Department of Water Resources
Testimony for SWRCB Hearing on Cease and Desist Order

South Delta Improvement Program and Operation of Permanent Gates[1]

The Department of Water Resources (DWR), in cooperation with the U. S. Bureau of Reclamation and South Delta Water Agency, has been developing a program to install permanent operable gates in the South Delta as part of the proposed South Delta Improvements Project (SDIP). The SDIP includes two components: (1) a physical/structural component describing the construction and operation of the permanent gates, and (2) an operational component describing increased pumping at the State Water Project (SWP) Delta pumps. My presentation today is only about the physical/structural component of the proposed SDIP. My presentation consists of a: (1) description of the proposed permanent gate design and operations, and (2) an explanation of how the gates will improve circulation in the south Delta which, most of the time, will result in improved water quality as measured by Electrical Conductivity (EC). I will also review the proposed SDIP as described in DWR and Reclamation's Joint Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) and the schedule for constructing the gates for the SDIP.

1. Design and Operation of the Permanent Operable Gates

DWR and Reclamation are proposing to install permanent operable gates to replace the four temporary rock barriers that have been installed seasonally since about 1990. The proposed gates are of a bottom hinge design (See Figure 1) as opposed to the radial gates described during the water rights hearings for Decision 1641. Bottom hinge gates have several advantages.

- First, they lay flat on the river bottom during floods and do not cause an obstruction to flood water or debris.

- Second, because in-stream abutments are not necessary, the channel does not need to be widened to accommodate flood flow. This in and of it self saves time and costs. Creating a set back levee for gate construction would take years because of the peat soils in the south Delta.

- Third, these gates provide the most flexibility in operation and for river traffic.

The permanent gates will operate to raise water levels and to induce circulation in the south Delta channels. DWR Figure 2 is an artist's rendition of what a permanent gate structure would look like. These are as aesthetically pleasing as they are functional. The permanent gate will operate to achieve improvements in water levels and circulation by capturing tidal flows on the high tide.

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[1] Presented by Paul A. Marshall, Department of Water Resources, Supervising Engineer of the Bay-Delta Office and Program Manager for the South Delta Improvements Program.

DWR Figure 3 depicts south Delta conditions without gate or barrier influences. (NEED TO CHANGE FIGURE SO NO BARRIERS] Flow into the south Delta comes down the San Joaquin River which splits at Old River. The flow that comes into Old River is then split into Middle River, Grant Line Canal, and the remainder of Old River.

Figures 4 and 5 illustrate the range of potential operations that will be available using the proposed permanent gate operations. The south Delta is influenced by tidal action and the raising and lowering of the gates use this tidal action to induce circulation in the south Delta. To capture tidal flow, the gate is positioned on the bottom of the channel during flood tide. As the tidal flow slows, the gate is raised to capture the high tide. When the gate is fully raised, the tide can ebb toward the Bay while the gate preserves stage on the upstream (or east) side of the gate.

Trapping the high tide on Middle River and Old River and setting the gate elevation in the Grant Line Canal at a lower water level results in water flowing from Middle River and Old River into Grant Line Canal, inducing circulation of water in the south Delta channels. During modeling of the gate operations, the height of the gate on Grant Line Canal is set at a 0.0 feet mean sea level so it operates as a weir, allowing high waters to flow over it. Under some conditions, it is best to allow San Joaquin River water to flow through Old River by keeping its gate functioning as a weir.

2. Improvements in Circulation and Improvements in Water Quality

DWR has studied the effects of the proposed permanent gate operations compared to the effects of the temporary barriers on water quality in the south Delta. Modeling has shown that the gate operations induce circulation in the south Delta and result in significant water quality improvements as measured by EC. We have compared days exceeding the 1000 µS/cm level in DSM2 model runs for both existing conditions (with the temporary barriers in place) and with the proposed permanent operable gates.

Under existing conditions with the seasonal installation of temporary barriers, the modeling of a16-year period shows that the EC values at the Middle River compliance location would exceed the 1000 EC 386 days and at the Old River compliance location would exceed the 1000 EC 181 days (Figure 6).

Under the proposed permanent gate operations, the same modeling of the 16-year period shows the EC values did not exceed 1000 EC at either station. Modeling of these operations predicts improvements in the average EC in the South Delta channels as follows (Figure 7):

- Old River at Tracy: 17.5 % decrease in EC from existing conditions.
- Grant Line: 6% decrease in EC from existing conditions.
- Middle River: 26% decrease in EC from existing conditions.

DWR Figure 8 depicts the difference of daily salinity (EC) from results of modeling of existing conditions with temporary barriers compared to permanent gate operations. This graph shows EC values specific for the monitoring station located on the Middle River at

Mowry Bridge. Changes above the zero line (marked in yellow) indicate improvements to salinity at this station. Please note that for a vast majority of the time, the difference is above zero with a bulk of that improvement in the range of 150 to 200 µS/cm.

DWR Figure 9 depicts the same type of graph showing the difference in EC of the model results between existing conditions and operation with permanent gates for the monitoring station located on Old River at Tracy Road. Again, the graph shows that the operation of permanent gates provides, most of the time, a substantial improvement in water quality, which is often greater than 100 EC.

In contrast, Figure 10 depicts the results of the difference in modeled results of EC at San Joaquin River at Brandt Bridge monitoring station. While some differences in EC are noted between existing conditions and conditions with the permanent gates, this difference is much less when compared to the two previous graphs at monitoring locations on Old River and Middle River. Also, the even distribution of the differences, both positive and negative, indicates that the average change at this station is quite nearly zero. So, on the average, the model results indicated that the operation of the permanent gates do not provide significant improvements to water quality, as measured by EC, on the San Joaquin River at Brandt Bridge.

3. SDIP Draft EIS/EIR.

The Draft EIS/EIR for the SDIP describes the construction and operations of four permanent gates. One gate is a fish control structure at the Head of Old River operated to benefit the movement of salmon on the San Joaquin River and south Delta. The other three gates are for control of water levels and circulation to benefit agricultural uses in the south Delta. The gates on Old River near Tracy Road and the Middle River will be located at about the same location as the current locations of the temporary barriers. The gate on Grant Line Canal will be constructed about five miles west of the temporary barrier site.

The proposed SDIP was not designed to provide benefits to water quality, as measured in EC, on the San Joaquin River. The Draft EIS/EIR of the proposed SDIP includes the following three objectives (Figure 11):

- Reduce the movement of San Joaquin River watershed Central Valley fall-/late fall–run juvenile Chinook salmon into the south Delta via Old River;

- Maintain adequate water levels and, through improved circulation, water quality available for agricultural diversions in the south Delta, downstream of the head of Old River; and

- Increase water deliveries and delivery reliability for SWP and CVP water contractors south of the Delta and provide opportunities to convey water for fish and wildlife purposes by increasing the maximum permitted level of diversion through the existing intake gates at CCF to 8,500 cfs.

The first two objectives are achieved by the SDIP physical/structural component which includes the construction and operation of the permanent gates. The third objective is achieved by the SDIP operational component. DWR and Reclamation have decided to proceed with a decision making process for these two components that will be done in two stages (See Figure 12). In the first stage, DWR and Reclamation will decide whether to approve the physical/structural component and in the second stage they will decide the operational component. The second stage will follow the decision on the physical/structural component to allow time for new information on the pelagic organism decline to be evaluated. DWR and Reclamation propose to construct the physical and structural component of the SDIP prior to the full implementation of the increase in the allowed diversions through Clifton Court Forebay, proposed in the operational component. The analysis in the Draft EIS/EIR considers operations of the physical/structural component under existing diversion rates as well with a range of operational scenarios of increased diversion rates proposed as part of the operational component (Figure 13).

Other actions that are part or the physical/structural component include dredging about 5 miles of the center of the channel in Middle River and some spot dredging in the Sugar Cut area and West Canal. To facilitate more flexibility in gate operations we also propose to extend 24 shallow agricultural intakes in this area (Figure 14).

The operation component of SDIP consists of increased diversions into Clifton Court Forebay. Figure 15 illustrates the small increases SDIP would be seeking in diversions through Clifton Court Forebay. Total average increases range from 126 TAF to 286 TAF on top of the current average diversion of more than 5900 TAF into Clifton Court Forebay. This represents increases ranging from 2% to 5% (on average) in water diversions into the Forebay.

