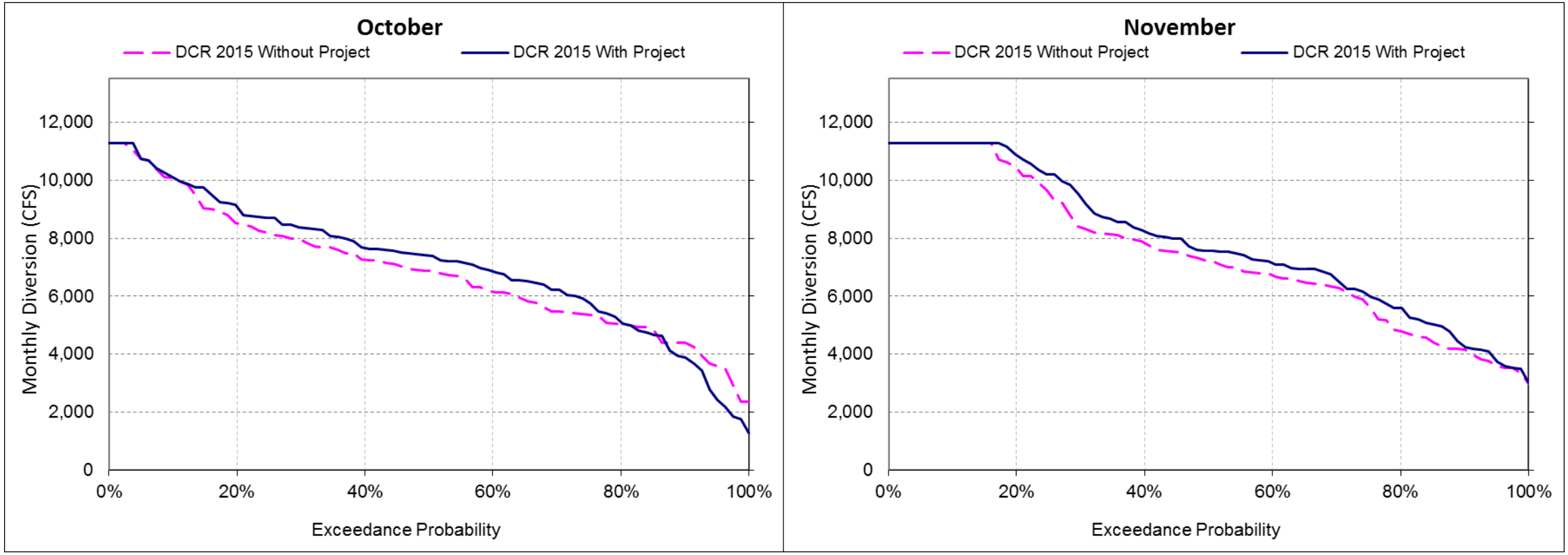
DSM2 Results – OMR – Aug-Sep



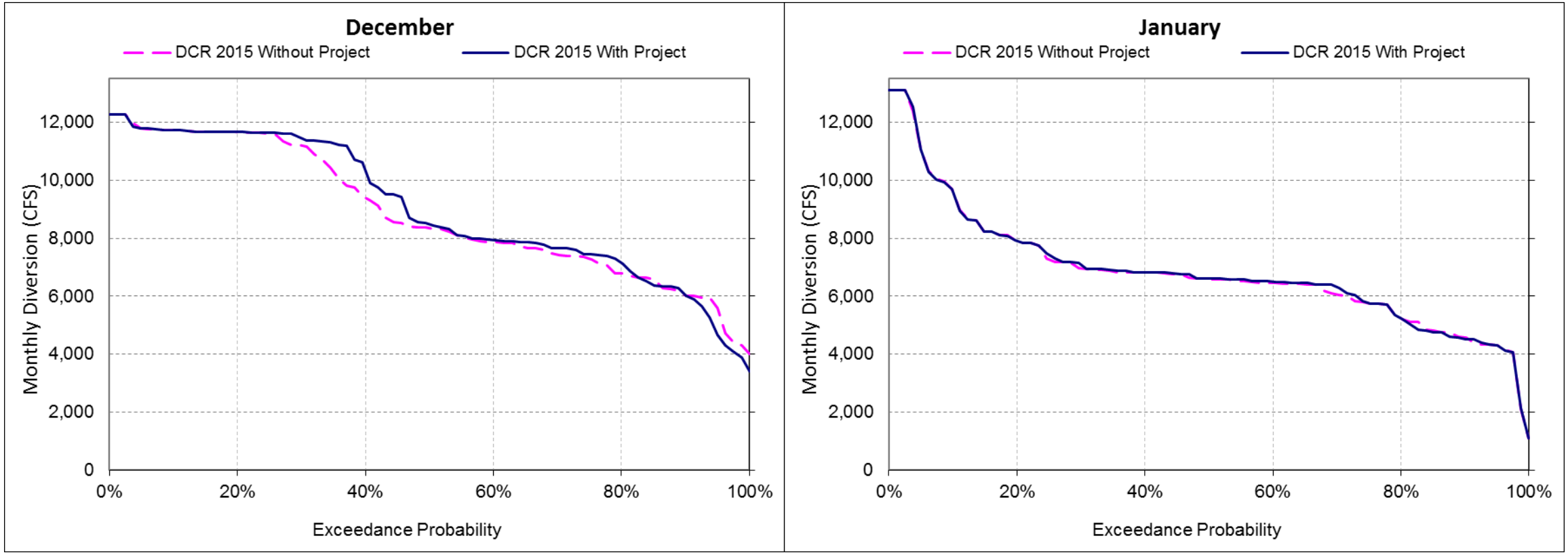
DSM2 Results – Total Exports



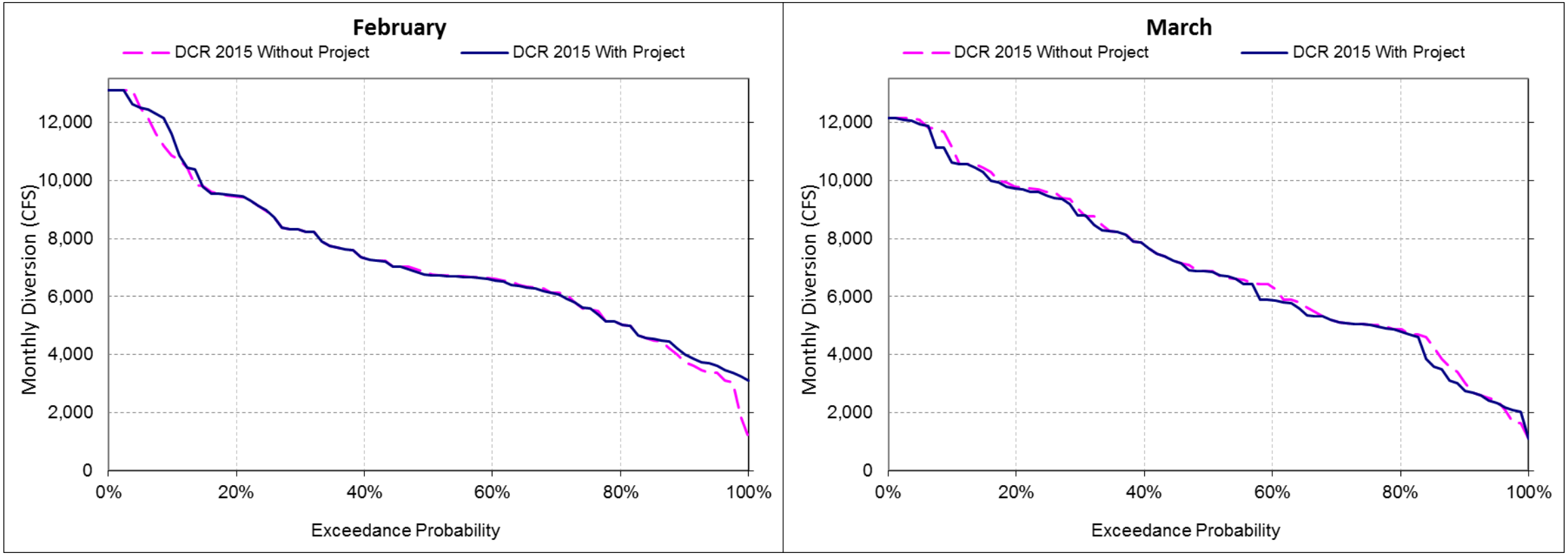
DSM2 Results – Total Exports – Oct-Nov



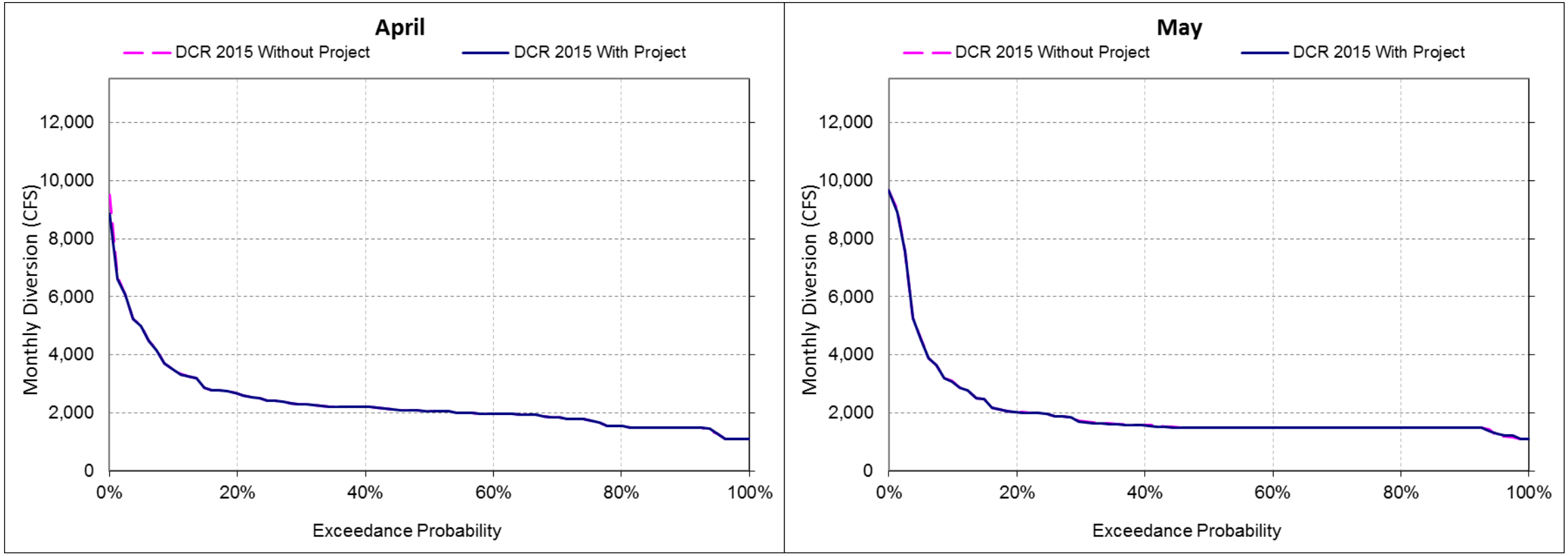
DSM2 Results – Total Exports – Dec-Jan



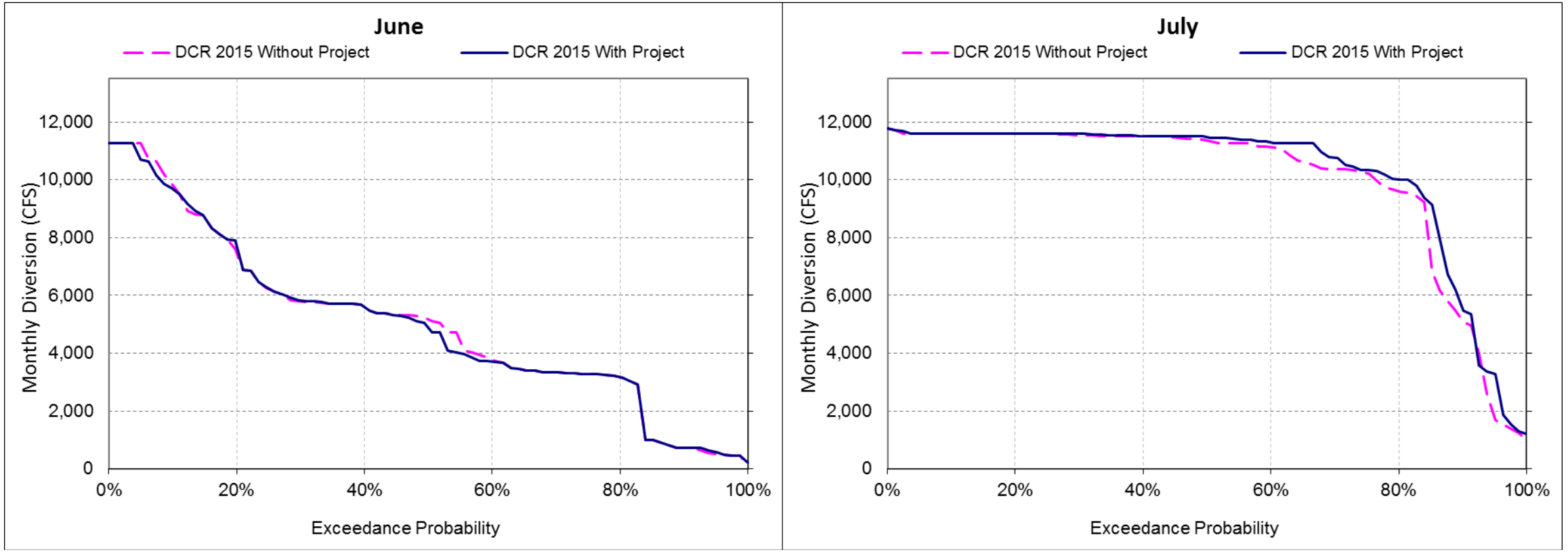
