Department of Water Resources
Testimony for SWRCB Hearing on Cease and Desist Order 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 what the Temporary Barriers Project (TBP) is, how the barriers function, and how they can help improve local water quality. I'll be using a PowerPoint slide presentation as a visual aid for the testimony. Copies of these slides are attached to this 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

Three flow control barriers (agricultural barriers) 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 impacts to local water levels caused by State Water Project (SWP) and Central Valley Project (CVP) Delta exports. However, low water levels in the area are also influenced by low San Joaquin River (SJR) inflows, local agricultural channel depletions, natural tidal variations, fluctuating barometric pressure, local wind velocities and direction, and limited channel capacity.

[1] Presented by Mark Holderman, DWR engineer and manager of the Temporary Barriers Project.

The fourth barrier is a fish control rock barrier that helps improve migration conditions in the south Delta for chinook salmon smolts emigrating down the SJR in the spring and helps improve dissolved oxygen in the SJR for immigrating adults in the fall. The fish barrier is located at the Head of Old River (HOR), which is on Old River near the confluence with the San Joaquin River.

These barriers collectively have been installed to test the feasibility of the permanent operable gates (known also as operable barriers or flow control structures) now proposed by the Department of Water Resources (DWR) under its South Delta Improvements Program (SDIP).

The next slide [Figure 4] provides a sense of the number of agricultural diversions in the south Delta area that are effected by the barriers. DWR surveyed the diversions in this area initially in early 1999. Diversions are mostly turbine pumps but there are a few siphons, especially at the west end of Union Island, where lower land elevations relative to the channel water levels make siphons workable.

This next slide [Figure 5] shows a map of the south Delta area with the temporary barrier sites shown in red. The three agricultural barriers are located in the Middle River, the Old River near Tracy Pumping Plant, and the east end of Grant Line Canal The permanent operable gates that will be constructed under the SDIP will be at approximately the same locations except for the Grant Line Canal barrier. The location of the permanent gate on Grant Line Canal, indicated in green, will be on the west end of the canal instead of the east end

Installation History

DWR has been installing and operating temporary barriers to assist diversions by farmers within the South Delta Water Agency in the south Delta since 1989. The fall Head of Old River barrier has been installed at the request of the Department of Fish and Game (DFG) since 1968 to benefit migrating adult Chinook salmon. The Spring HOR barrier has been installed since 1992 for the benefit of migrating salmon smolts to keep the smolts in the main channel of the San Joaquin River. The temporary barriers are rock structures placed across the channel with culverts placed through the rock near the low water levels. DWR is presently permitted to install and operate the barriers through the year 2007 and we are committed to continuing the temporary barriers program until such time as permanent, fully operable gates are constructed.

Operations

Typically each year, the barriers are installed from April 15 to about November 15. While the agricultural barriers operate partially or wholly throughout this time, the spring HOR barrier operates from April 15 to May 15, and sometimes until May 30 if requested by the fish agencies and then is removed for the summer. The fall HOR barrier is then installed about mid-September, when requested by DFG, and operates until mid-November. As required by our US Army Corps of Engineers Permit and biological opinions for constructing the barriers, all the barriers must be removed from the channels by November 30. This minimizes impacts to fish and prevents the barriers from being an impediment to higher river flows in the winter and spring.

The next three slides [Figures 7-9] depict how the culverts at the temporary barriers work to allow water to fill the upstream reaches on

the rising tides and then maintain the higher water levels while the tide recedes. Three of the barriers have six 4-foot diameter culverts. The barrier on Old River at Tracy has nine culverts 4-foot diameter culverts.

The first slide [Figure 7] shows how the rising or “flood” tide forces water over the barrier and through the culverts. The hydrostatic pressure of the flood tide forces water against the flap gates on the culverts and opens the flap gates on the upstream side to enable water to flow into the channel upstream of the barrier. .

The next slide [Figure 8] shows the tide beginning to recede or “ebb.” The flap gates close with the change in direction of flow, holding water levels higher on the upstream side of the barrier. On the downstream side of the barrier, the water levels begin to lower as the tide ebbs along the channels towards the Bay.