Modeling predicts about a 1% increase in salinity (as measured as EC) at the SWP diversion facility (Figure 16). Modeling predicts about a 10% decrease in salinity at the CVP facility. Because less salt would be exported to San Joaquin Valley farmers, the farmers receiving the water would be able to manage their salt loads better.

DWR Figure 17 depicts our estimated costs for the SDIP. Total cost for construction and mitigation is estimated to be about $110 million.

4. Current Schedule for Construction of Permanent Gates

Our most current schedule indicates DWR and Reclamation will complete the public review of the Draft EIR/EIS in January 2006 and finalize the EIS/EIR in early summer. Construction of the gates structures would take until early 2009 (See Figure 18).

South Delta
IMPROVEMENTS PROGRAM

SWRCB Status Presentation

October 24, 2005

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Operational Barriers

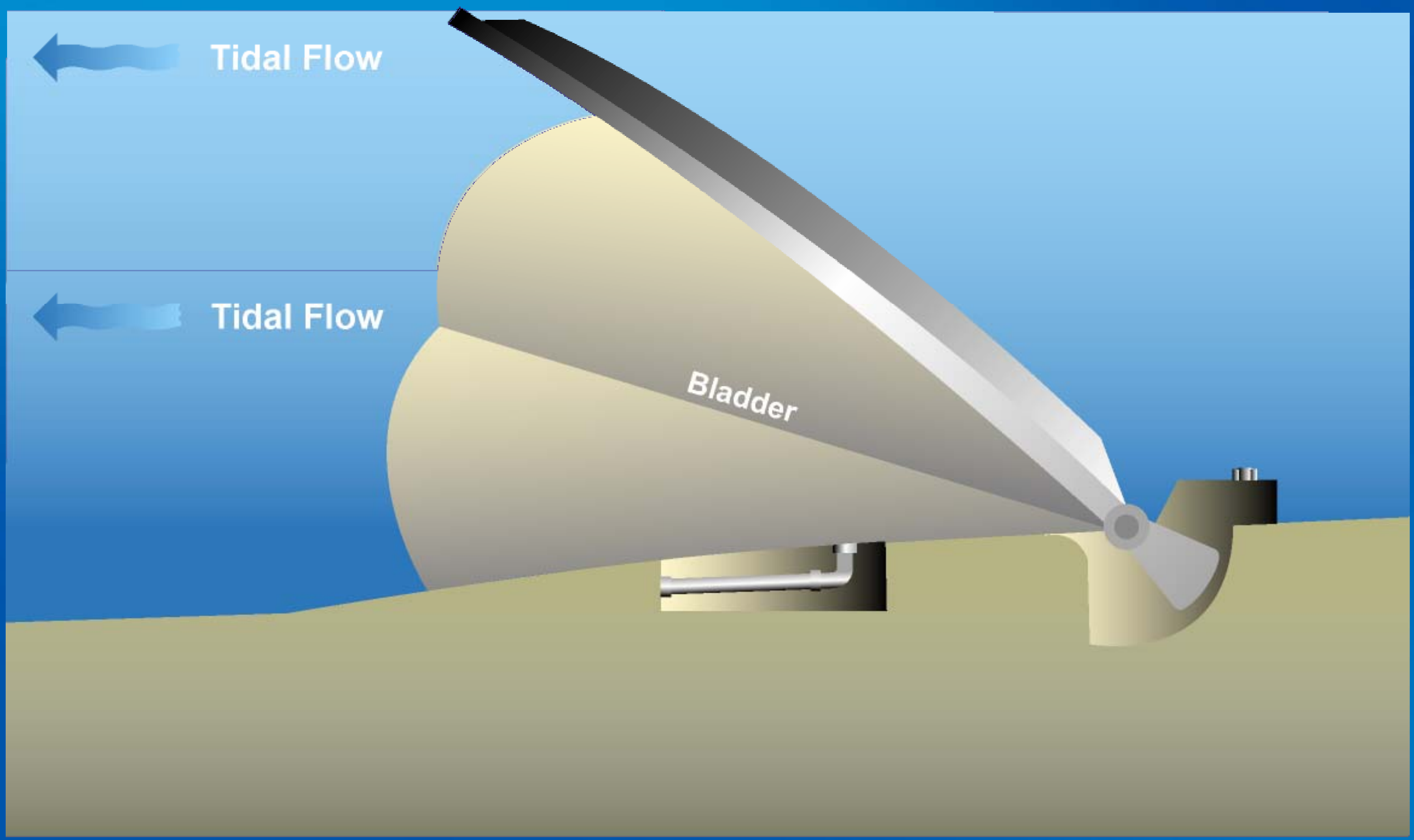

Figure 1

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Permanent Gate Conceptual Drawing

