Update on the Selection of an Adaptive Range for Water Operations

5-Agency Technical Staff

Introduction

As a part of the BDCP adaptive management program, adjustments to water operations criteria will be necessary and advisable

- Adaptive Range Working Group Charter:
  - Identify the adaptive range limits for BDCP water operation parameters using operational criteria, analyses, modeling assumptions, etc. produced through previous BDCP efforts

- The Working Group initially charted the various flow targets and other operational criteria developed during the past 4 years of BDCP

- Biological rationale were considered, and deliberation focused on defining the adaptive range limits for water operations parameters

BDCP Adaptive Water Operations Range End Points

Adaptive Range Working Group, May 2011

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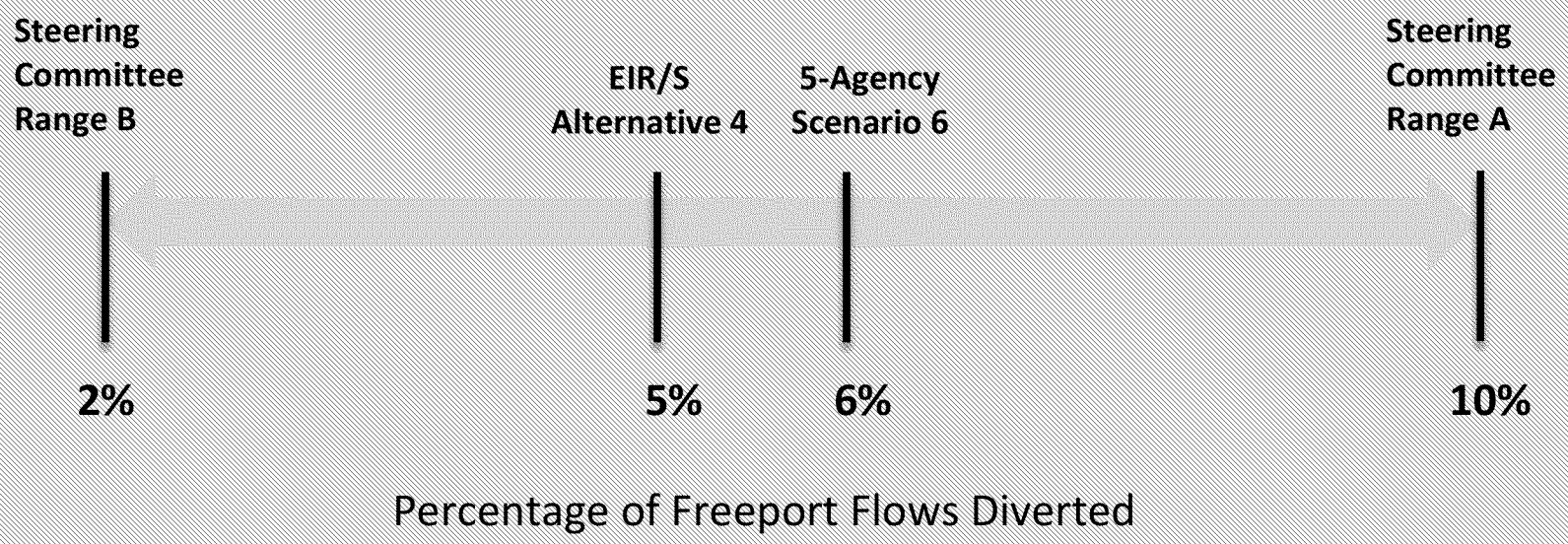
Intermediate waypoints

North Delta Diversion Constant Low-Level Pumping (December-June)

- A small baseline percentage of flow that can be diverted when Freeport flows are at least 5,000 cfs
- No more than 300 cfs at any one intake