The third slide [Figure 9] shows the conditions after the tide has fully ebbed. The culverts remain closed holding water levels high on the upstream side of the barrier while the water levels downstream drop to their low tide levels.

The next four slides [Figures 10-13] are aerial views of the barriers. The first slide shows the Old River at Tracy barrier with the boat ramp for recovering and launching recreational boaters on the left and the culvert structure near the center of the barrier. The next slide shows the Grant Line Canal barrier at a time in the tidal cycle when water flows over the weir portion of the barrier from upstream. This barrier also has a boat portage ramp. Here you can see the culvert structure, which at this barrier stays in place in the channel all year long. At the far right side of the barrier a fish weir operates using flashboards to adjust the amount of flow for fish passage. In the next

slide is the Middle River barrier. This barrier also has culvert structures that are in place in the channel all year. Installation of this barrier only requires placing of rock in the center to create a weir. Note that in this picture water is flowing over the MR weir, so it's difficult to see. This next slide shows the HOR barrier, installed at the confluence of Old River and the San Joaquin River. The San Joaquin River is in the background. Notice in the center of the barrier is a portion that is not rip-rapped. In the spring only, we install a clay "plug" that can wash away in a extreme high flow situation, thus controlling the breach in the barrier to reduce damage to nearby levee slopes. In the fall, instead of a clay plug, we install a notch that allows continuous flow for migrating adult salmon that might otherwise get trapped on the Old River side of the barrier.

Historical Water Quality Measurements

Water quality in the south Delta is influenced by many factors—the quality of incoming SJR flows, salt water intrusion from San Francisco Bay, local agricultural drainage, poor circulation in south Delta channels ("null zones"), and CVP and SWP Delta exports. This next slide [Figure 15] shows the 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. The next slide [Figure 16] 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 a number of reasons why this improvement happens. One, the SJR river flows are much higher when the HOR barrier is operated in April/May in support of

the Vernalis Adaptive Management Plan experiment. Higher flows improve the water quality entering the south Delta area, which is generally SJR water during this time. Two, when the HOR barrier isn't operating 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. Three, the barriers hold a greater volume of water in the channels above the barriers than would normally be present without the barriers. Higher volumes provide greater dilution of salt from upstream and agricultural sources.

