

**Department of Water Resources
Testimony for SWRCB Hearing on Cease and Desist Order
Modification Regarding
The South Delta Temporary Barriers Project ¹**

Background

The purpose of my testimony today is to explain to the State Water Resources Control Board how the Temporary Barriers Project (TBP) is operating to help improve local water quality in the south Delta. I'll be using a PowerPoint slide presentation for this testimony, copies of which are attached to my written testimony.

This outline slide [Figure 2] shows what I'll be presenting in my testimony. The TBP, initiated in 1990, provides for the seasonal installation of three flow control rock barriers and one fish control rock barrier in south Delta channels.

The three flow control barriers (or "agricultural barriers"), shown in Figure 3 are designed to help maintain water levels and improve circulation in south Delta channels during the irrigation season so that south Delta farmers can adequately divert water. These agricultural barriers mitigate for the adverse effects of lowered water levels in some southern Delta channels caused by SWP and CVP Delta diversions pumping..

¹ Presented by Mark Holderman, DWR Engineer and manager of the Temporary Barriers Project

The next slide [Figure 4] shows a map of the south Delta area with the temporary agricultural barrier sites shown in red. These three barriers are located in Middle River near Victoria Canal, the Old River near the CVP's Jones Pumping Plant, and at the east end of Grant Line Canal

Operations

The temporary barriers are basically rock structures, or weirs, constructed across the channel, with culverts placed through the rock near the channel bottom.

Typically each year, the barriers are installed from April 15 to about November 15. The agricultural barriers operate partially (with culvert flap gates tied open) early in the spring, and later operate fully (with flap gates untied and operating tidally) after delta smelt are no longer in the area. As required by our federal and State permits for constructing the barriers, all the barriers must be removed from the channels by November 30.

Circulation and Water Quality Improvements

Water quality in the south Delta is influenced by many factors— the quality of incoming San Joaquin River (SJR) flows, salt water intrusion from San Francisco Bay, local agricultural drainage, poor circulation in south Delta channels, diversions of water by the CVP and SWP, tidal action, and channel capacity.. Diversions in the Delta can cause hydrodynamic changes that affect water

quality. During periods of high exports and peak irrigation, higher quality water is drawn into the southern Delta, mixes with flow from the San Joaquin River, and improves the quality of water in the south Delta area. However, SWP and CVP export pumping and in-Delta diversions in the southern Delta can cause or exacerbate stagnant, or null zones in some channels. The null zones can prevent circulation of better quality water that is otherwise available from the main channels. The TBP operations can help improve circulation and reduce the number of null zones in the area.

Figure 5 shows water quality compliance and monitoring sites in the south Delta area. The red dots indicate the locations where water quality is measured in support of the Temporary Barriers Project monitoring requirements. The yellow dots indicate the locations where water quality is monitored in compliance with D-1641. Figure 6 shows water quality measurements taken from three Temporary Barriers Project monitoring locations in 2003. These locations are along Old River from the Delta Mendota Canal to the HOR. You can see from this example how water quality generally improves when the temporary barriers are operating. There are several reasons for the improvements. During the summer months, when SJR flows are low and poorer quality; the three agricultural barriers reduce the amount of SJR flows entering the south Delta and change circulation dynamics. Also, the barriers improve circulation and reduce stagnant zones in areas upstream of the barriers. Finally, under certain export/inflow relationships and time of the year, the barriers induce movement of better-quality Sacramento

River water into upstream reaches of Old River to mix with poorer-quality SJR river water.

Recent Actions to Improve Water Circulation/Water Quality

DWR has for a number of years been coordinating exports and temporary barrier operations with the South Delta Water Agency (SDWA) through monthly coordination conference calls with SDWA, USBR, and SWRCB staff. Through this coordination, the parties agreed to investigate ways to better operate the temporary barriers and determine if these new operations could help improve circulation and resulting water quality. Hydrodynamic modeling was done of numerous alternatives to culvert operations and barrier modifications, resulting in conclusions that tying open culverts on the Old River near Tracy barrier during certain tidal periods, as well as increasing the height of the Middle River barrier by one foot, would increase circulation down Old River and potentially improve water quality in that channel [Figure 7].

During the summers of 2007 and 2008, DWR field personnel tied open varying numbers of culverts flap gates at the Old River near Tracy barrier, depending on tidal conditions, agricultural diversion demand, and water levels—in an effort to increase circulation and effect an improvement in water quality upstream of the barrier. DWR staff monitored water quality measurements at the Tracy Road Bridge compliance site on Old River to determine what changes in salinity might

be due to the culvert operations. A report on the 2007 “experiment” is being completed by DWR and will be sent to the SWRCB later this summer. DWR intends to continue these culvert operations and monitoring in 2009 and beyond.