DSM2 Results – Total Exports – Feb-Mar



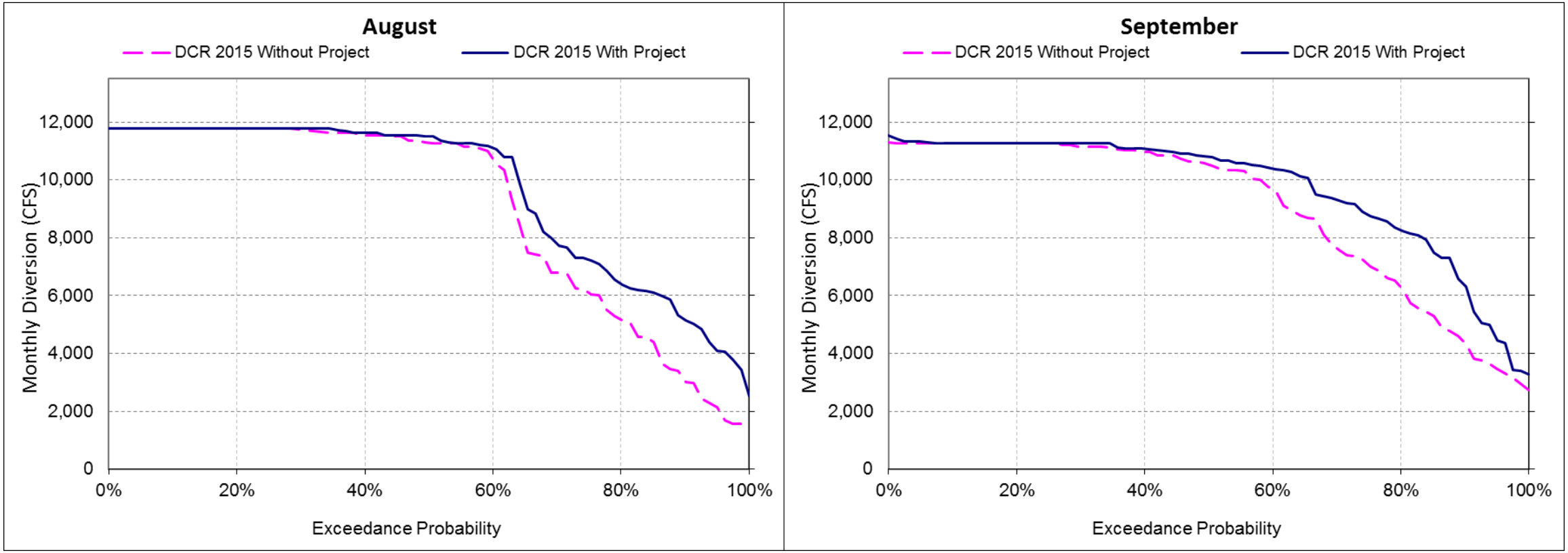
DSM2 Results – Total Exports – Apr-May



DSM2 Results – Total Exports – Jun-Jul



DSM2 Results – Total Exports – Aug-Sep



Tools for Delta Smelt Analysis

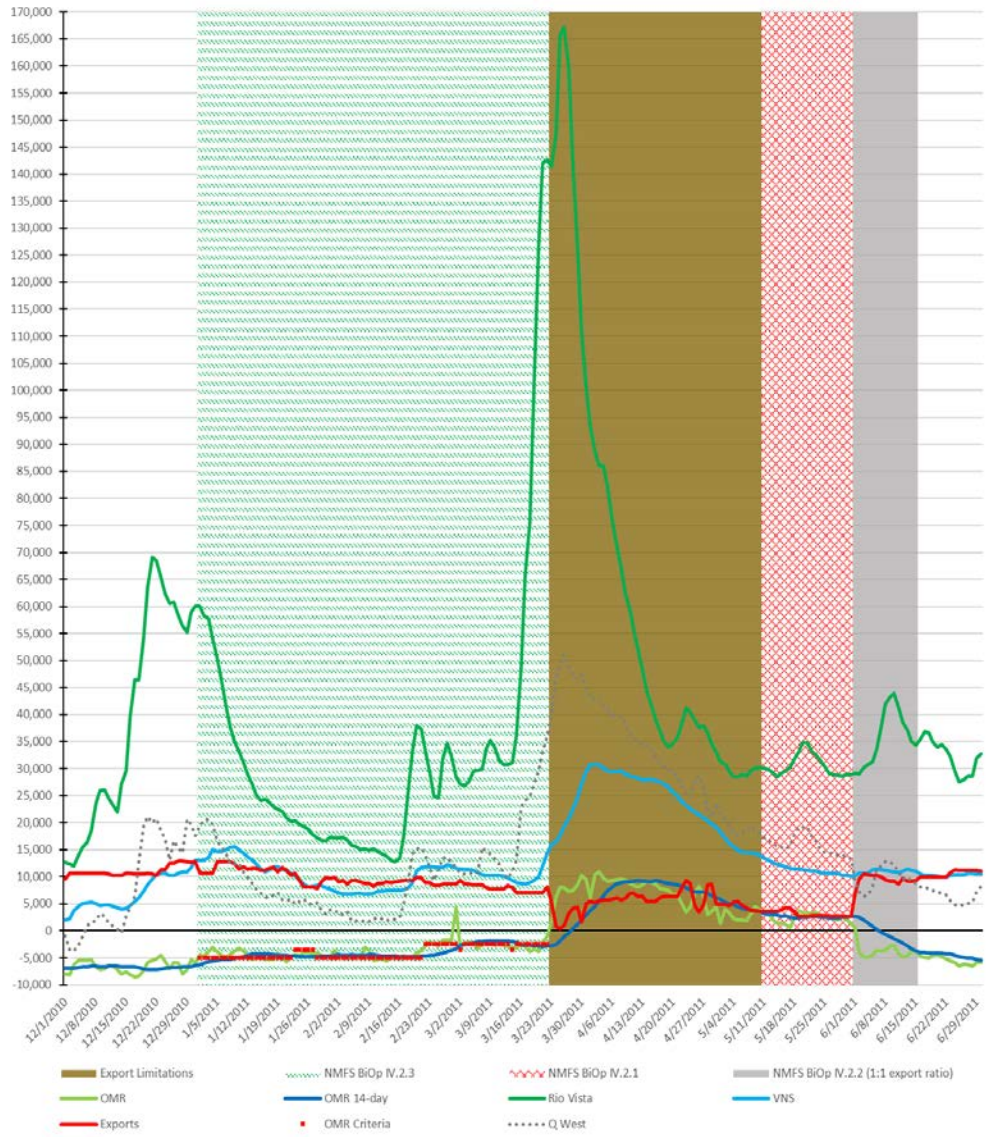
- Low Salinity Zone
- Delta Smelt Habitat Index
- Estimate change in entrainment with DSM2 PTM simulations
  - Implemented in WaterFix EIR/EIS

Review of Delta Operations Report

- Daily availability tool is based on DOSS, SWG, and WOMT
- For the most part, consistent with Daily Availability Tool
  - Slight difference on control factor in some days of some years