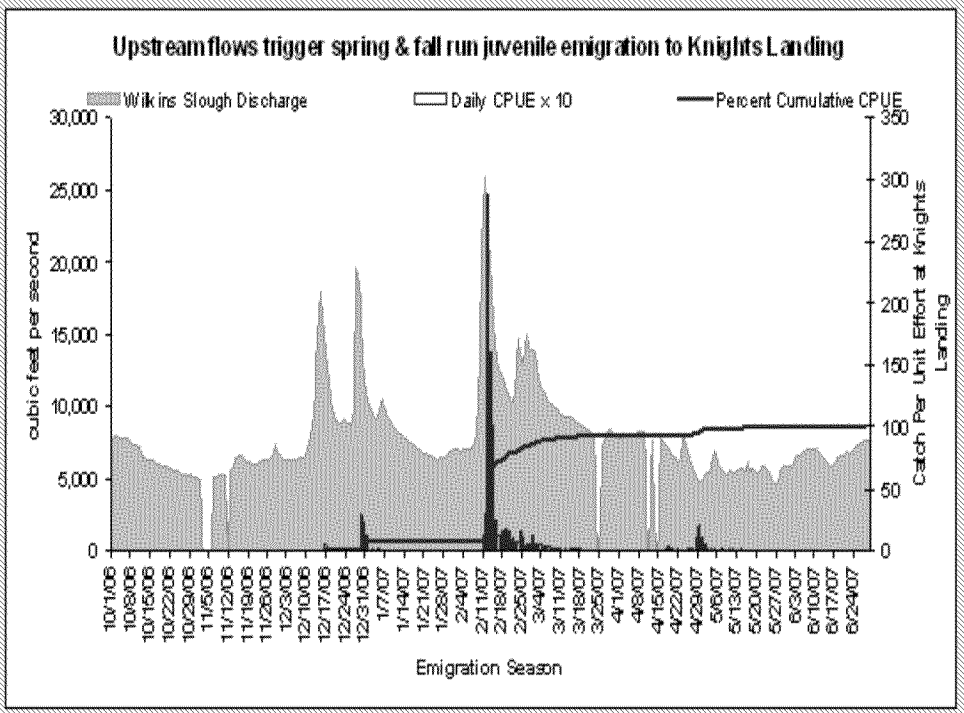


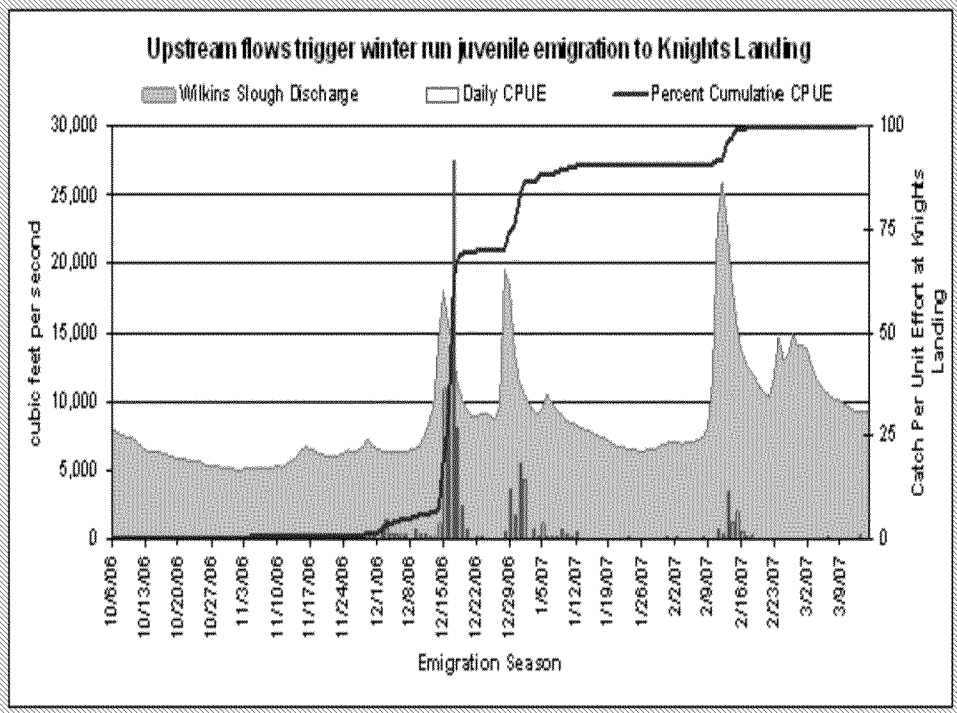
North Delta – Bypass Flows

	Steering Committee Range A	Steering Committee Proposed Project	5-Agency Scenario 6	Federal Scenario 3	Steering Committee Range B	EIR/S Enhanced Aquatic Alternative
Initial month of pulse protection	NA	December	December	December	December	December
Final month of pulse protection	NA	June	June	June	June	June
Freeport 20,000 cfs flow days to exceed Level 1	10 d	15 d	15 d	NA	20 d	20 d
Freeport 20,000 cfs flow days to exceed Level 2	20 d	30 d	30	NA	45 d	45 d
Dec-Apr post-pulse bypass flow (@ example waypoints)						
Level 1 flow at 12,000 cfs	?	11280	11280	11280	11760	11400
Level 2 flow at 12,000 cfs	11600	11600	11600	11600	11600	11600
Level 3 flow at 12,000 cfs	10500	10500	10500	10500	10500	10500
Level 1 flow at 15,000 cfs	?	14100	14100	14100	14700	14250
Level 2 flow at 15,000 cfs	13400	13400	13400	13400	13400	13400
Level 3 flow at 15,000 cfs	12000	12000	12000	12000	12000	12000

Pulse protections to facilitate emigration of juvenile Chinook salmon

Winter run: peak Delta arrival in mid-December
Fall and Spring-run: peak Delta arrival in mid-February (water year 2007).





Key Adaptive Mgmt Question:

how far downstream does the flow need to get to protect salmon and sturgeon?

BDCP Adaptive Water Operations Range End Points

Adaptive Range Working Group, May 2011

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Fremont Weir Adult Fish Passage

Range from minimum to maximum capacity of Tule Canal

<u>Need for adaptive range:</u>

- No design for passage structure, cannot determine necessary flows
- Different species behaviors, potentially different flow requirements
- Performance measures for passage unidentified, 100cfs may not be adequate

100 cfs	Potential intermediate flows through 11.5 ft elevation deep passage gate undefined	1000 cfs

Probably adequate flows for passage

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OMR Flows

Note: All rules actually vary according to hydrodynamic indicators; only most negative OMR flow proposed in original scenario is shown

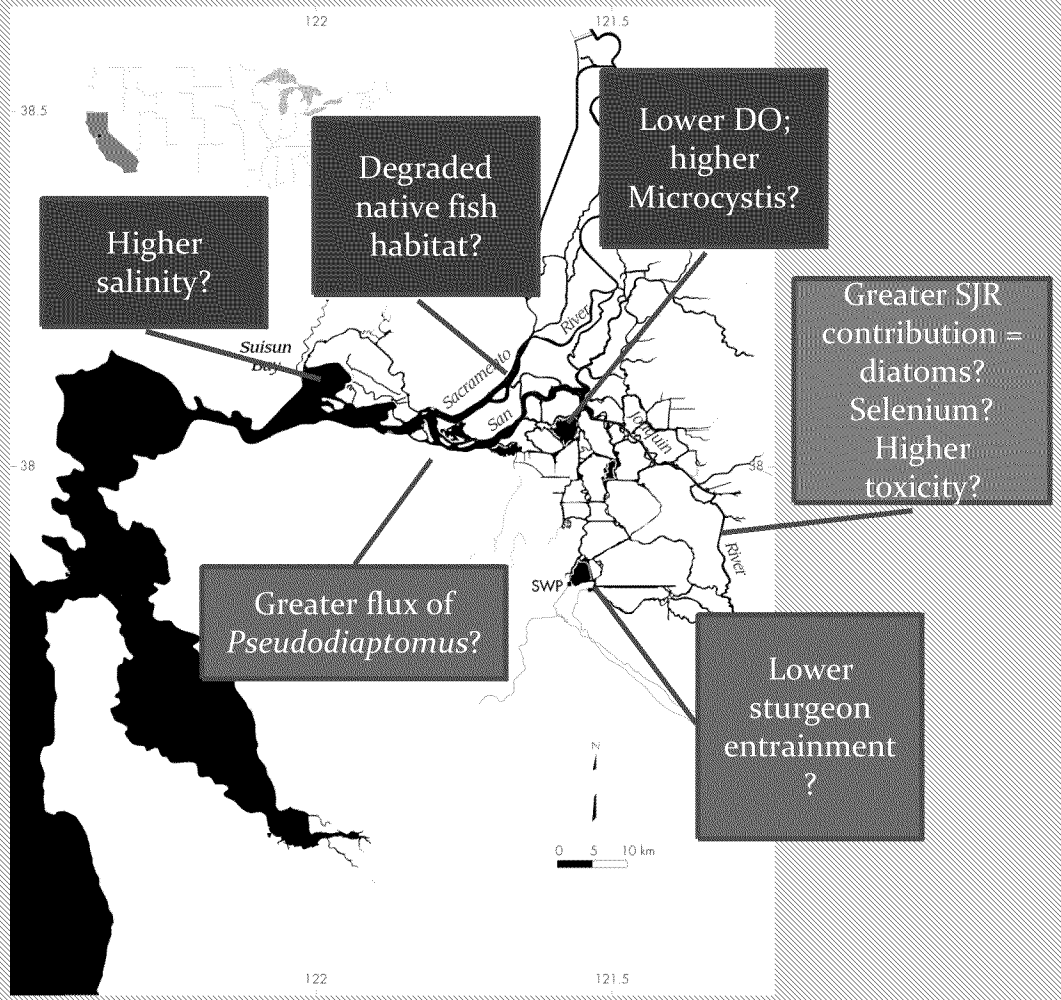
	Plaintiff's OCAP litigation	Steering Committee Range A	Steering Committee Proposed Project	5-Agency Scenario 6	Federal Scenario 3	Steering Committee Range B	EIR/S Enhanced Aquatic Alternative
April	-6100	-5000	-5000	-2000	-2000	-5000	NA*
May	-6100	-5000	-5000	-2000	-2000	-5000	NA*