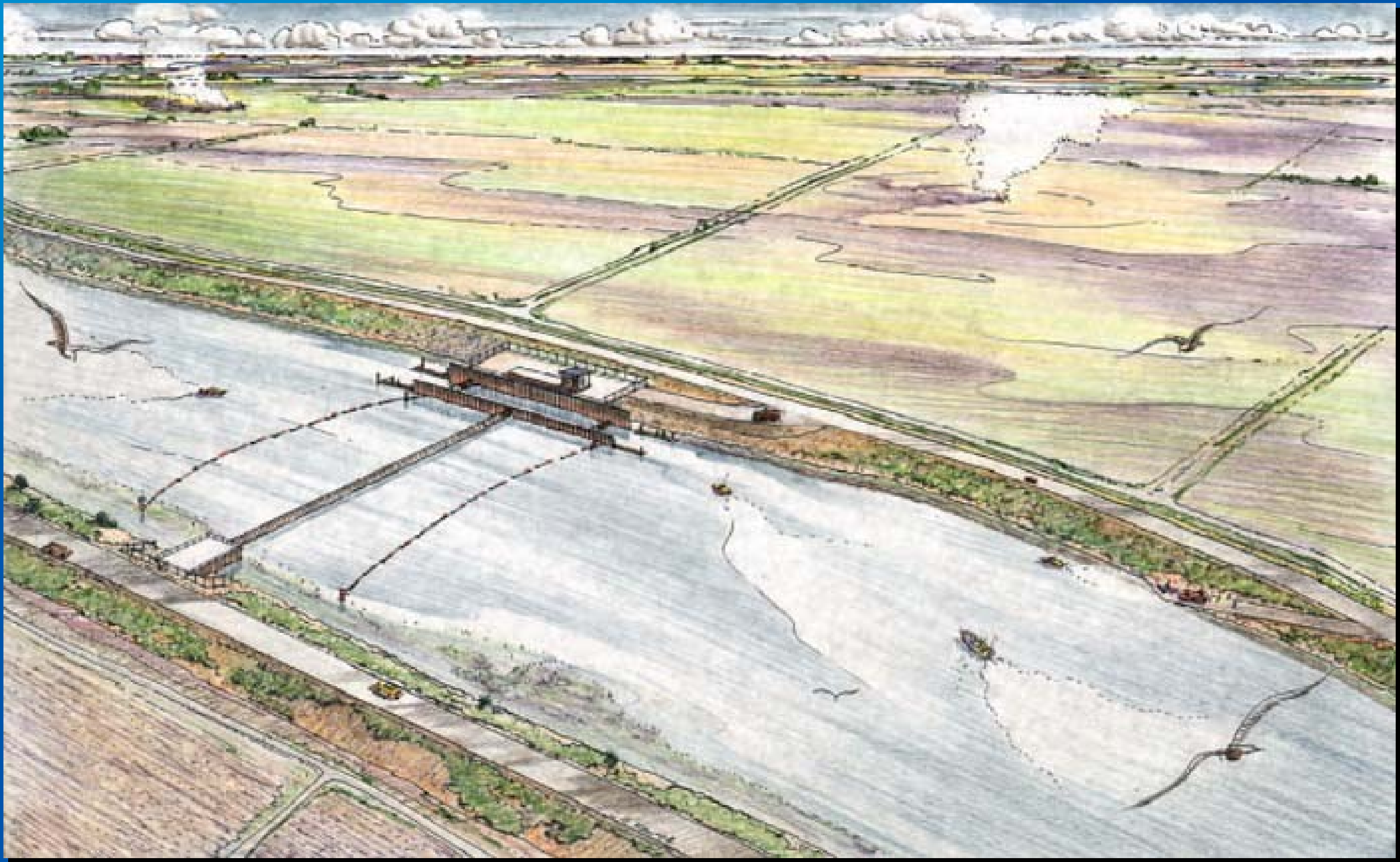

Figure 2

South Delta Water Flow

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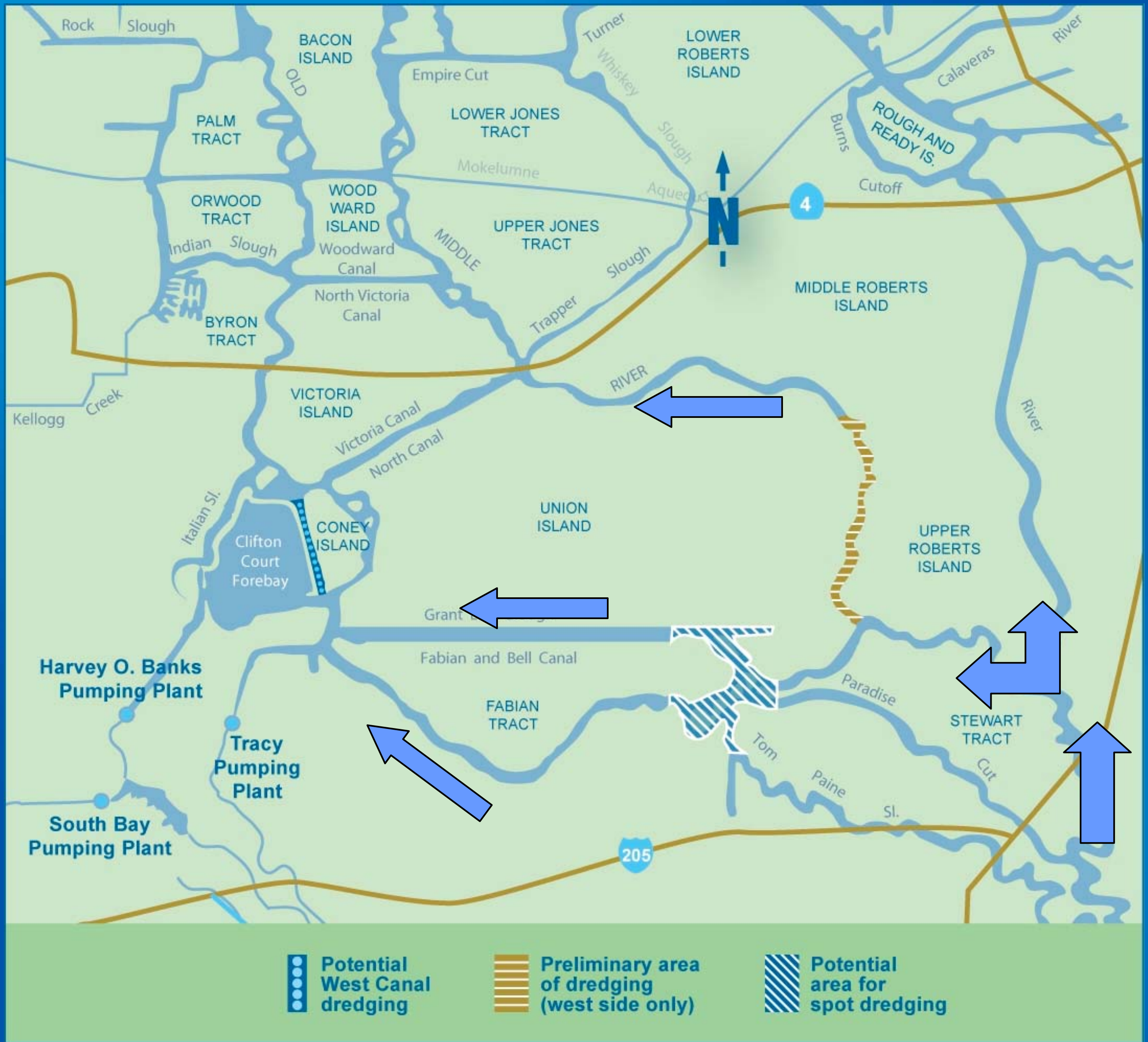

