The flow through the Delta cross channel and Georgianna Slough are given by:

\[ \text{DXC & Georg. Sl. Flow} = (a \times \text{Sac Flow}) + b \]

where

- \( a = 0.293, b = 2090 \text{ cfs} \Rightarrow \text{OPEN GATE POSITION} \)
- \( a = 0.133, b = 829 \text{ cfs} \Rightarrow \text{CLOSED GATE POSITION} \)

We can break the equation into individual components that will give the same result:

- \( \text{Georgianna Sl. Flow} = 0.133 \times \text{Qsac} + 829 \Rightarrow \text{OPEN OR CLOSED GATE POSITION} \)
- \( \text{DXC Flow} = 0.160 \times \text{Qsac} + 1261 \Rightarrow \text{OPEN GATE POSITION} \)
- \( \text{DXC Flow} = 0.0 \Rightarrow \text{CLOSED GATE POSITION} \)

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The above documented equations are modified based on the flow results from 2009 DSM2 recalibration model for estimating the DXC & Georg. Sl flow. The equations are modified as follows:

\[ \text{DXC & Georg. Sl. Flow} = (a \times \text{Sac Flow}) + b \]

where

- \( a = 0.3217, b = 1051 \text{ cfs} \Rightarrow \text{OPEN GATE POSITION} \)
- \( a = 0.1321, b = 1087 \text{ cfs} \Rightarrow \text{CLOSED GATE POSITION} \)

We can break the equation into individual components that will give the same result:

- \( \text{Georgianna Sl. Flow} = 0.1321 \times \text{Qsac} + 1087 \Rightarrow \text{OPEN OR CLOSED GATE POSITION} \)
- \( \text{DXC Flow} = 0.1896 \times \text{Qsac} - 36 \Rightarrow \text{OPEN GATE POSITION} \)
- \( \text{DXC Flow} = 0.0 \Rightarrow \text{CLOSED GATE POSITION} \)

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Modify the regression equations used to compute flow through the Delta cross channel and Georgiana Sl for the BDCP PP (25000ac Restoration was included) scenario derived based on DSM2 outputs.

\[ \text{DXC & Georg. Sl. Flow} = (a \times \text{Sac Flow}) + b \]

where \( a = 0.2842, b = 453 \text{ cfs} \Rightarrow \text{OPEN GATE POSITION} \)
where \( a = 0.1339 \), \( b = 745 \) cfs \( \Rightarrow \) CLOSED GATE POSITION

We can break the equation into individual component that will give the same result:

Georgianna Sl. Flow \( = 0.1339 \times Q_{sac} + 745 \Rightarrow \) OPEN OR CLOSED GATE POSITION

DXC Flow \[ = 0.1503 \times Q_{sac} - 292 \Rightarrow \) OPEN GATE POSITION

DXC Flow \[ = 0.0 \Rightarrow \) CLOSED GATE POSITION

/*

! Split arc C401B into Georgianna Sl. and DXC components
define DXC_max {value 99999.*taf_cfs} ! over 1,600,000 cfs (plenty big)
define C401B_GEO {std kind 'FLOW-GEORGIANA' units 'CFS'}
define C401B_DXC {std kind 'FLOW-DXC' units 'CFS'}
goal splitC401B {C401B = C401B_GEO + C401B_DXC}

! Georgiana Sl. component is always this equation
goal GeorgSlough {C401B_GEO = 0.1316 \times C400 + 1102.0} ! 15 cm and 45 cm SLR

! Number of days in each month that the DXC gate is open
define WQCP_days_open   {select days_open from xchanneldays where month=month}
define numberofdaysopen {value min(WQCP_days_open, NMFS_days_open) }
!NMFS_days_open defined in DCC_stub or DELTA RPAs logic

define fract_open   {value numberofdaysopen/daysin }
define fract_open_ {alias fract_open kind 'DXC-FRACT-OPEN' UNITS 'NONE'} !for output only

! ######### Sac Flow Closure ###############
! Sac flow at which gates will be closed
define SAC_threshold  { value 25000.0} ! units = cfs

! The following variables are zero or one if their corresponding condition is false or true, respectively
define int_SAC_below  {INTEGER std kind 'INTEGER' units 'NONE'} ! 0: high flow; 1: low flow
define int_SAC_above  {alias 1. - int_SAC_below kind 'INTEGER' units 'NONE'} ! 1: high flow; 0: low flow
define SAC_above {std kind 'FLOW-SAC-ABV' units 'CFS'} ! zero if C400 < threshold
define SAC_below {std kind 'FLOW-SAC-BEL' units 'CFS'} ! zero if C400 > threshold
define SAC_max {value 99999.*taf_cfs} ! over 1,600,000 cfs (plenty big)

! following constraints allow only one of the two flow variables to be positive
goal SAC_flood_flow \{SAC_above - SAC_below = C400 - SAC_threshold \}
goal SAC_abv_force \{SAC_above < int_SAC_above * SAC_max\}
goal SAC_bel_force \{SAC_below < int_SAC_below * SAC_max\}

! code shengjun added 8/12/2004
!define DXC {lower unbounded kind 'GATE-DAYS-OPEN' units 'NONE'}
define DXC_est { value numberofdaysopen}
define DXC_estdv {alias DXC_est kind 'GATE-DAYS-OPEN' units 'NONE'}
goal setDXC \{DXC = DXC_est * int_SAC_below\}

! Gate open and closure equations with the automatic Sac closure
!goal open_cond_flow \{ C401B_DXC =
0.1896*SAC_threshold*int_SAC_below*fract_open -
0.1896*SAC_below*fract_open + int_SAC_below*(-36.)*fract_open \}
! equation below is for 15cm and 45 cm sea level rise
!goal open_cond_flow \{ C401B_DXC =
0.1871*SAC_threshold*int_SAC_below*fract_open -
0.1871*SAC_below*fract_open + int_SAC_below*(-7.4)*fract_open \}

GOAL HELP_INTEGER \{LHS C401A RHS 0.0 LHS>RHS PENALTY 0.000001\)

!************************************************************************
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