*Alternative 4 does not actually require the listed OMR flows, it disallows South Delta pumping unless those OMR flows occur

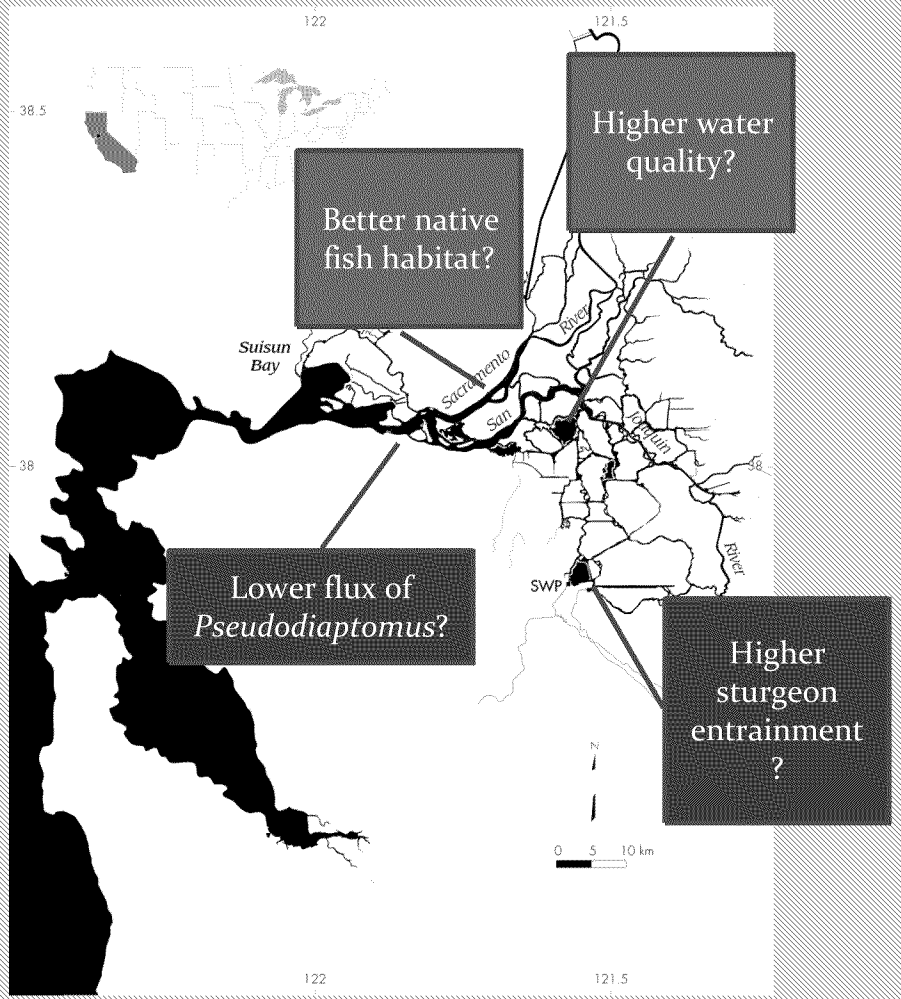
Key Adaptive Mgmt. Question

Is the biggest water export problem seasonal (entrainment) or chronic (entrainment + habitat suitability)?