Figure 3

South Delta Water Flow

South Delta IMPROVEMENTS PROGRAM

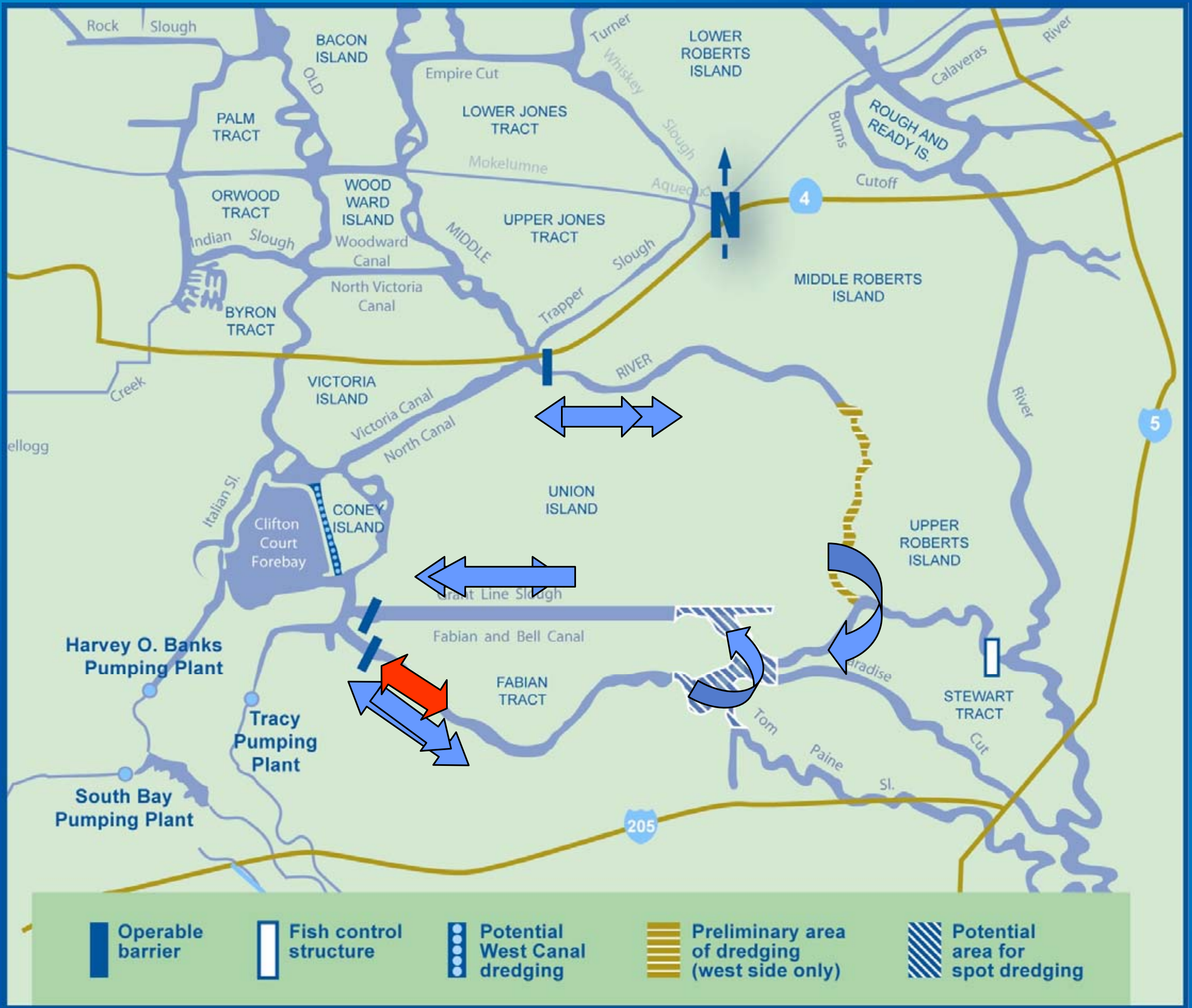

Figure 4

South Delta Water Flow

South Delta IMPROVEMENTS PROGRAM

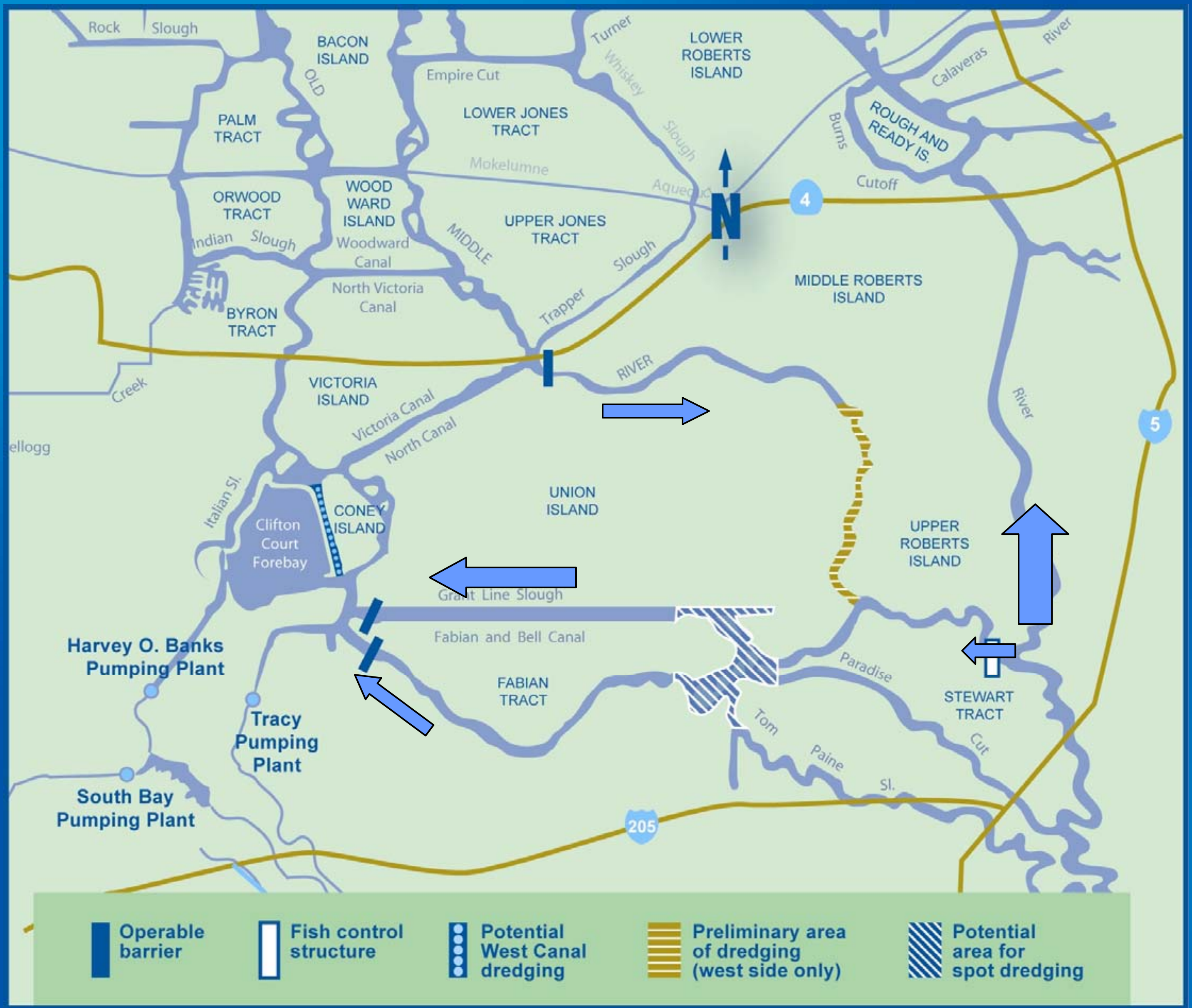

Figure 5

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Days of Non-Compliance EC and Stage

Model Results: Days of Exceeding 1000 µS/cm EC		
Conditions	Middle River	Old River
Existing Conditions	386	181
Permanent Gates	0	0

Figure 6

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SDWA Water Quality

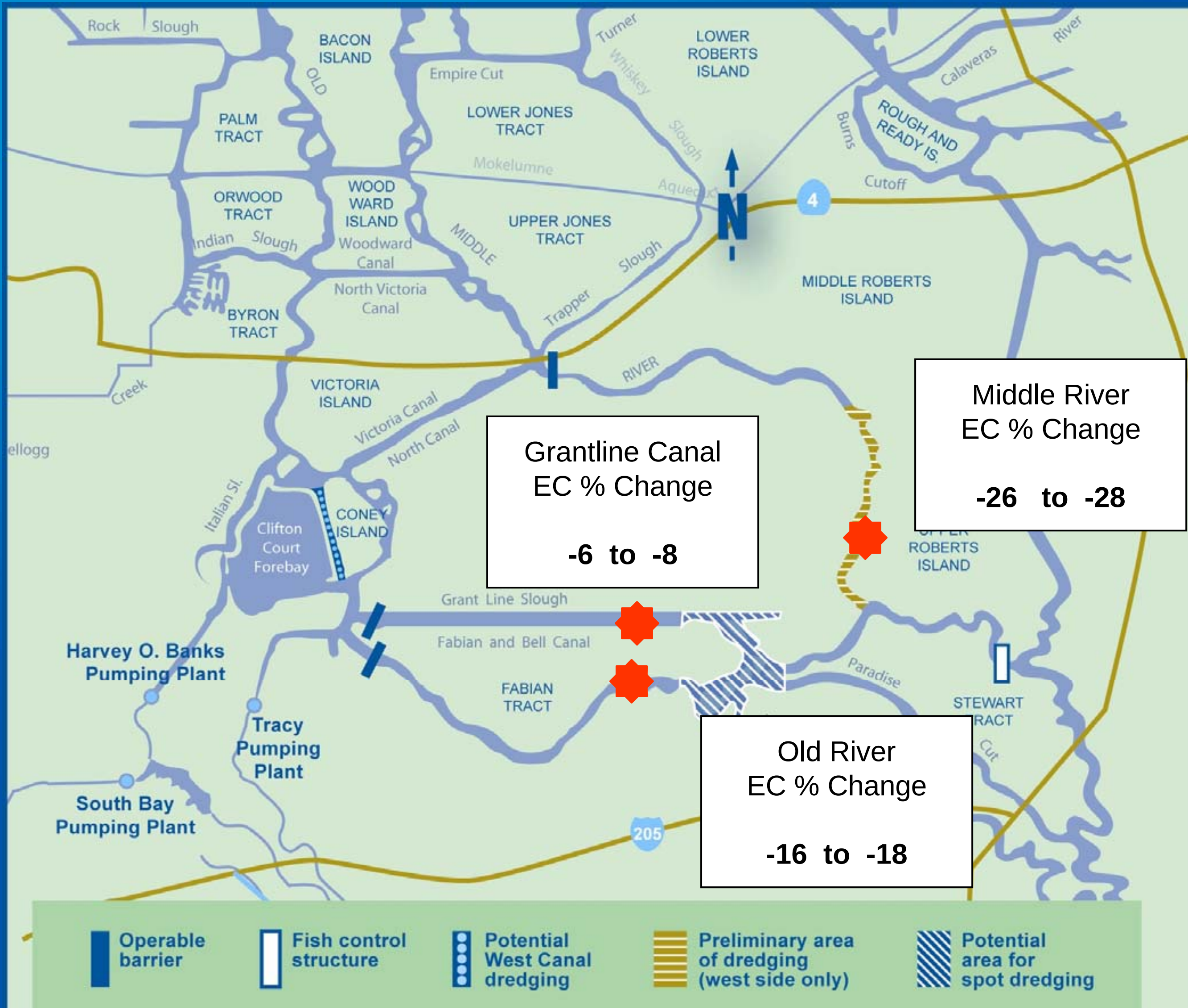

Figure 7

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EC Improvement on Middle River at Mowry Bridge