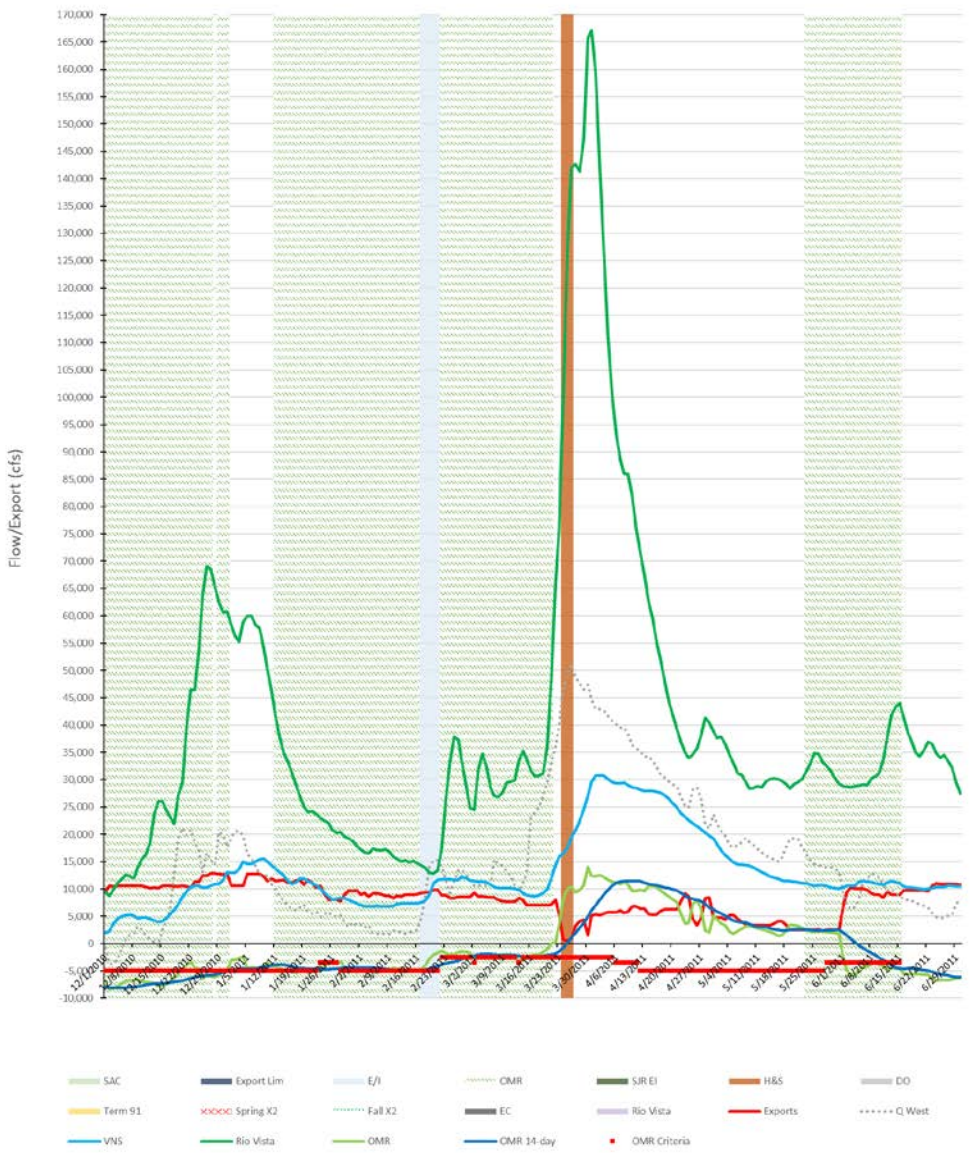
Excess Delta Conditions

2011 SVI:W/SJVI:W

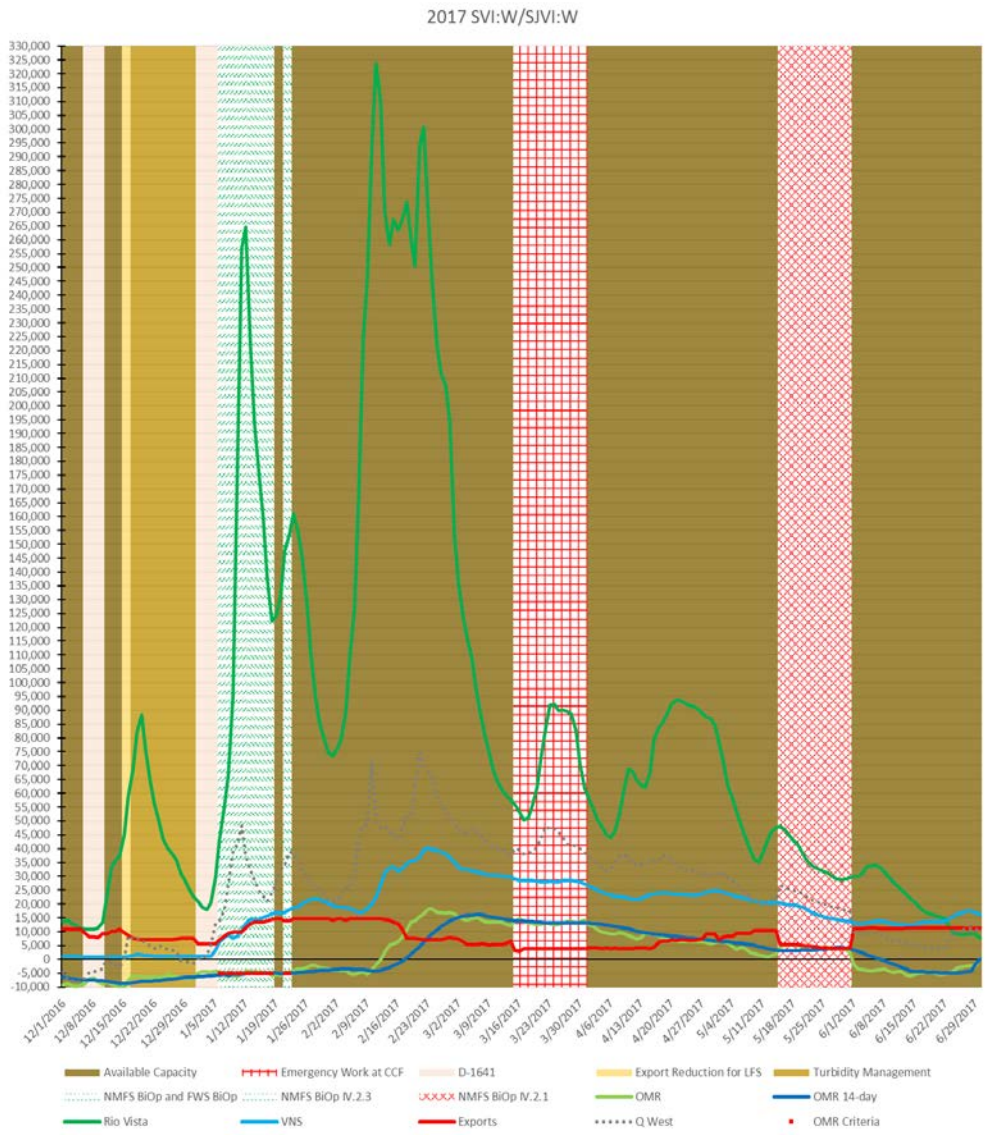


Excess Delta Conditions

