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DELTA TUNNELS INDUCED CHANGES IN
GROUNDWATER
RECHARGE AND STORAGE

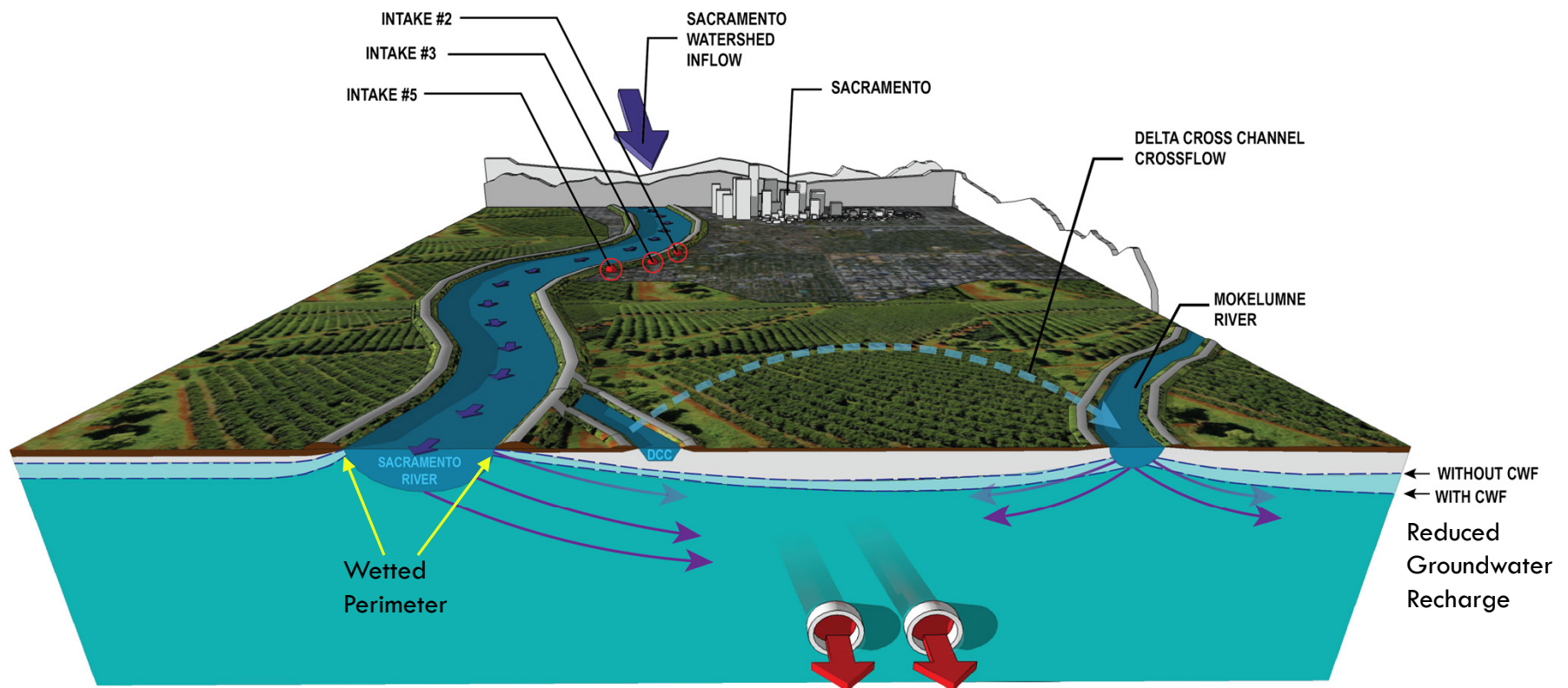
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OVERVIEW OF PRESENTATION

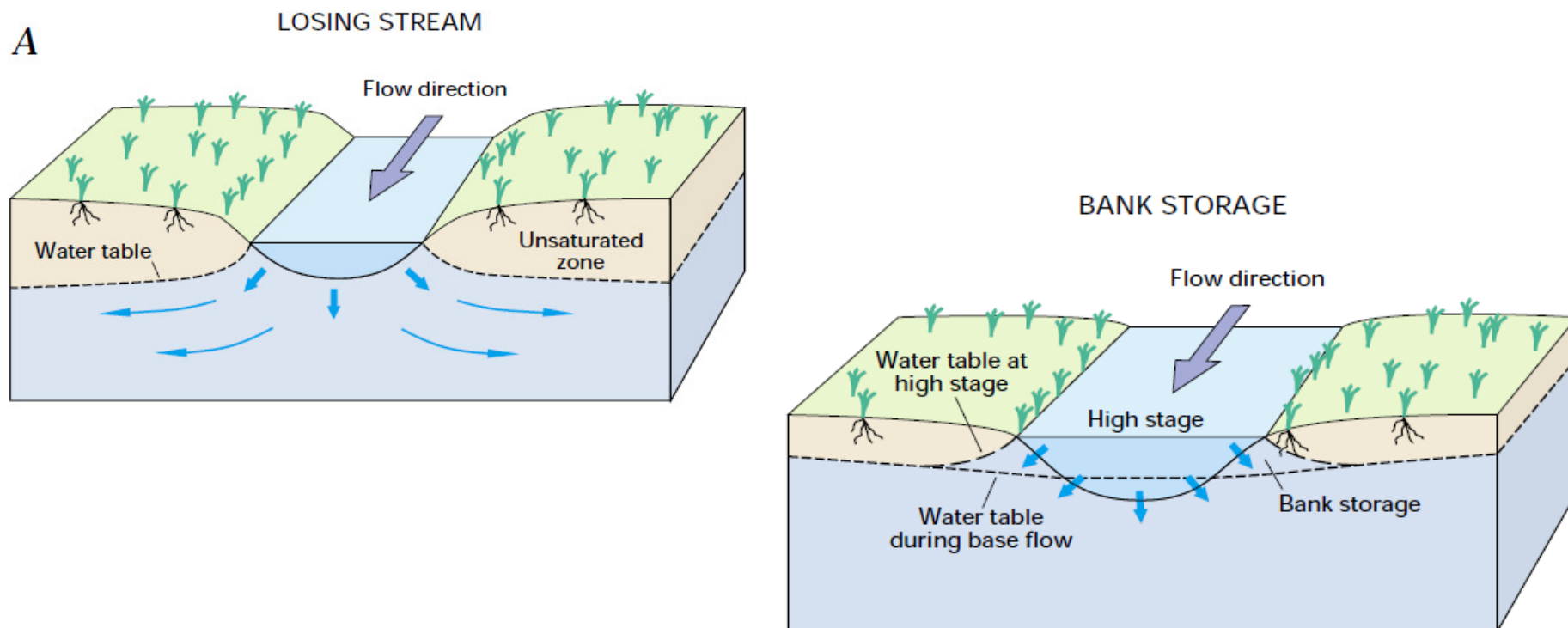
- KEY ELEMENTS OF ANALYSIS
- FINDINGS
- SUPPORTING INFORMATION
- SUMMARY OPINIONS