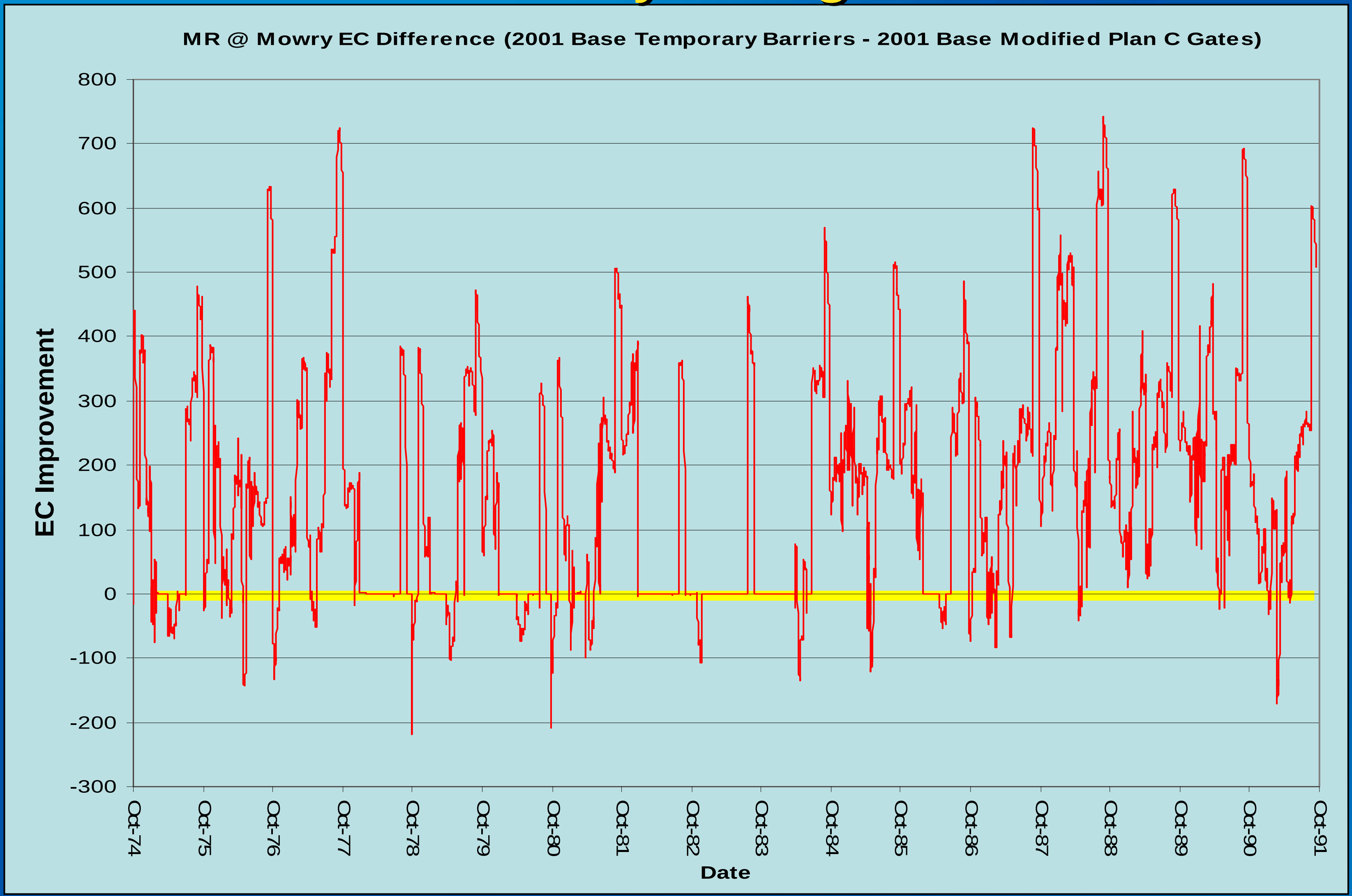

Figure 8

EC Improvement on Old River at Tracy Road

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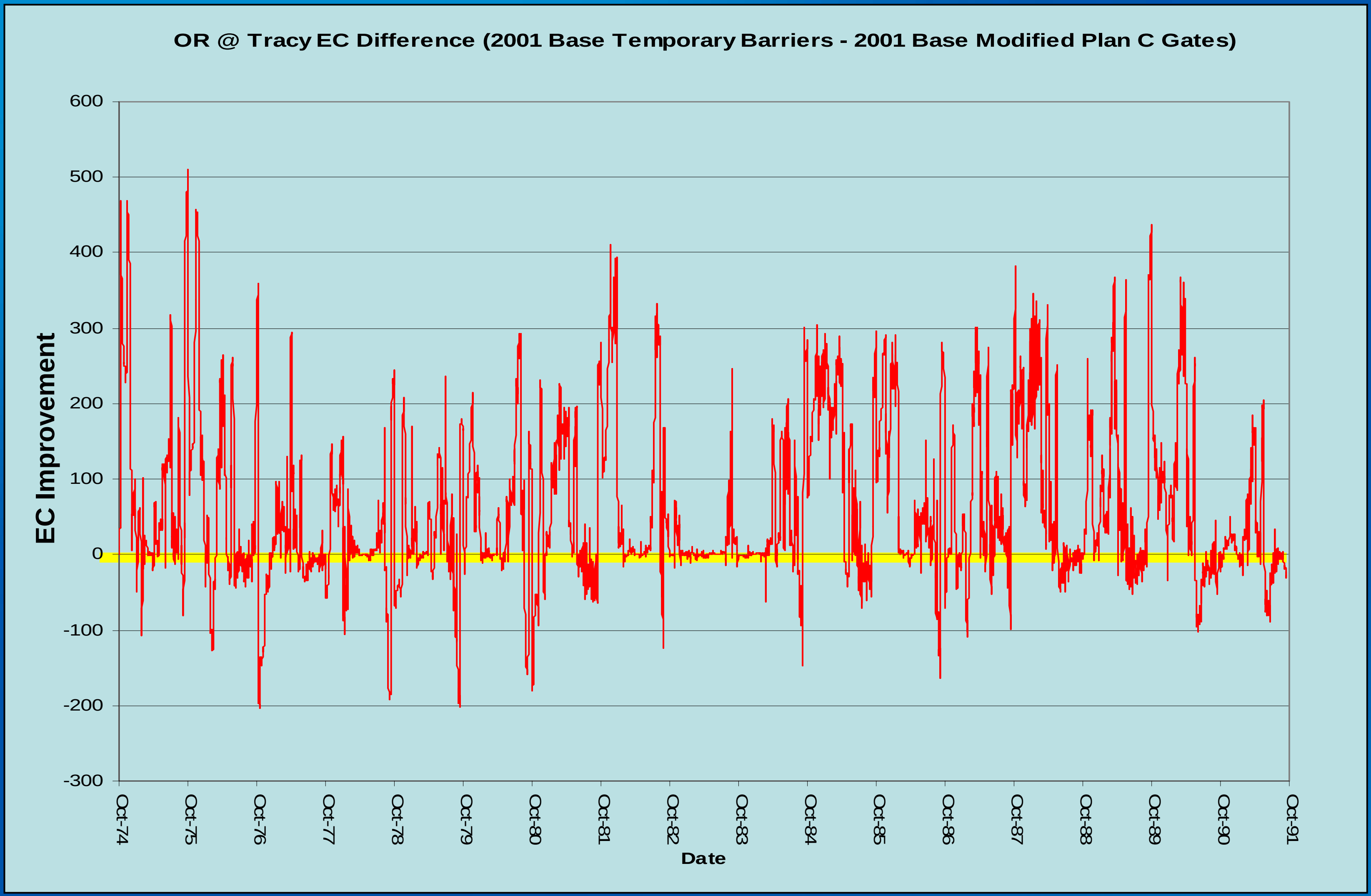