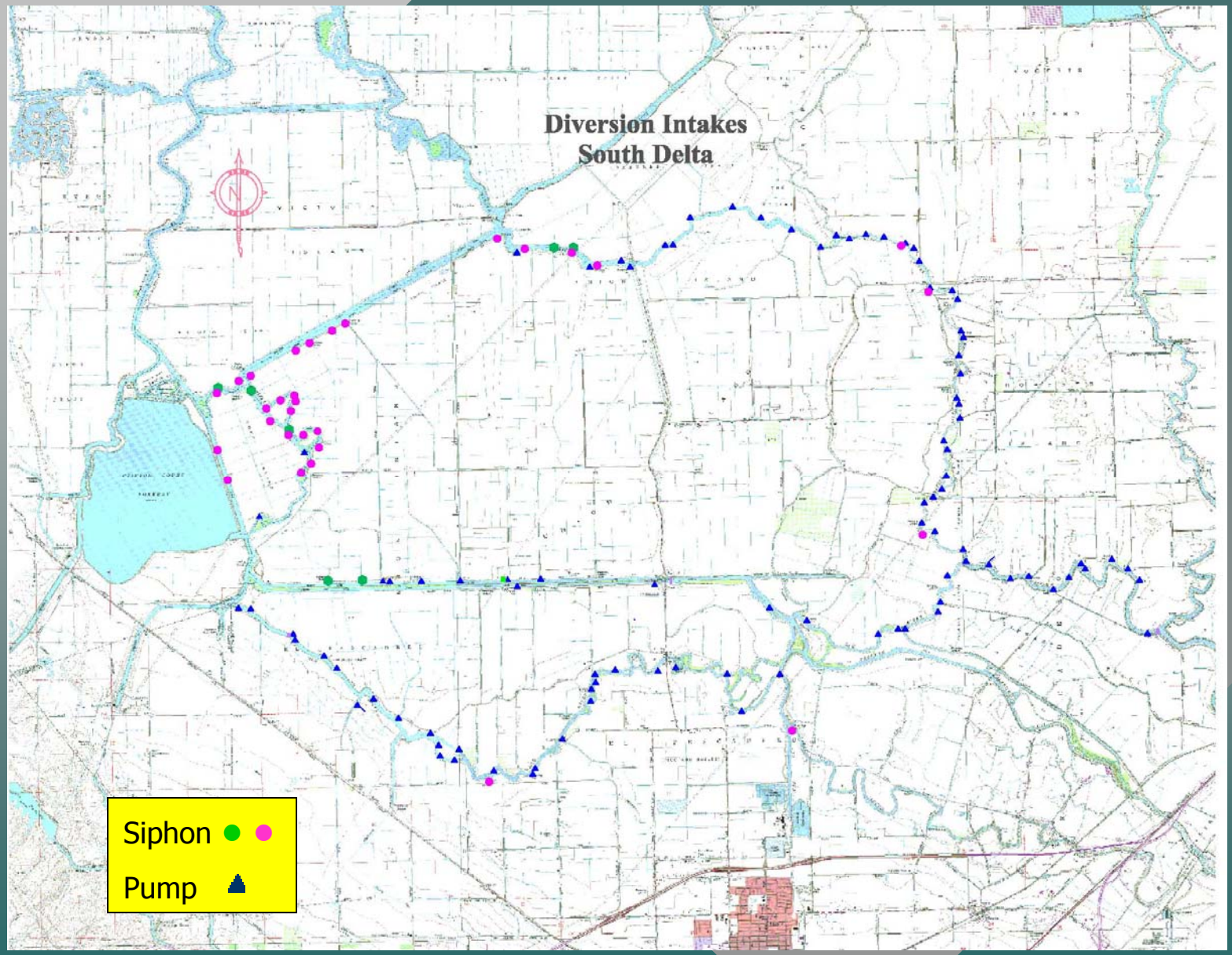
Conclusion

This presentation describes the purpose of the Temporary Barriers Project, explains how the barriers work, and shows that the barriers improve water levels for the benefit of agriculture, and at times improve water quality at some locations in the south Delta.

Outline

- Temporary Barriers Project (TBP)
  - Background
  - Installation History
  - Operations
- Historical Water Quality Measurements