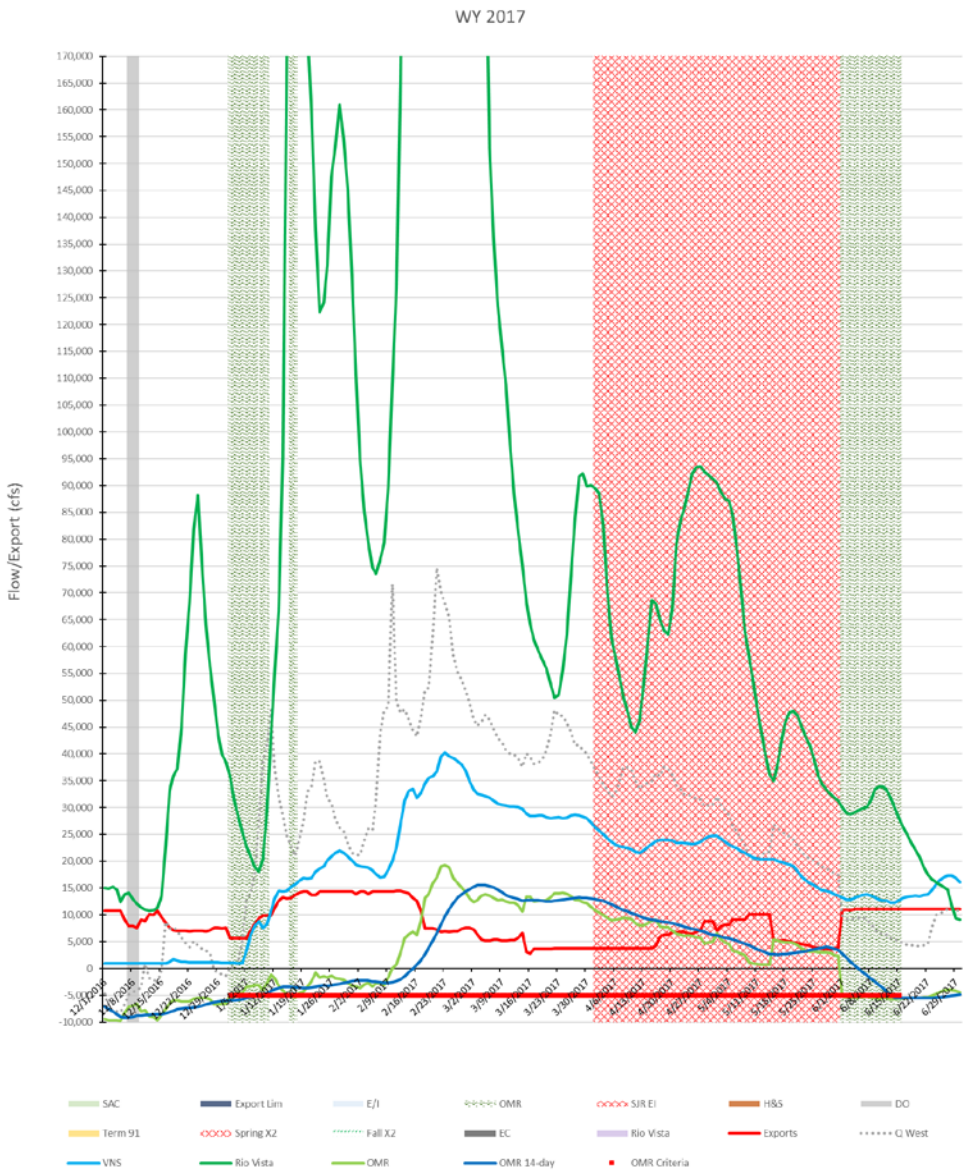
WY 2011



Excess Delta Conditions



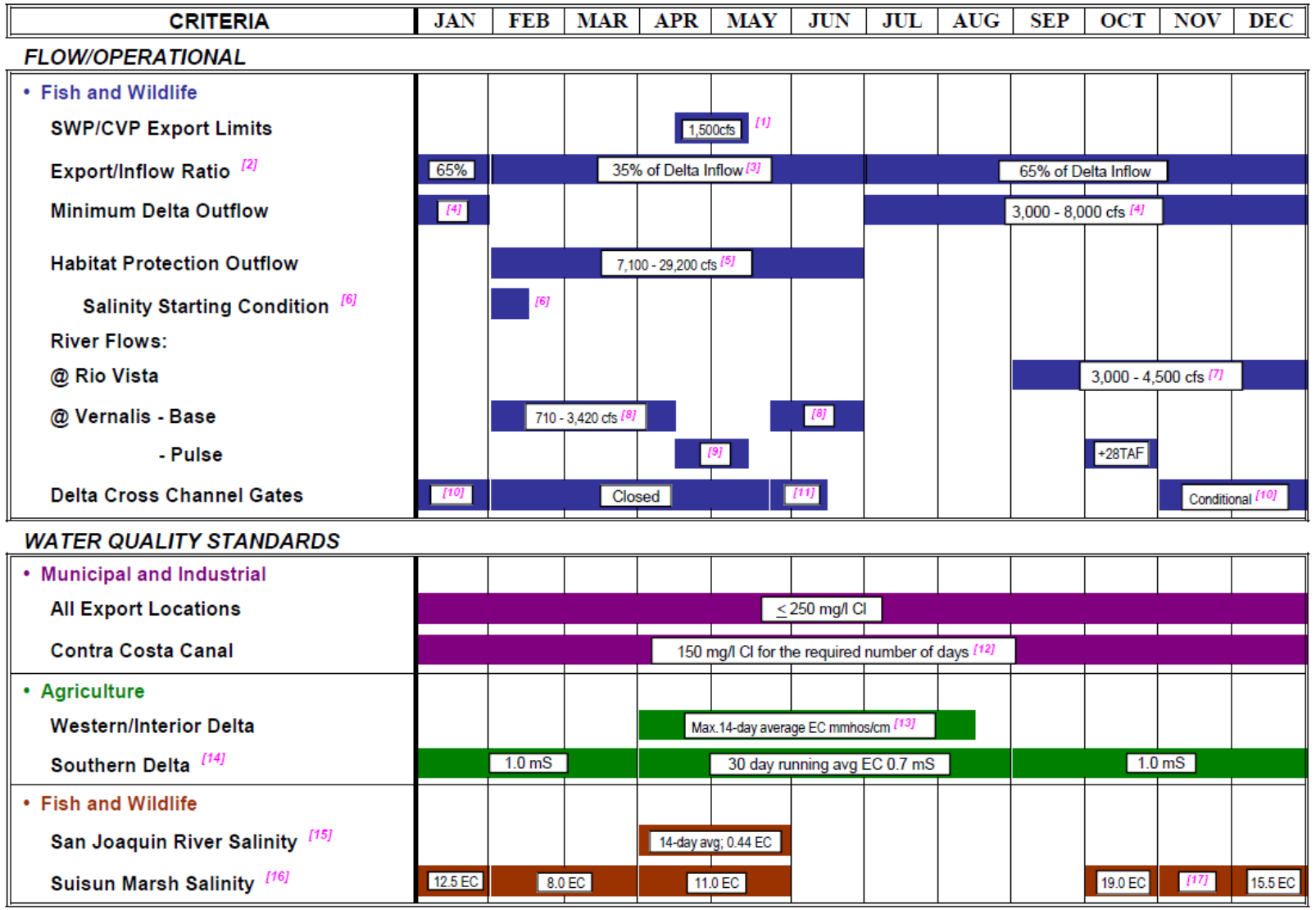
Excess Delta Conditions



Bay-Delta Standards