HYDROLOGIC CONCEPTUAL MODEL OF SURFACE WATER AND GROUNDWATER EXCHANGE



Changes to the Wetted Perimeter are the key mechanism of groundwater depletion

SURFACE WATER RECHARGES GROUNDWATER WHEN HYDRAULIC GRADIENT IS OUTWARD








Taken from USGS Circular 1139

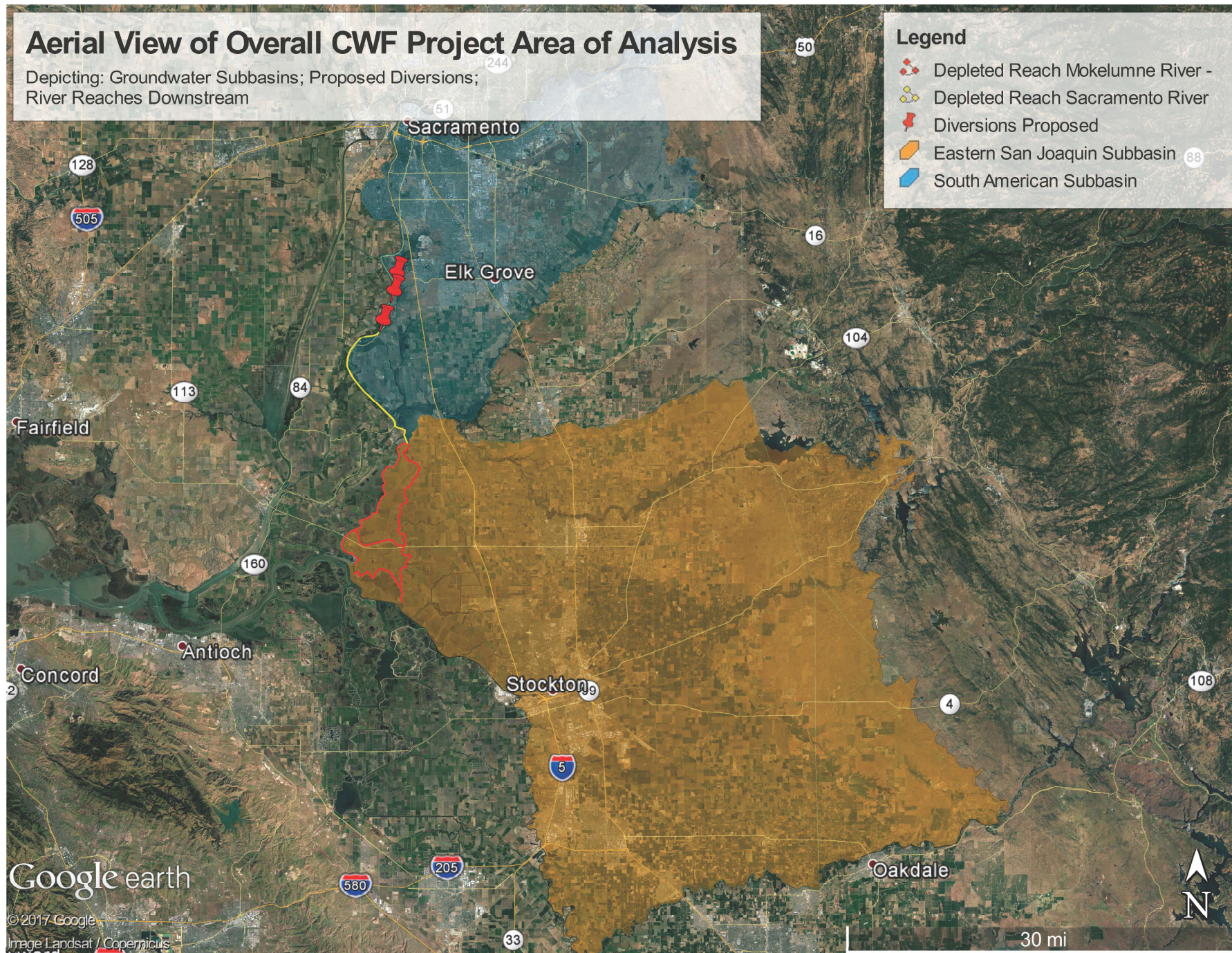
Surface Water and Groundwater- A Single Resource

Aerial View of Overall CWF Project Area of Analysis

Depicting: Groundwater Subbasins; Proposed Diversions; River Reaches Downstream

Legend

-  Depleted Reach Mokelumne River -
-  Depleted Reach Sacramento River
-  Diversions Proposed
-  Eastern San Joaquin Subbasin 88
-  South American Subbasin