Figure 1



Diversion Locations

Figure 2

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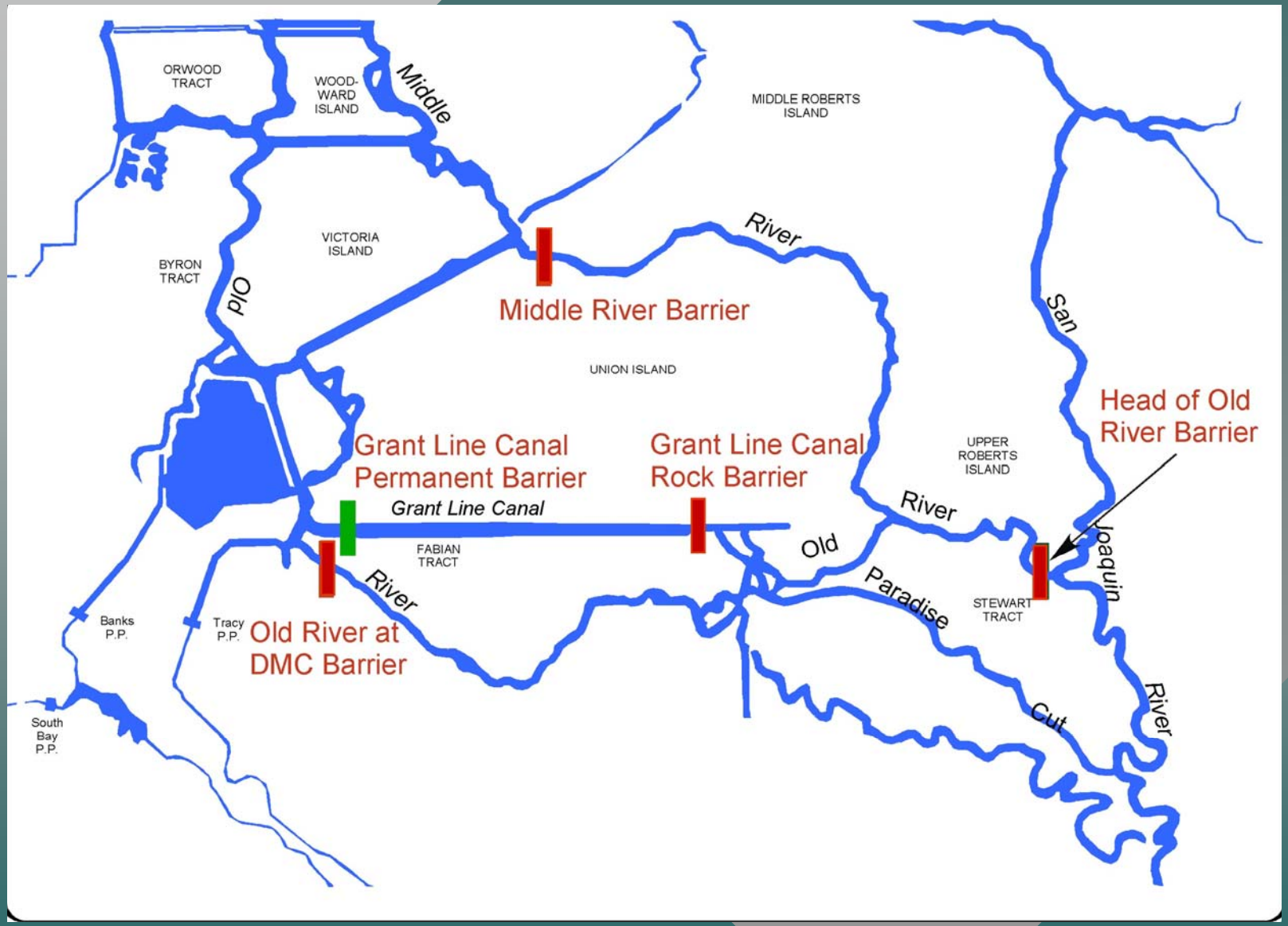
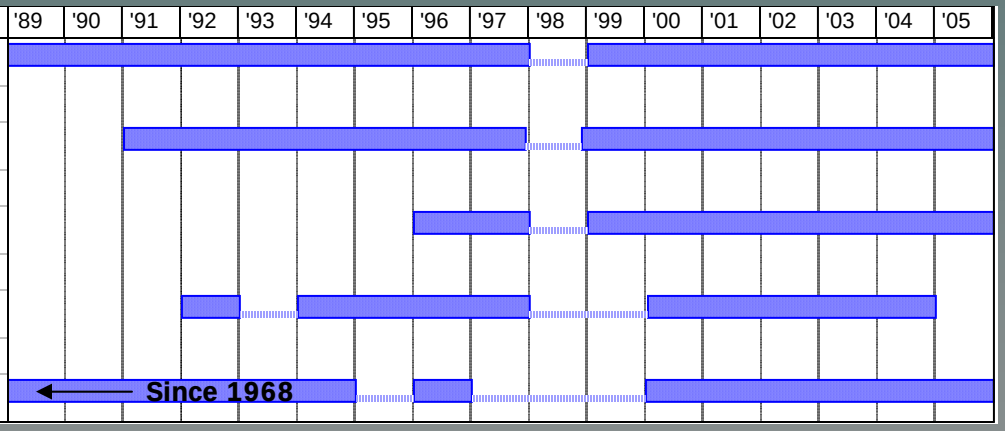


South Delta Barriers Locations

Figure 3

ID	Task Name
1	**Middle River Barrier**
2	
3	**DMC Barrier**
4	
5	**Grant Line Canal Barrier**
6	
7	**Spring Head of Old River Barrier**
8	
9	**Fall Head of Old River Barrier**