Contained in D-1641

DRAFT



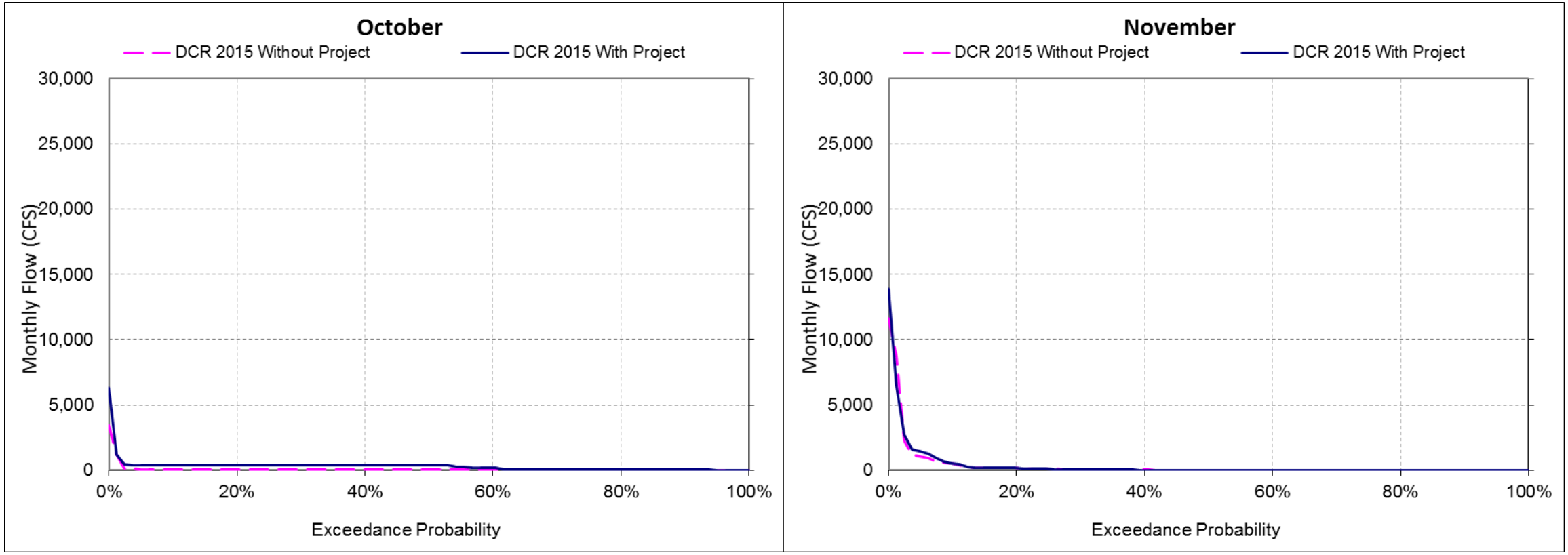
[#] See Footnotes

Operations Compliance and Studies Section