The pros and cons of favoring North Delta Diversions during summer

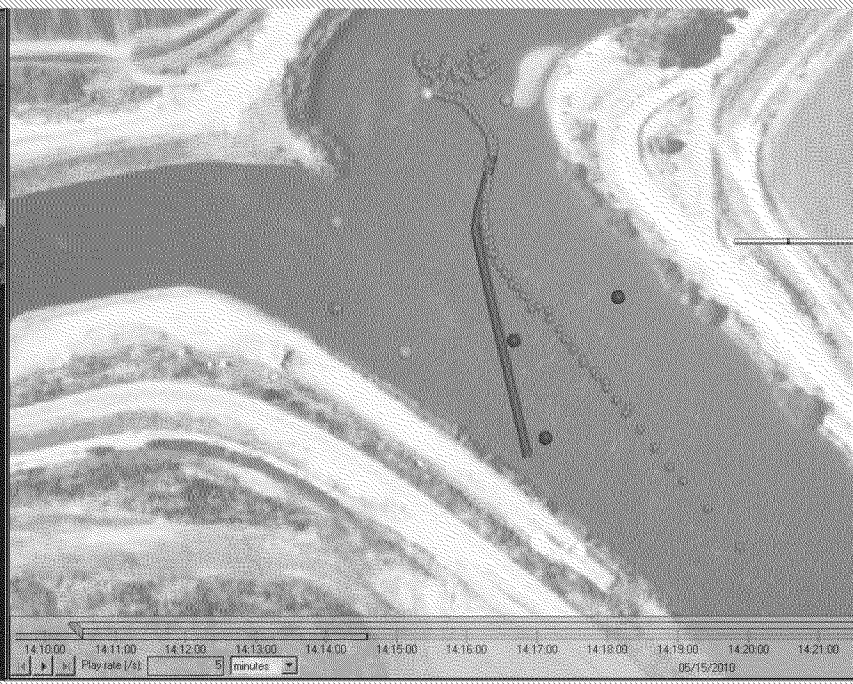


The pros and cons of favoring South Delta Diversions during summer



Key AM question:

Can operations of a barrier at Head of Old River increase survivorship of San Joaquin River steelhead, salmon, and splittail?



HORB waypoints:

100% open Year round	100% closed April & May	5-Agency Scenario 6	5-Agency Scenario 4
Non-physical barrier	Rock barrier	Operable gate	Operable gate

OPERABLE GATE MAXIMUM FLEXIBILITY

HORB waypoints:

5-Agency Scenario 6

- When barrier 'IN' 50% leaky to simulate real time gate operations
- Factors influencing gate operations
  - Flood flow management
  - Water quality (salinity, temp, DO)
  - Stage for Ag pumps
  - Species interactions
  - Fish migration and behavior (diurnal, tidal)
  - Habitat restoration of S. delta

5-Agency Scenario 4

WY	W	AN	BN	D	C
Oct*	IN	IN	IN	IN	IN
Nov	OUT	OUT	OUT	OUT	OUT
Dec	OUT	OUT	OUT	OUT	OUT
Jan	IN	IN	IN	IN	IN
Feb	IN	IN	IN	IN	IN
Mar	IN	IN	IN	IN	IN
Apr	IN	IN	IN	IN	IN
May	IN	IN	IN	IN	IN
Jun	IN	IN	IN	IN	IN
Jul	OUT	OUT	OUT	OUT	OUT
Aug	OUT	OUT	OUT	OUT	OUT
Sep	OUT	OUT	OUT	OUT	OUT