TBP Installation History

Figure 4

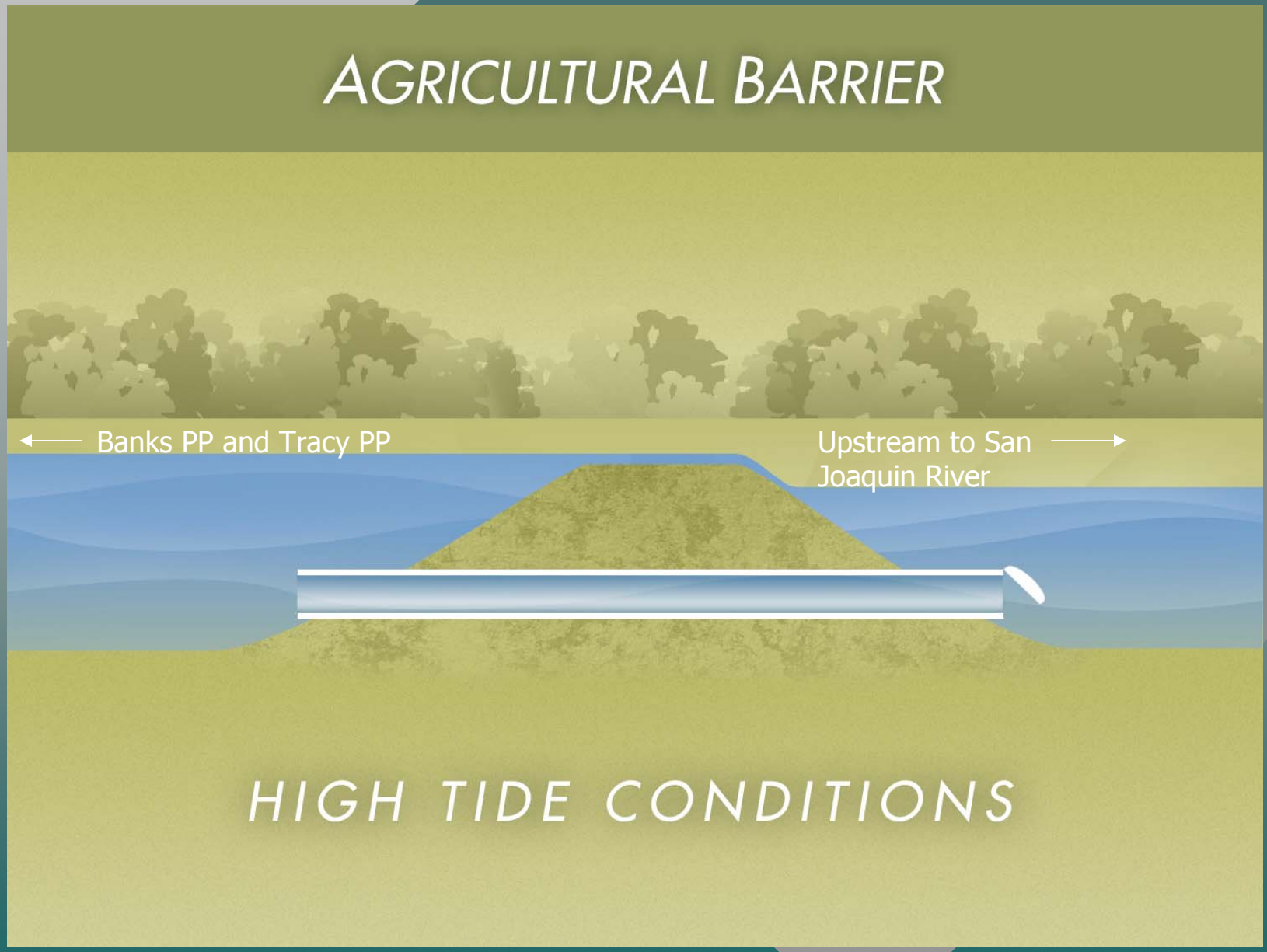

AGRICULTURAL BARRIER
Banks PP and Tracy PP
Upstream to San Joaquin River
HIGH TIDE CONDITIONS