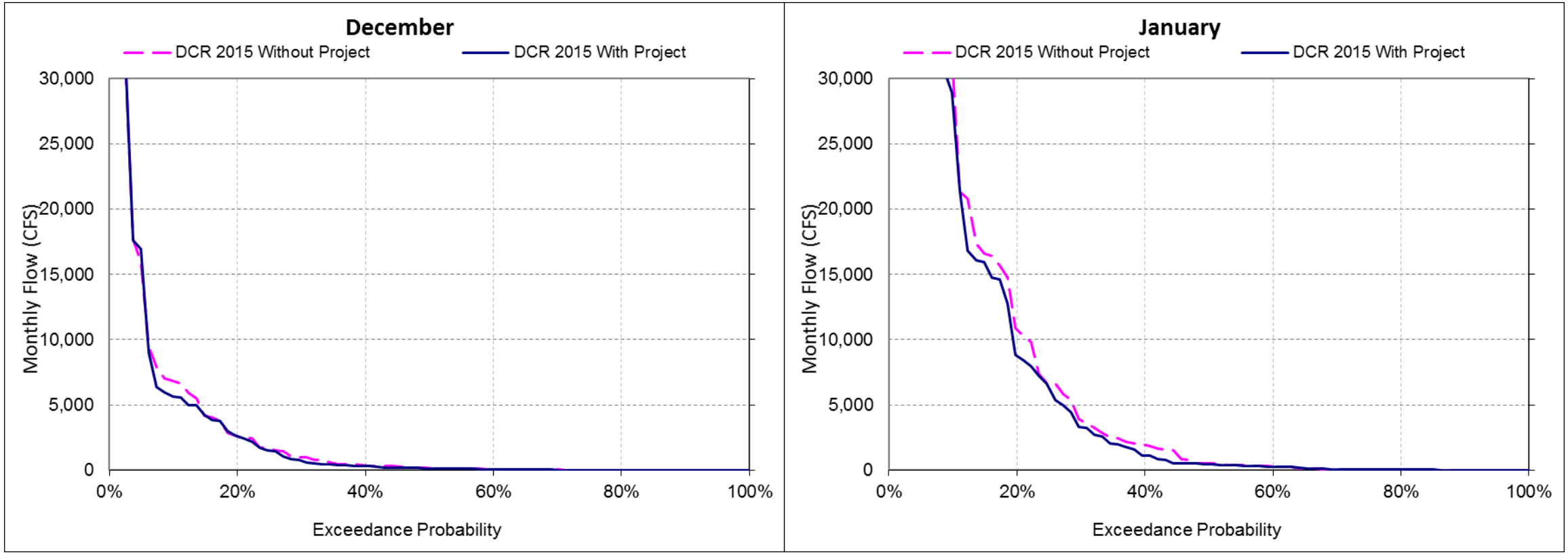
Revised 9/29/00

Preliminary: Subject to Revision

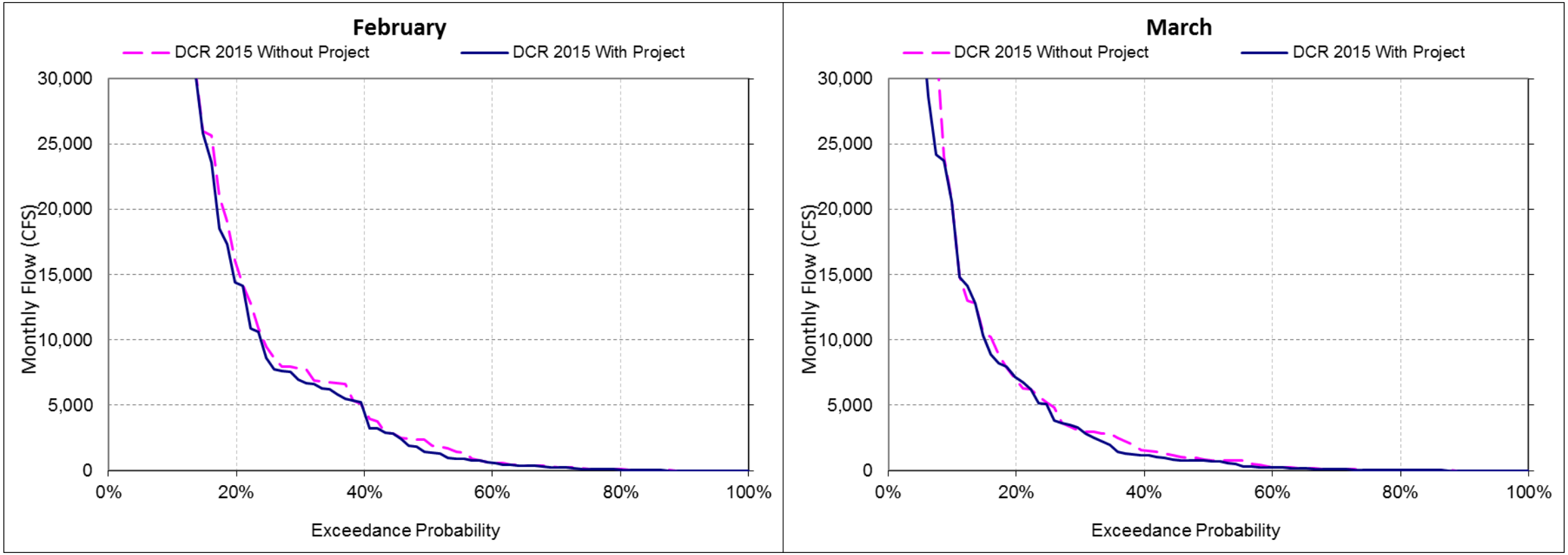
DSM2 Results – Yolo Bypass Flow – Oct-Nov