Figure 9

EC Difference on San Joaquin River at Brandt Bridge

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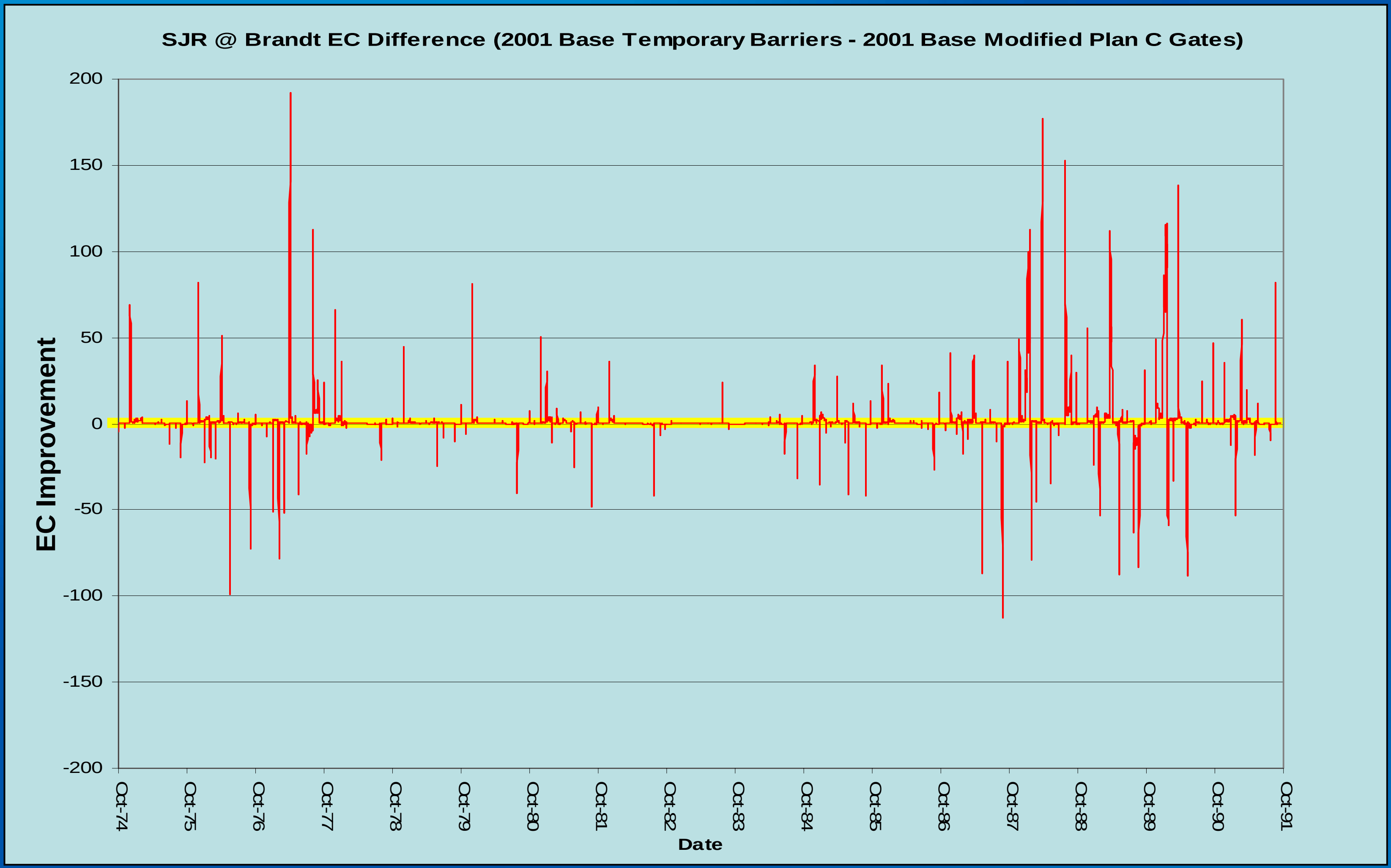

Figure 10

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SDIP Objectives/Purpose

- Reduce the movement of San Joaquin River watershed Central Valley fall-/late fall–run juvenile Chinook salmon into the south Delta via Old River;

- Maintain adequate water levels and, through improved circulation, water quality available for agricultural diversions in the south Delta, downstream of the head of Old River; and

- Increase water deliveries and delivery reliability for SWP and CVP water contractors south of the Delta and provide opportunities to convey water for fish and wildlife purposes by increasing the maximum permitted level of diversion through the existing intake gates at CCF to 8,500 cfs.

Figure 11

Staged Decision Process

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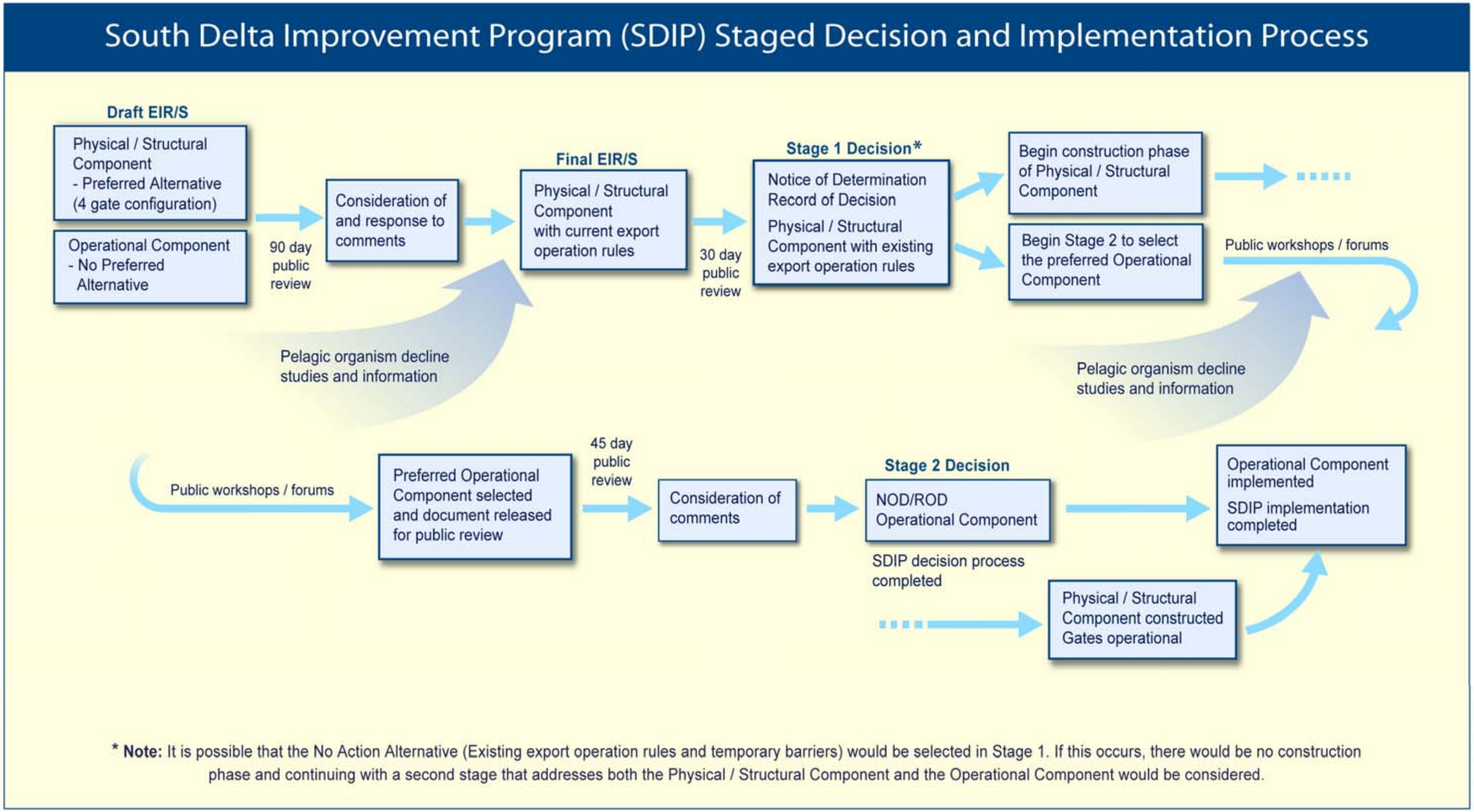

Figure 12

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Alternative Analysis

	Existing 6,680 cfs (D-1641)	Operational Scenario A	Operational Scenario B	Operational Scenario C
Temporary Barriers	No Action			
Four Gates (Preferred)	Stage 1	Alternative 2A (Stage 2)		
Four Gates (Preferred)	Stage 1		Alternative 2B (Stage 2)	
Four Gates (Preferred)	Stage 1			Alternative 2C (Stage 2)
Three Gates	Stage 1		Alternative 3B (Stage 2)	
One Gate	Stage 1		Alternative 4B (Stage 2)	