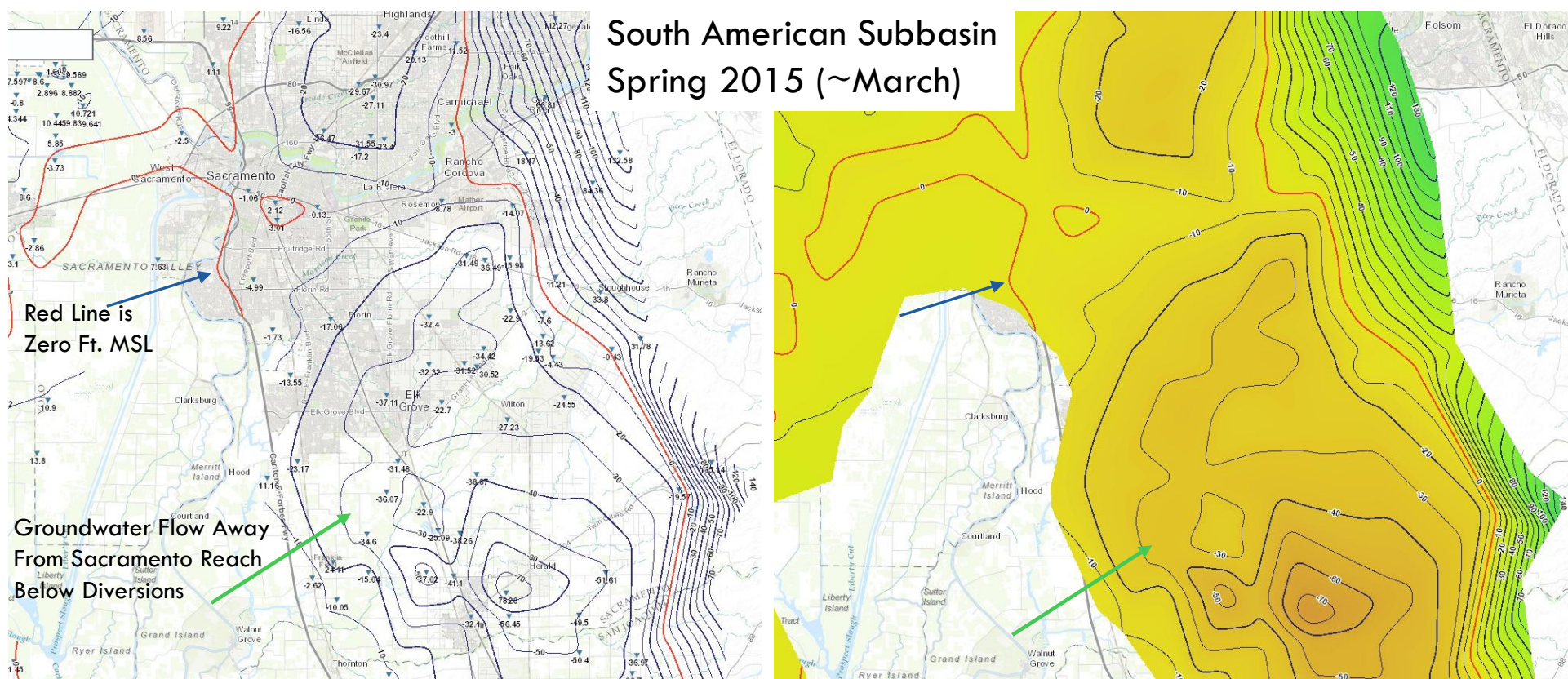


Google earth

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Image Landsat / Copernicus

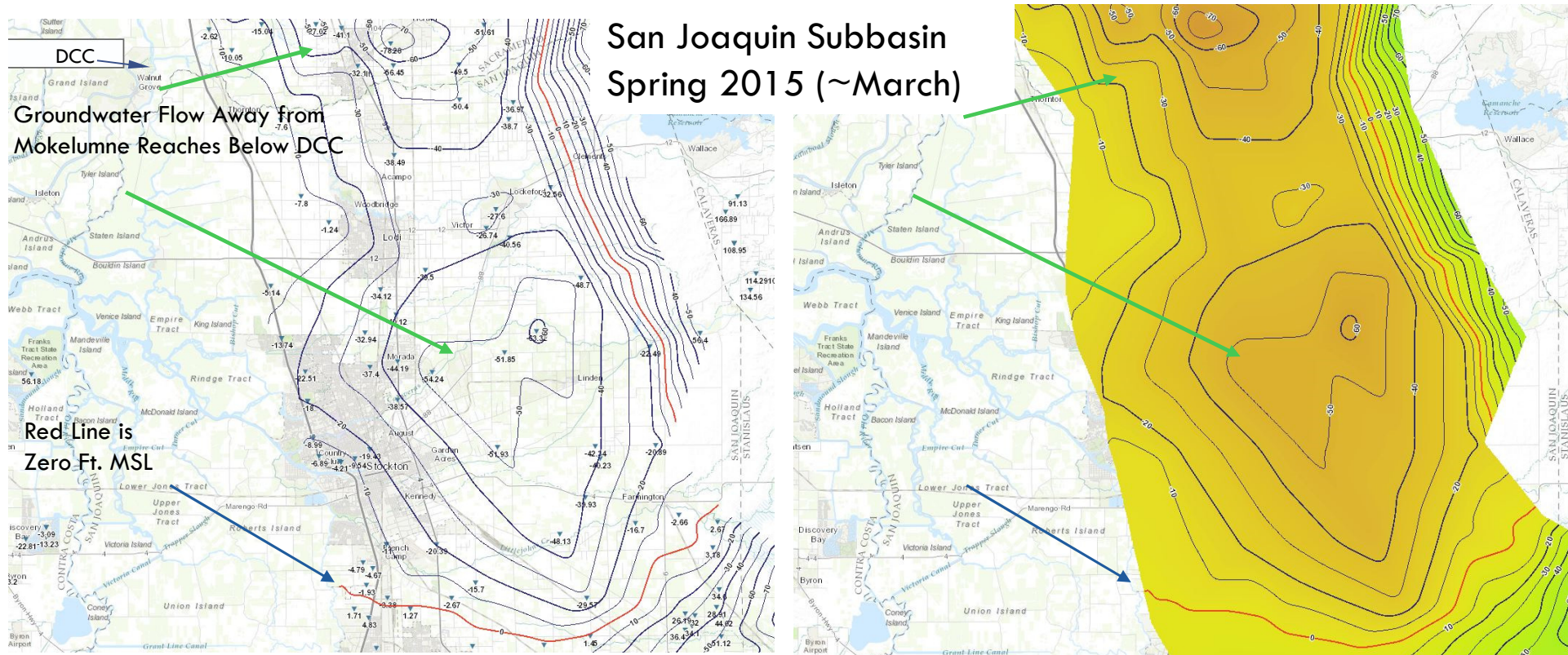
GROUNDWATER ELEVATIONS ARE BELOW SEA LEVEL AND RIVER STAGE IN BOTH GROUNDWATER SUBBASINS