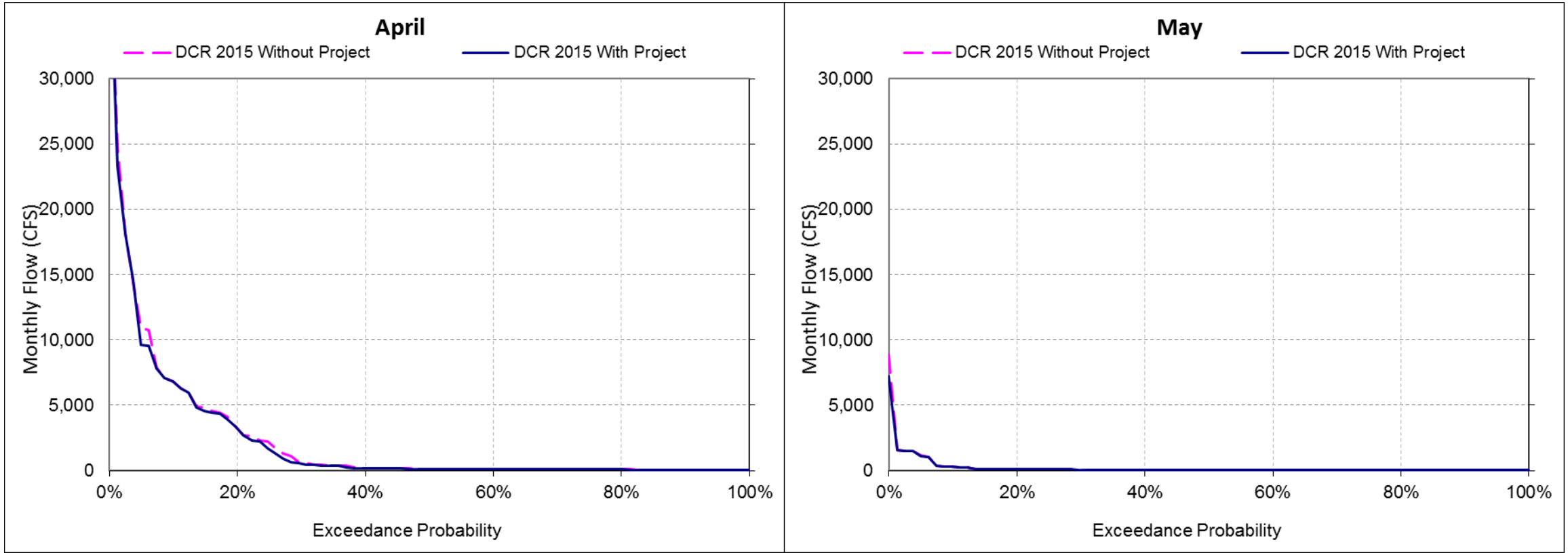
DSM2 Results – Yolo Bypass Flow – Dec-Jan



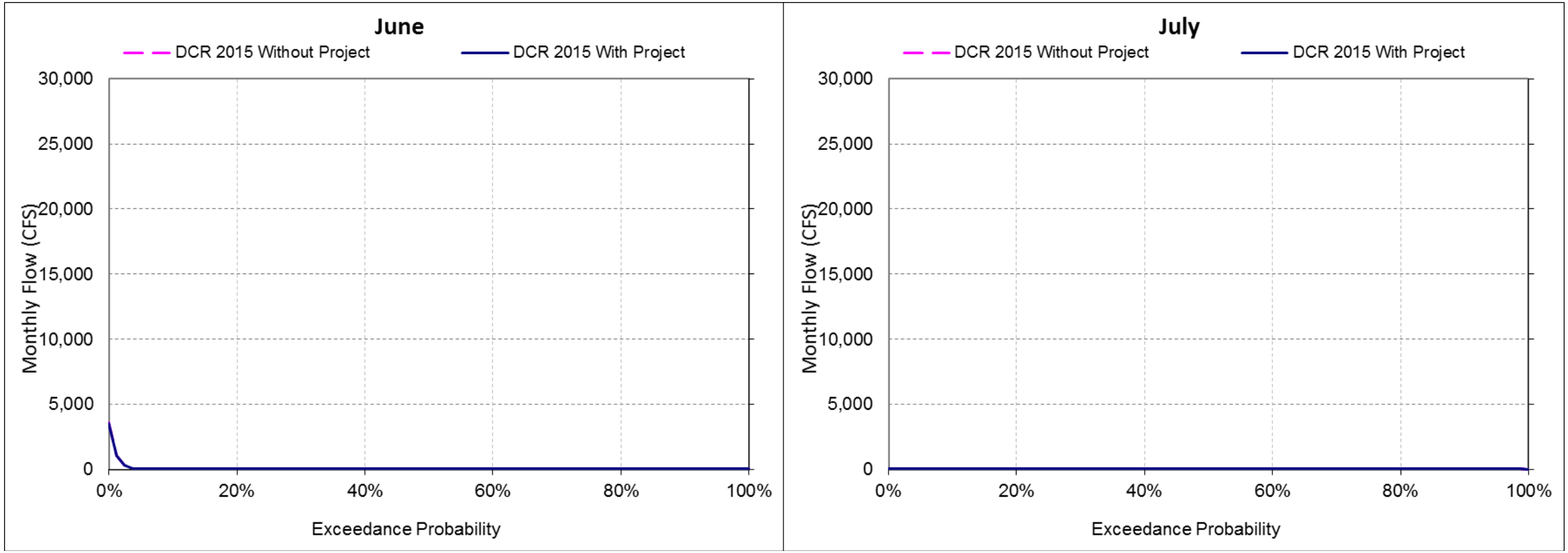
DSM2 Results – Yolo Bypass Flow – Feb-Mar



DSM2 Results – Yolo Bypass Flow – Apr-May



DSM2 Results – Yolo Bypass Flow – Jun-Jul



DSM2 Results – Yolo Bypass Flow – Aug-Sep