* Half month

OPERABLE GATE MAXIMUM FLEXIBILITY

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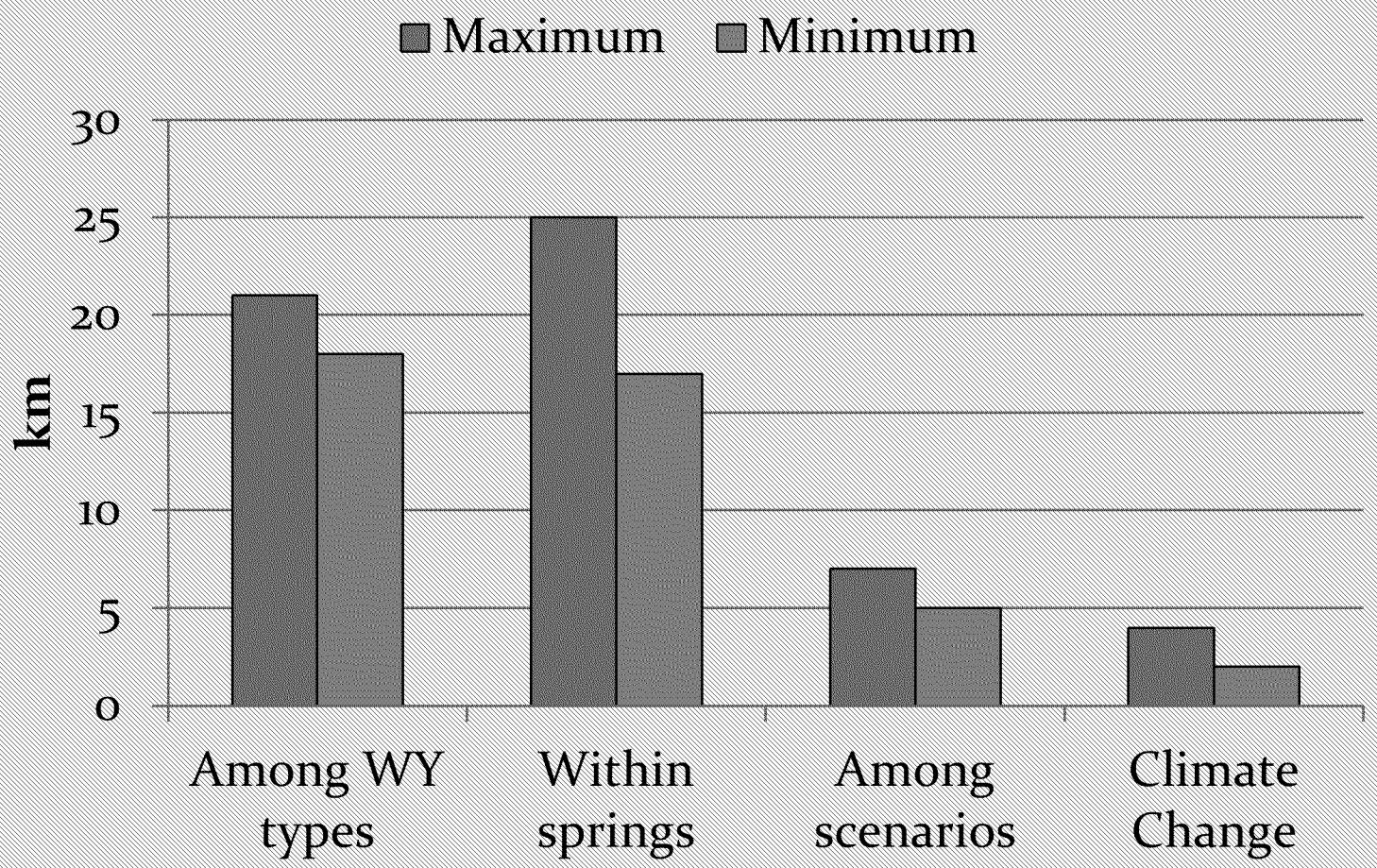
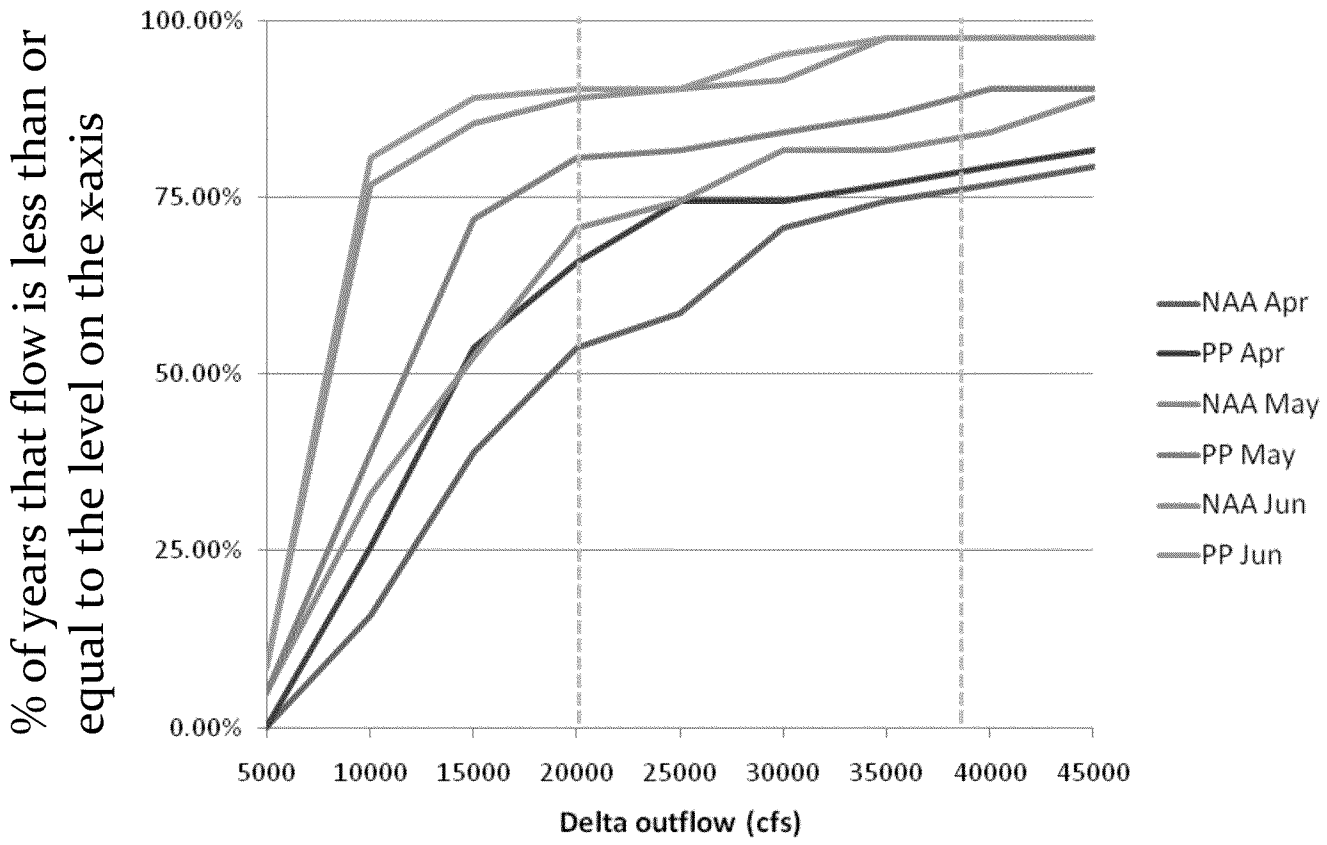
Spring X2 Waypoints
(maximum variation)