DWR's Posting of Data and Interpretation of the Data

<https://gis.water.ca.gov/app/gicima/>

GROUNDWATER ELEVATIONS ARE BELOW SEA LEVEL AND RIVER STAGE IN BOTH GROUNDWATER SUBBASINS

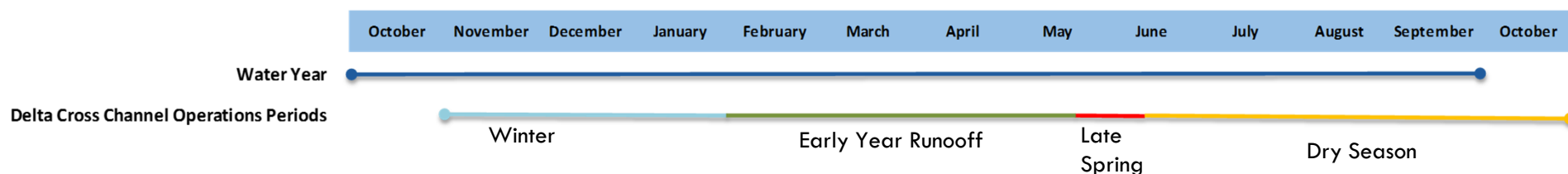


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TIMING ASPECTS ANNUALIZED PERIODS OF ANALYSIS