Figure 5

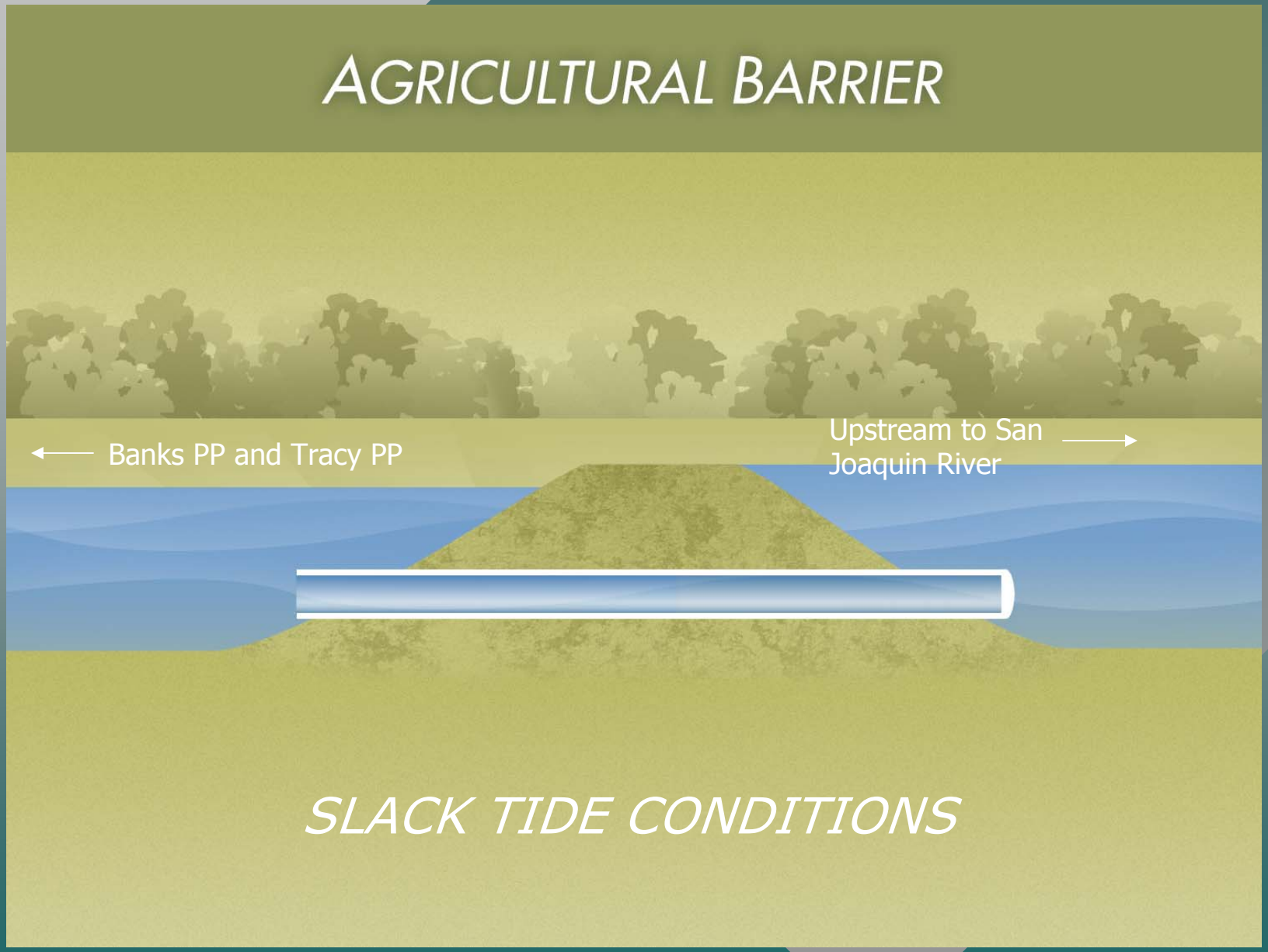

AGRICULTURAL BARRIER
Banks PP and Tracy PP
Upstream to San Joaquin River
SLACK TIDE CONDITIONS