There may be recommendations about Delta outflow in April-May



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Methodology

Delta Export to Inflow (E/I) Calculation

Current D-1641 Standard:

Maximum of 65% E/I in Jan, July-Dec; Max 35% in Feb-June

Formula: E/I = total inflow/total exports

Proposed Project:

Total inflow defined as Sac R. inflow below the diversions

Total exports does not include North Delta exports

-Result is that PP never exceeds the 65% and 35% standards

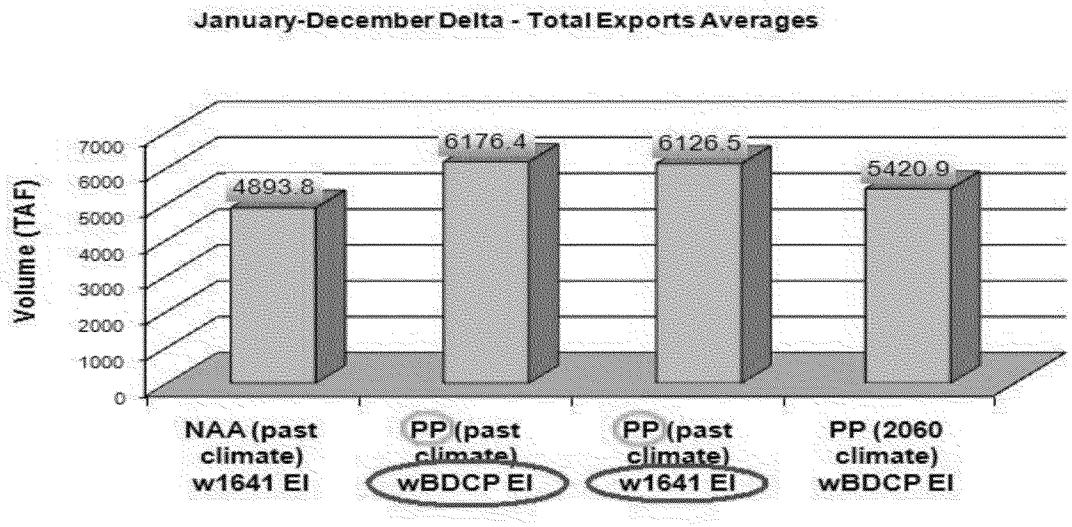
Suggested Calculation:

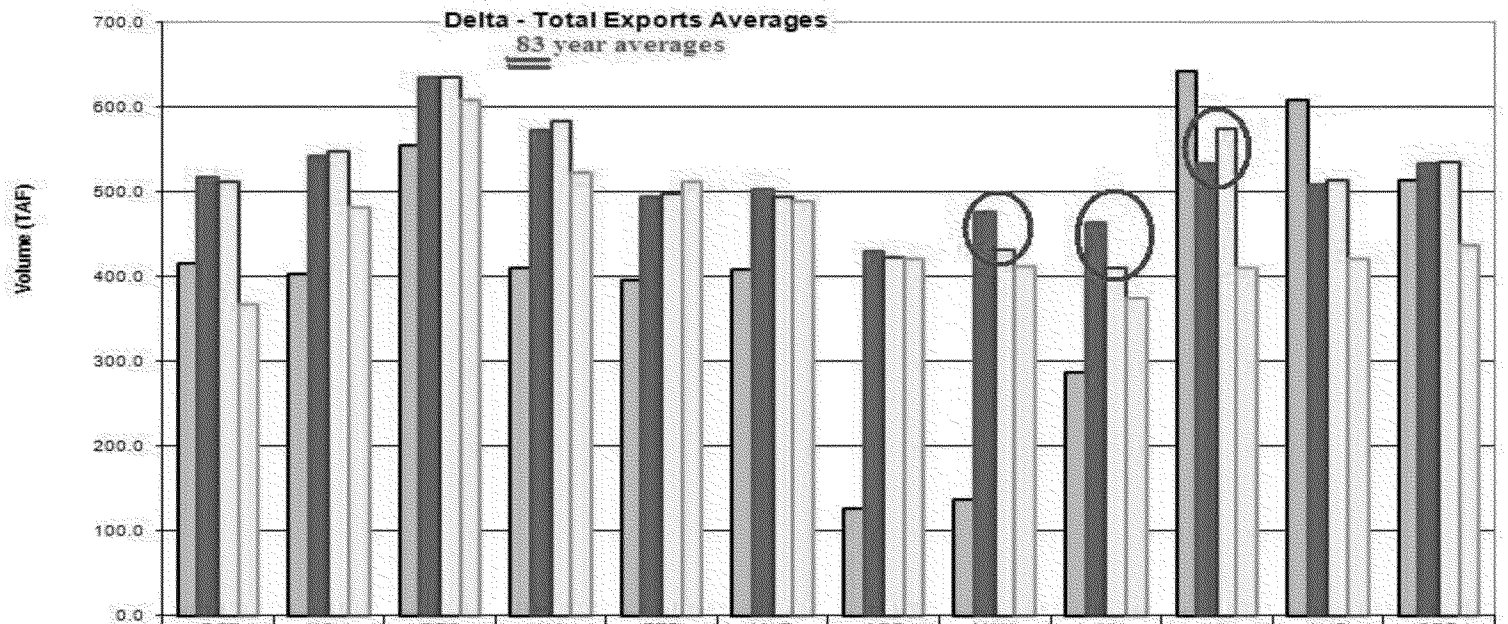
Total inflow is all flows entering the legal Delta (i.e., at Freeport)

Total exports includes North Delta exports

-If calculated this way, PP often exceeds standards, esp. in May and June

Month	% Years that D-1641 is Exceeded
March	15
April	18
May	**35**
June	**45**





	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
NAA (past climate) w1641 EI	414.7	403.3	555.2	409.1	394.9	408.2	125.2	136.5	286.8	642.3	607.8	514.1
PP (past climate) wBDCP EI	517.4	542.8	634.7	571.7	494.8	503.2	429.9	476.5	463.6	533.3	509.2	533.5
PP (past climate) w1641 EI	512.4	547.6	634.3	582.5	497.4	493.6	422.3	432.1	410.0	573.6	513.8	534.5
PP (2060 climate) wBDCP EI	368.0	480.8	608.6	523.4	512.4	489.1	420.6	412.0	374.9	409.7	420.1	436.4