MONTHS WATER YEARS DELTA-CROSS-CHANNEL-OPERATIONS PERIODS



RETURN FREQUENCY ANALYSIS

WHAT % OF THE TIME IS A FLOW CONDITION EXCEEDED IN A MONTH

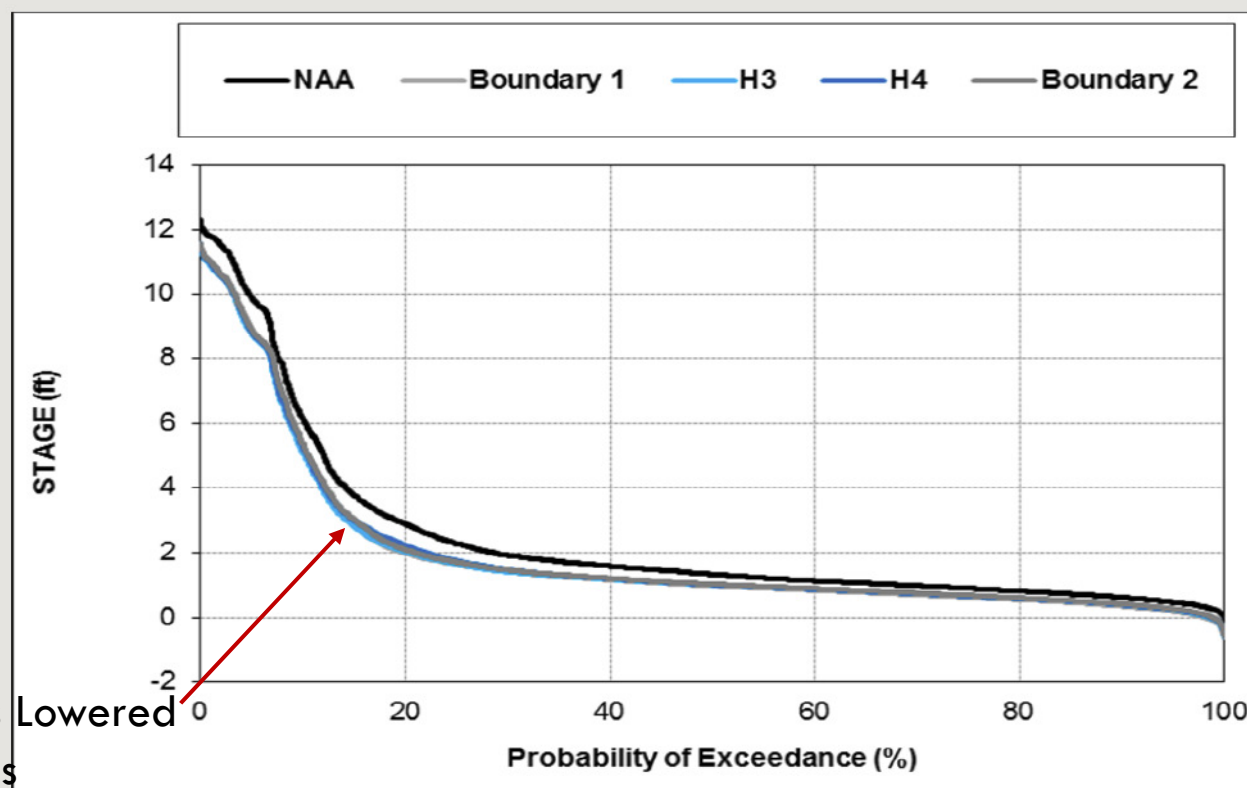
ANNUALIZED ANALYSIS

WATER YEAR TYPE

PERIOD ANALYSIS

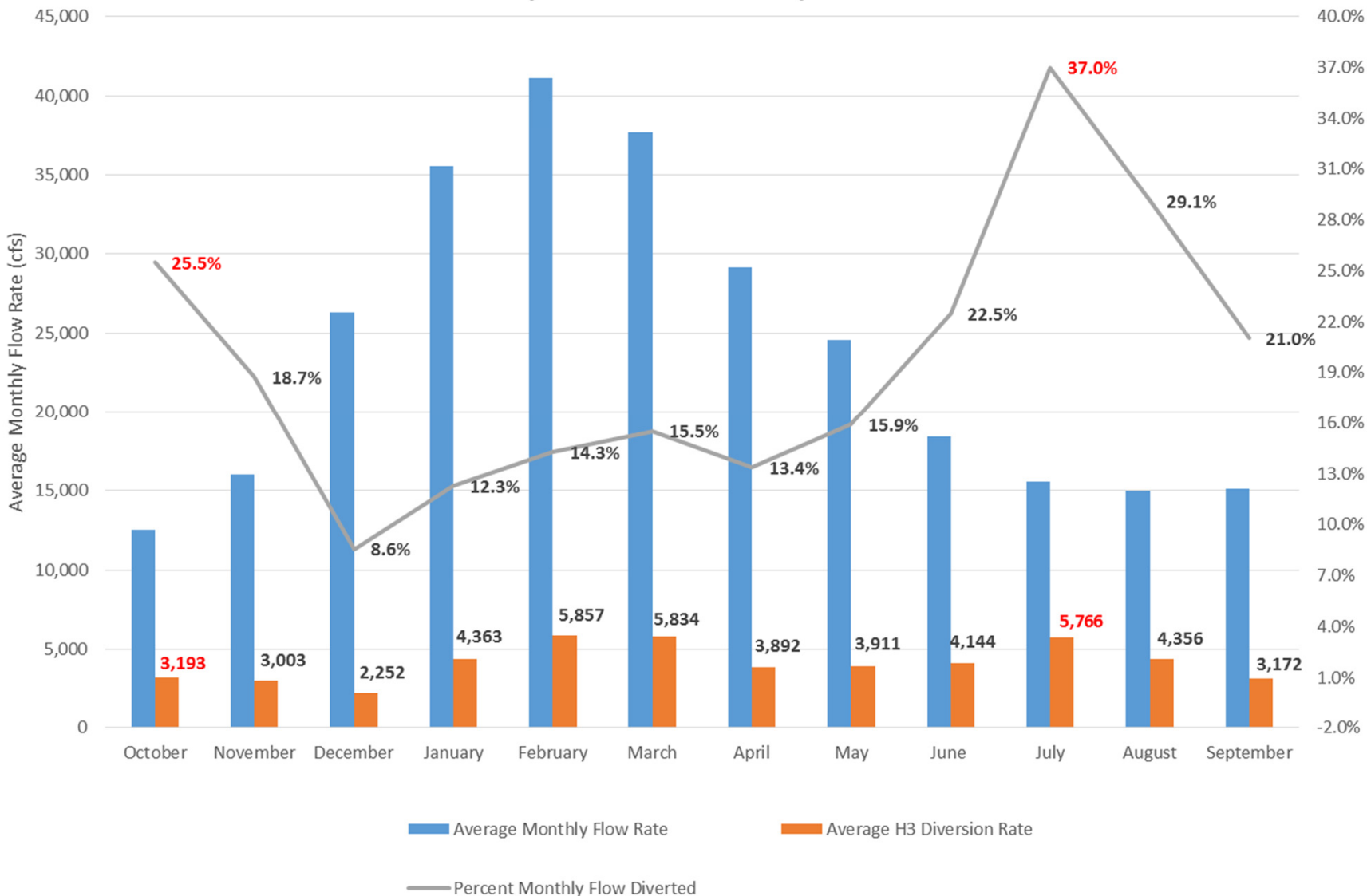
WHAT % OF AN OPERATING PERIOD IS THE DCC OPEN