Figure 13

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Preferred Physical / Structural Component

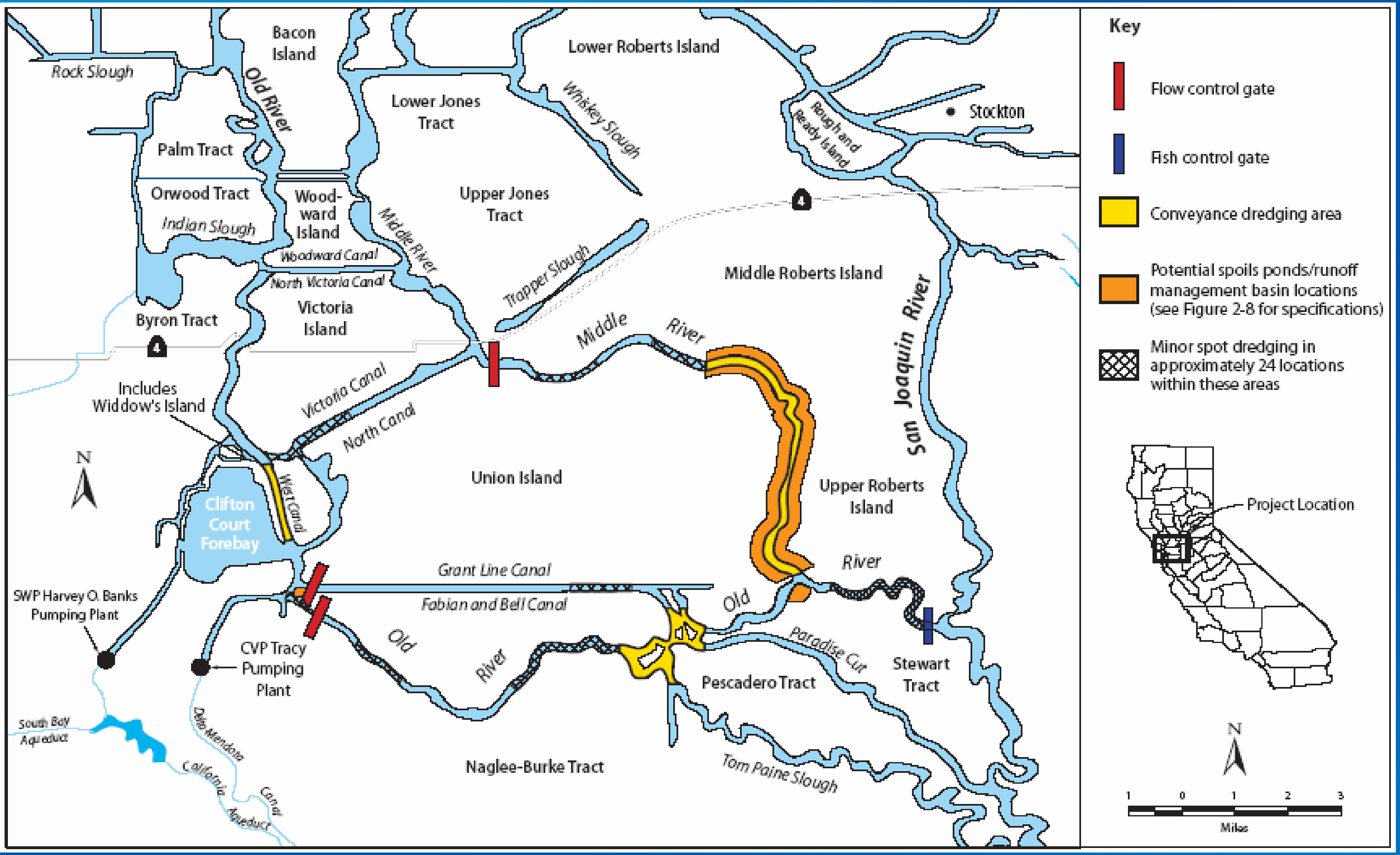

Figure 14

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Operational Component

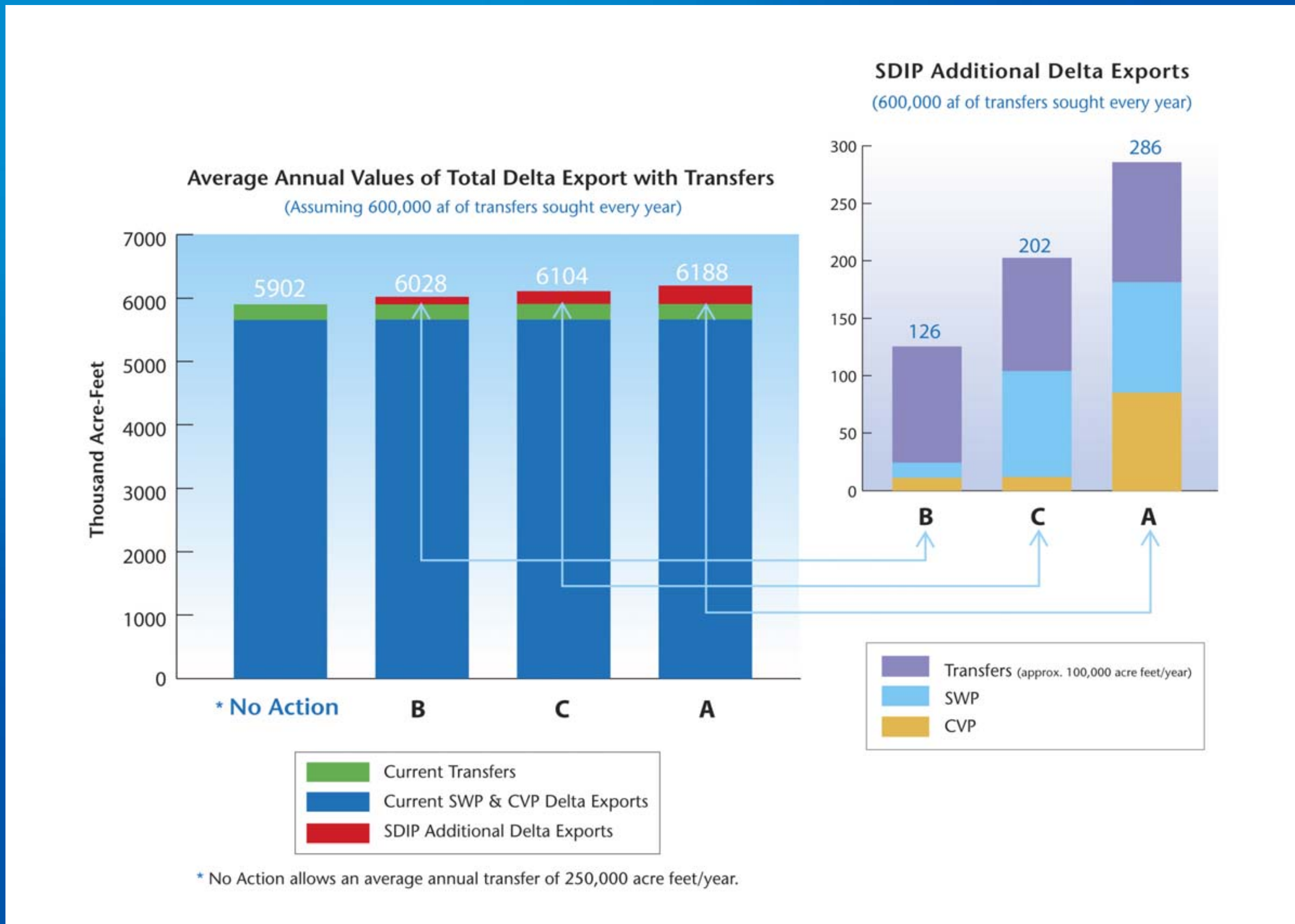

Figure 15

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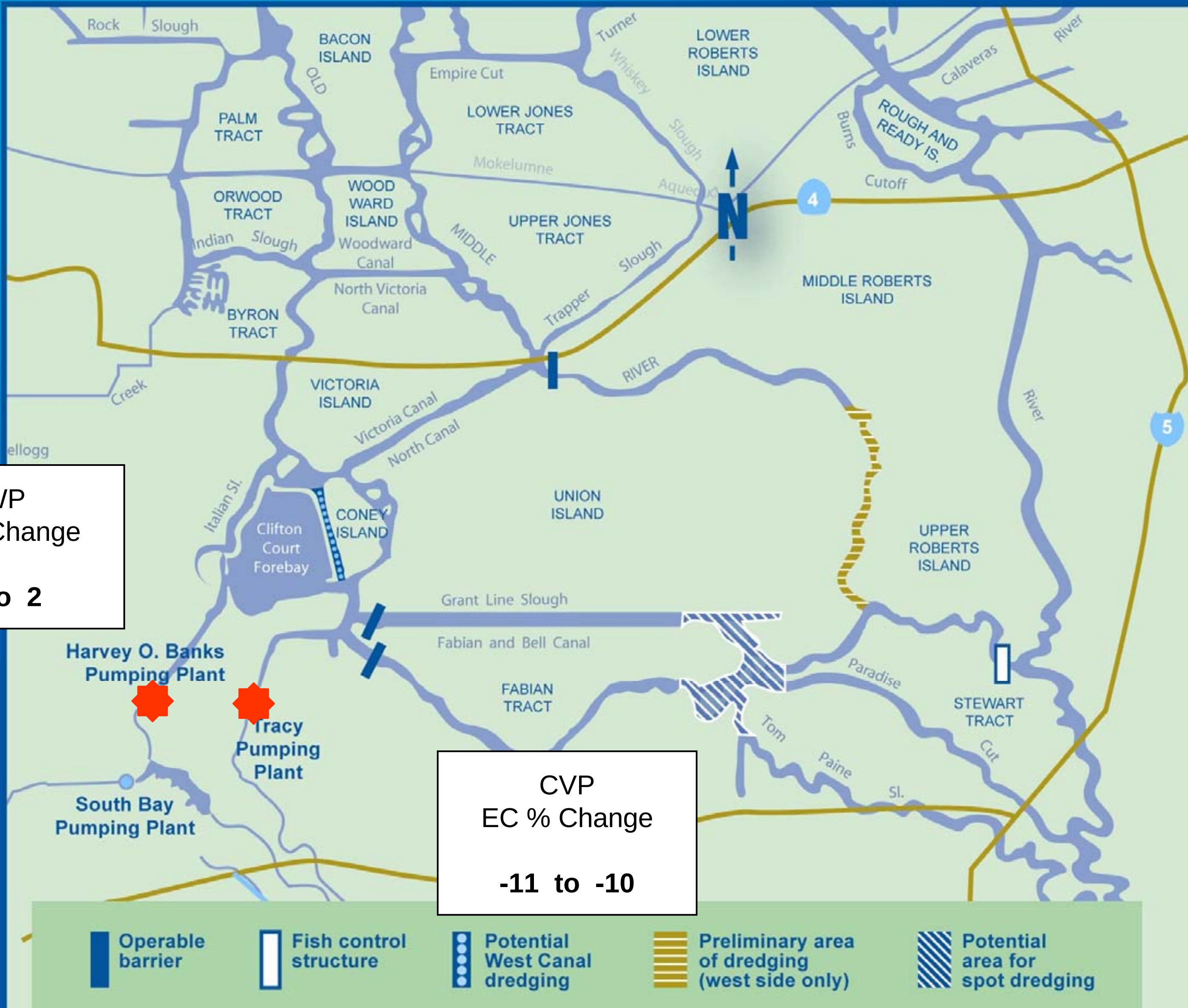
CVP and SWP Changes



SWP
EC % Change

1 to 2

CVP
EC % Change

-11 to -10

Figure 16

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Costs

Action	Estimated Cost ($)	Yearly Estimated Cost ($)
Construction		
Permanent operable gates	75 million	
Dredging	9 million	
Agricultural Extensions	2.5 million	