DWR has recently applied to the US Army Corps of Engineers (Corps) for a permit amendment to allow DWR to raise the weir height at the Middle River barrier by one foot. A similar application will be sent soon to the CA Dept of Fish and Game for an amendment to their permit. DWR intends to have permits to add the additional one foot of material to the weir sometime later this summer. As mentioned earlier, this modification has been shown in modeling to increase upstream flow in Middle River and subsequent increased downstream flow in Old River to improve circulation in these channels in a manner that is expected to reduce salinity “hot spots” and stagnant zones. The combination of the culvert operations at the Old River near Tracy barrier and the modification to the Middle River barrier should provide improvements in circulation in south Delta channels and as a consequence, possibly reduce salinity and stagnant zones in areas historically prone to salinity buildup. However, these improvements cannot be relied upon to consistently reduce salinity enough to ensure water quality objectives in the interior south Delta will be met.

Finally, DWR in June 2009 completely replaced 20-year old deteriorated and leaky culverts and flap gates in the Middle River barrier [Figure 8]. This will ensure the barrier performs more effectively at improving water levels and

circulation upstream of the barrier and helping to increase downstream flow and water quality on Old River.

Conclusion

To summarize, my intent has been to describe how the current Temporary Barriers Project operations—by manipulating culvert flap gates and changing the height of certain barriers—can at times help improve circulation and therefore water quality in the south Delta. This concludes my presentation.

Temporary Barriers Project

Department of Water Resources

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Outline

- Temporary Barriers Project (TBP)
 - Background
 - Operations
 - Circulation and Water Quality Improvements
 - Recent Actions to Improve Water Circulation/Water Quality
 - Conclusion

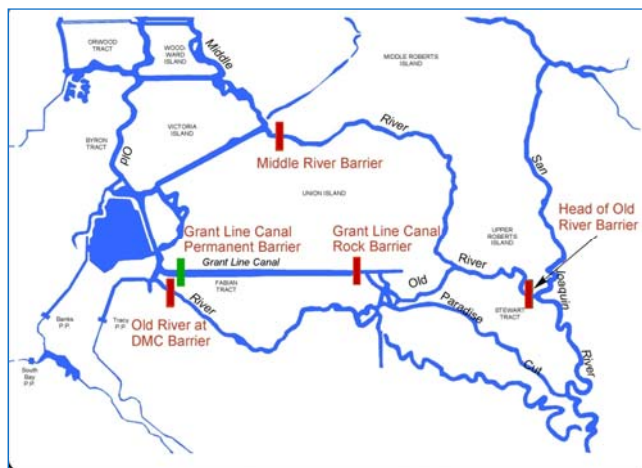
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Temporary Ag and Fish Barriers



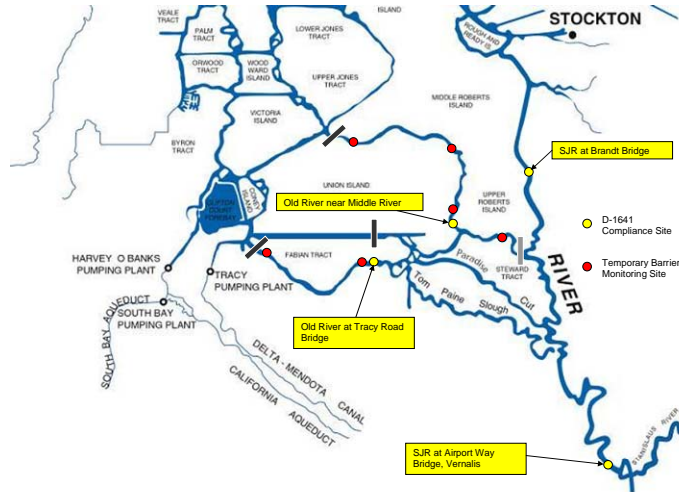
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Temporary Barriers - Locations



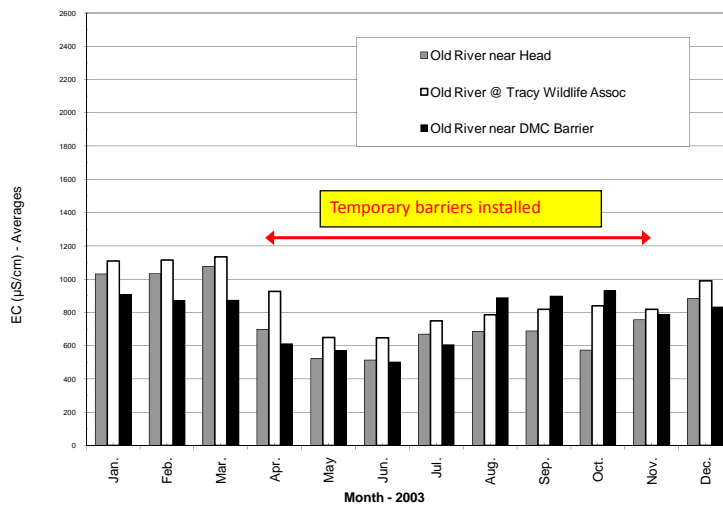
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Water Quality Compliance/Monitoring Sites



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Typical TBP Water Quality Improvements



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TBP Modeling for Circulation/WQ Improvements

Scenario	Change in Barrier Operations	Impacts of Barrier Operations on Period Average Flow (CFS) as Compared to:		
		Old River near Tracy	Middle River	Grant Line Canal
C2	MR Elev. +1.0-ft + All 9 ORT Flap Gates Tied Open	+95	-50	-140

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2009 Middle River Culvert Replacement



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