PROJECT PROPONENTS FREQUENCY ANALYSIS OF RIVER STAGE

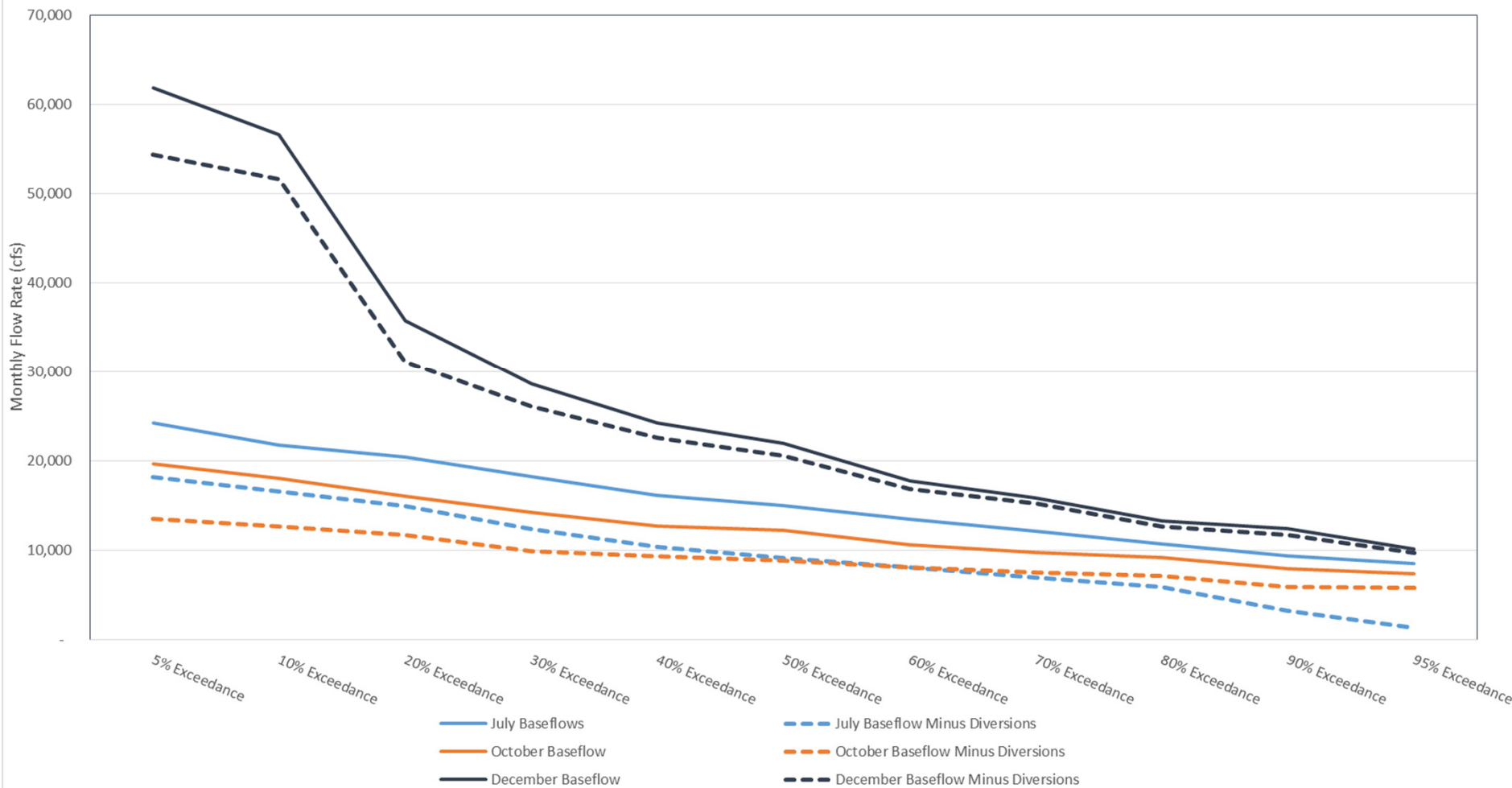

 PROBABILITY OF EXCEEDANCE FOR DAILY MINIMUM STAGE
 SACRAMENTO RIVER DOWNSTREAM FROM THE THREE
 PROPOSED INTAKES.


Note that
 River Stage is Lowered
 at All Intervals
 Between NAA and H3

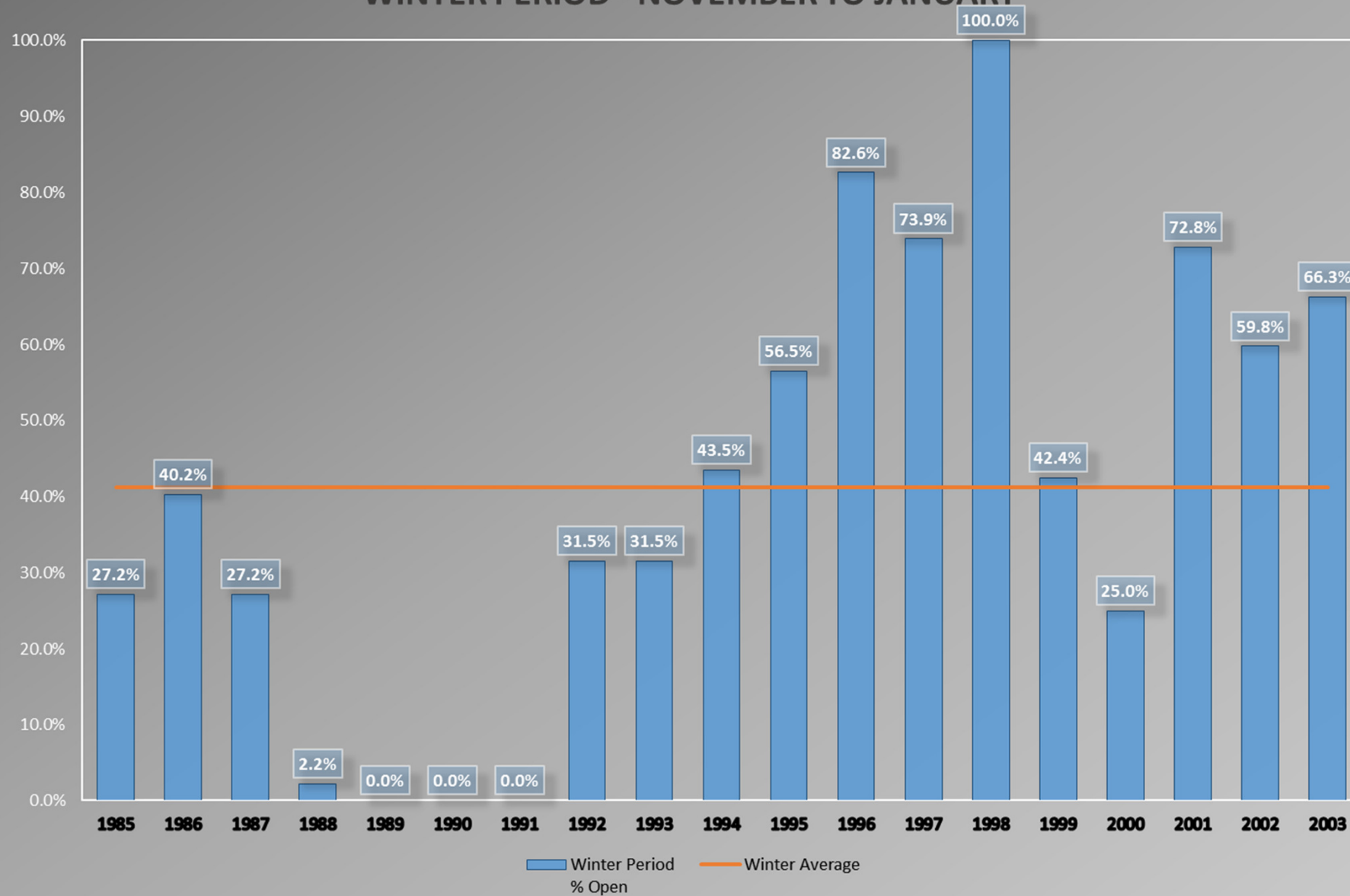
Monthly Average Flow and Diversion Rates Thru Freeport Gage March 1951 -September 2003 Compared to Scenario H3