Operations & Maintenance		Up to 1 million
Mitigation, Enhancement, and Conservation		
Acquire and Restore Habitats in the South Delta	10 million	
Mitigation for other project impacts (e.g., dredging impacts)	Up to 6 million	
Fishery Investigations[1]	6 million[1]	
Indirect Effects Conservation Measure[2]	2 million[2]	
Total	110.5 million	Up to 1 million

Notes:

1 This amount includes the total mitigation necessary for implementing both Stage 1 and Stage 2 decisions.

2 This measure applies to the implementation of the Stage 2 decision.

Figure 17

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Schedule

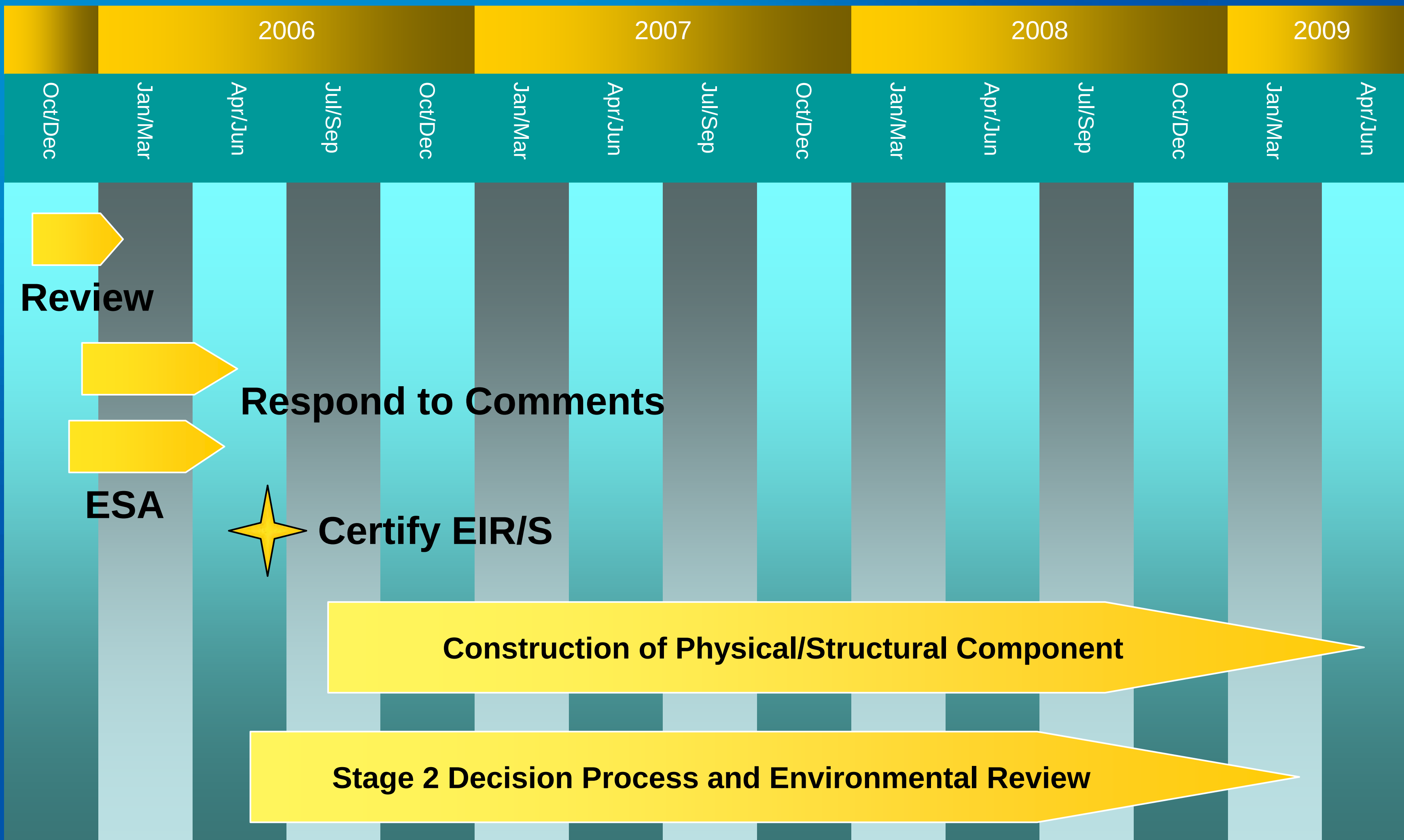

Figure 18