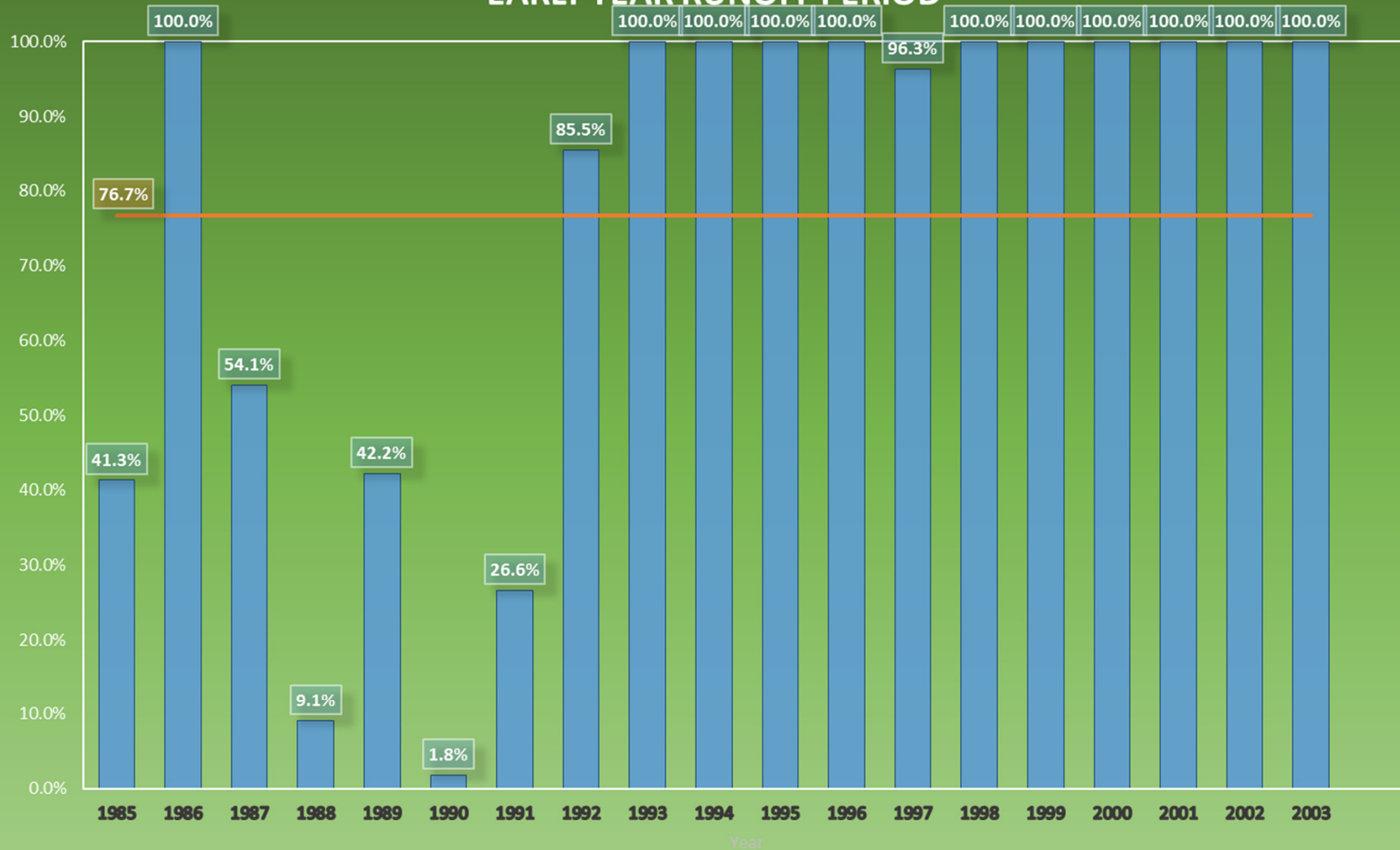
Representatives of Monthly Flow Exceedance Values for Baseflow and Baseflow Minus Diversions



DELTA CROSS CHANNEL PERCENTAGE OPEN WINTER PERIOD - NOVEMBER TO JANUARY

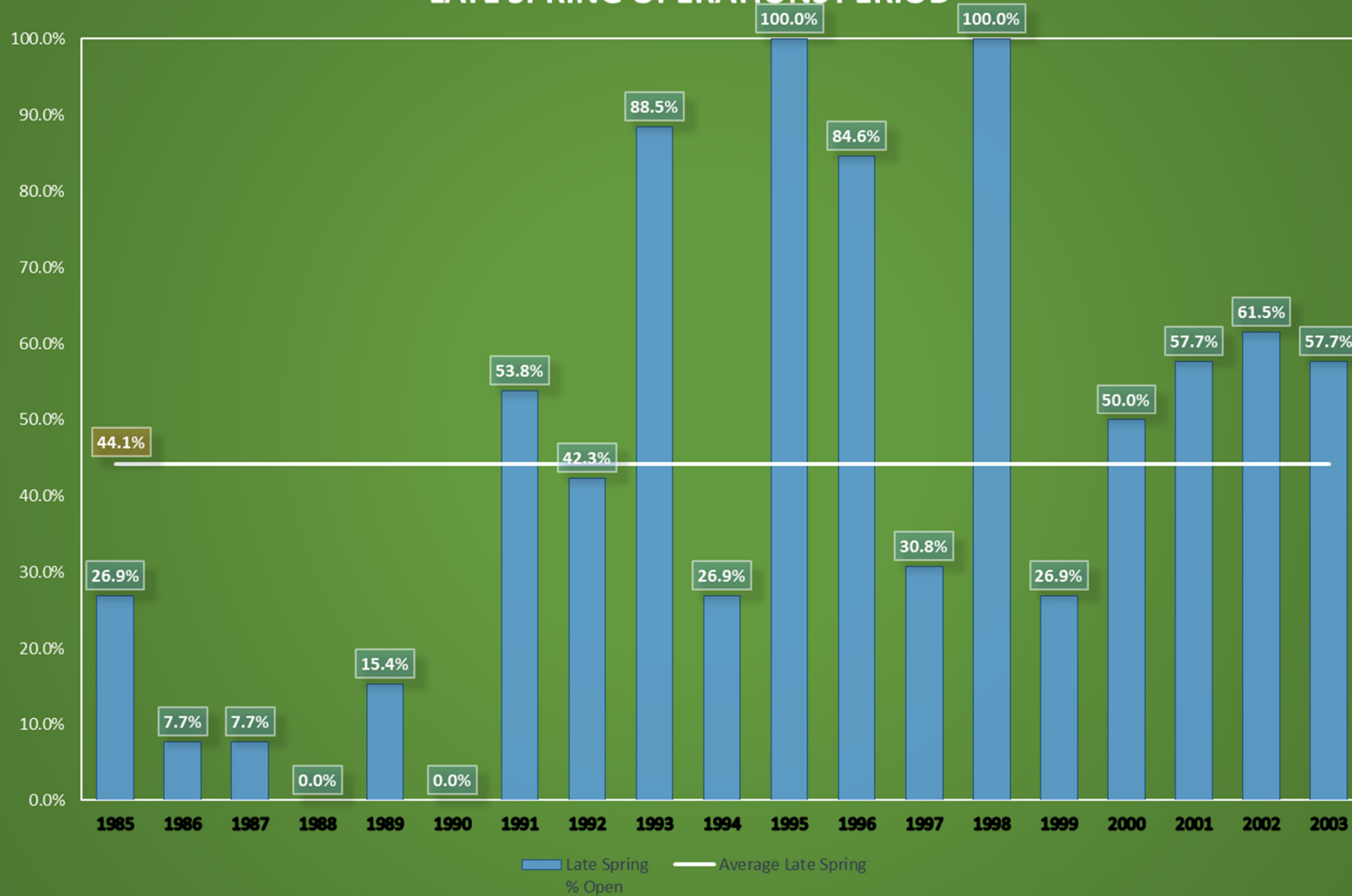


DELTA CROSS CHANNEL PERCENTAGE OPEN EARLY YEAR RUNOFF PERIOD

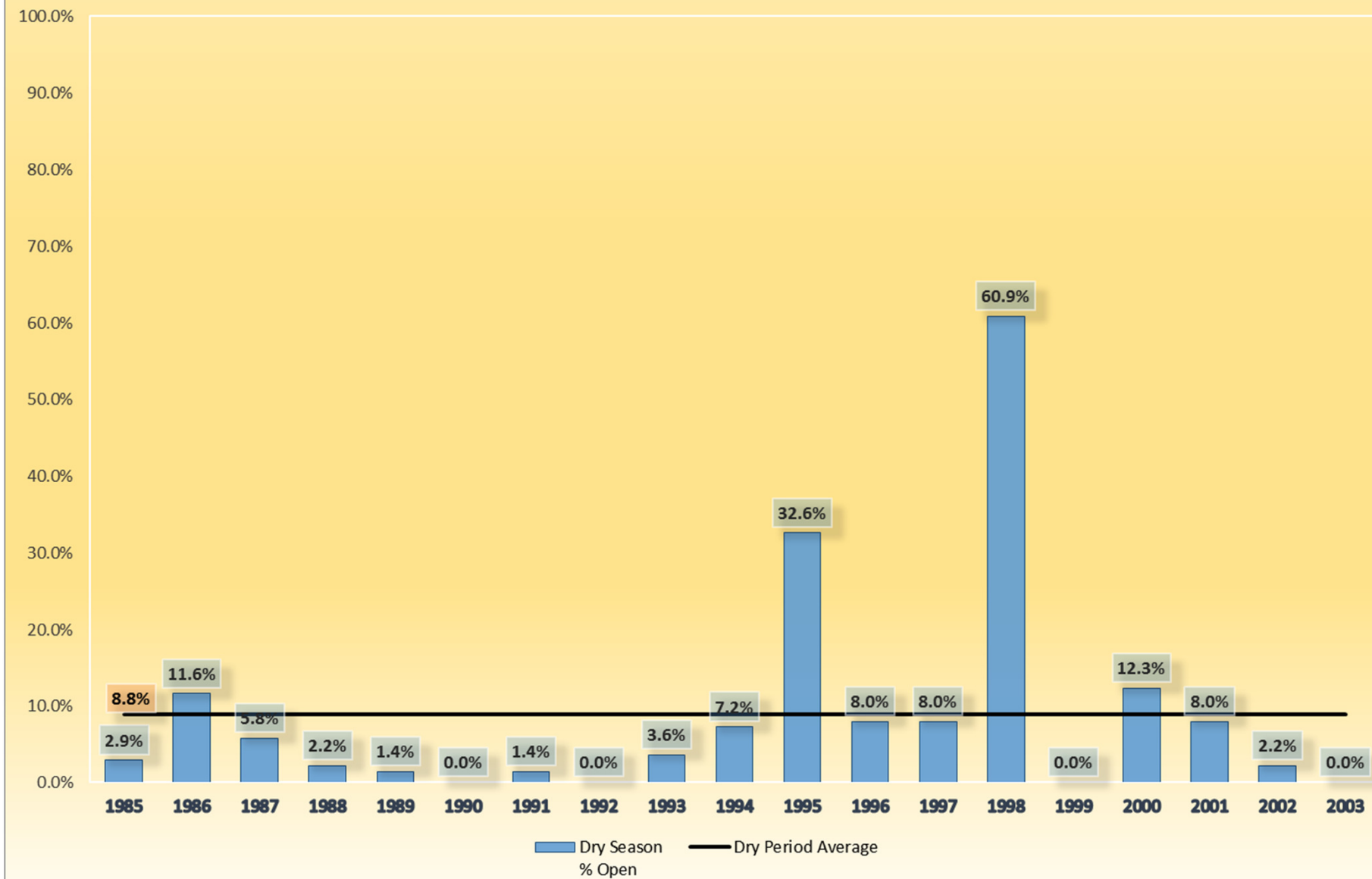


■ Early Year % Open
 — Average Early Year Runoff

DELTA CROSS CHANNEL PERCENTAGE OPEN LATE SPRING OPERATIONS PERIOD



DELTA CROSS CHANNEL PERCENTAGE OPEN DRY PERIOD - SUMMER TO MID FALL



Summary Opinions Based on Data Analysis

- The chronic, long term removal of groundwater recharge from two groundwater subbasins by the proposed Delta Tunnels project, and the corresponding reduction of their annual and long-term groundwater budgets, would be detrimental.

The proposed project would make it more difficult for the relevant Groundwater Sustainability Agencies and other groundwater users to reach sustainability, as required by SGMA, and be contrary to the public interest.