Figure 6

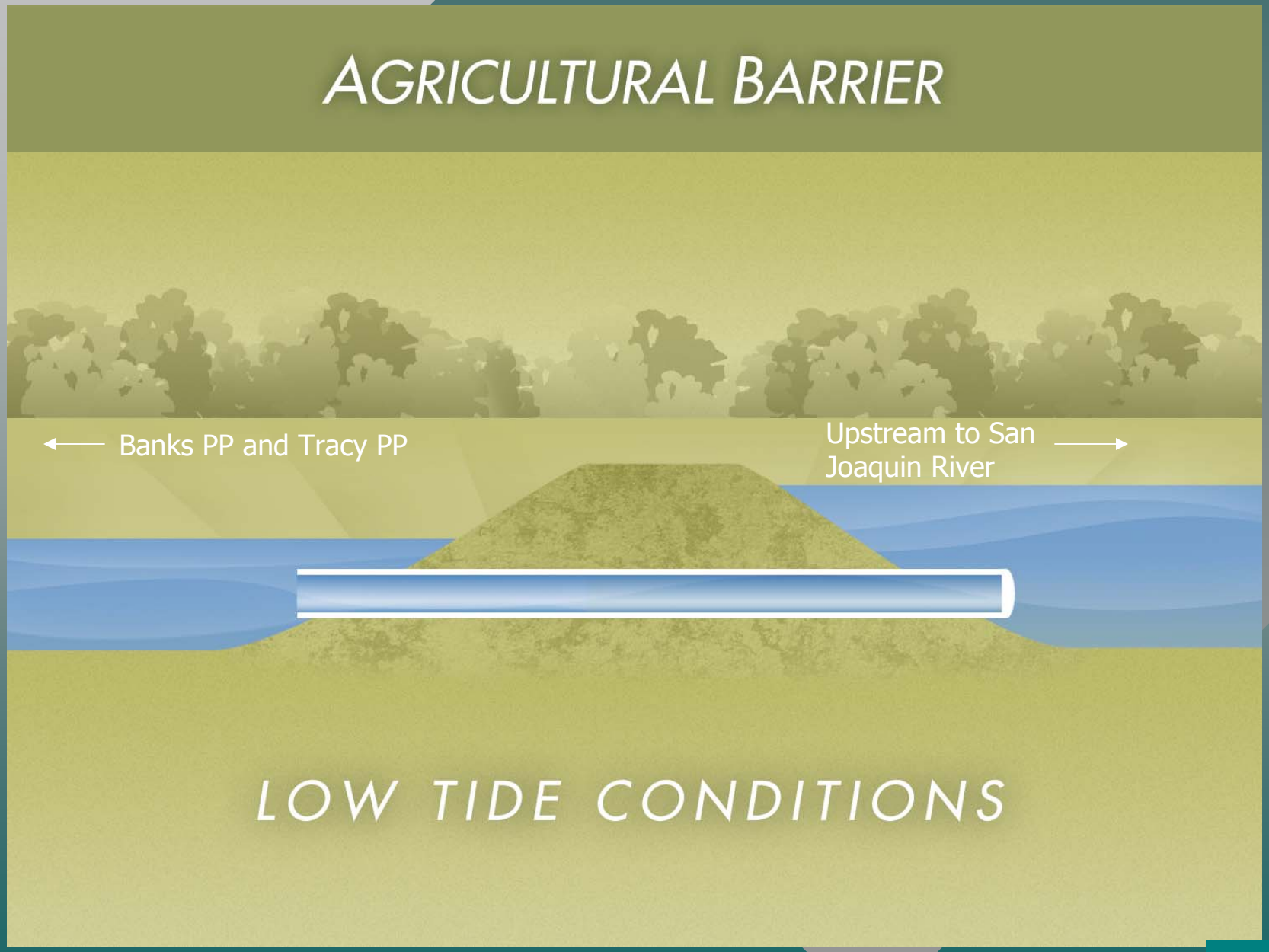

AGRICULTURAL BARRIER
Banks PP and Tracy PP
Upstream to San Joaquin River
LOW TIDE CONDITIONS

Figure 7

Old River at Tracy Barrier

Figure 8

Grant Line Canal Barrier

Figure 9

Middle River Barrier

Figure 10

Head of Old River Barrier

Figure 11

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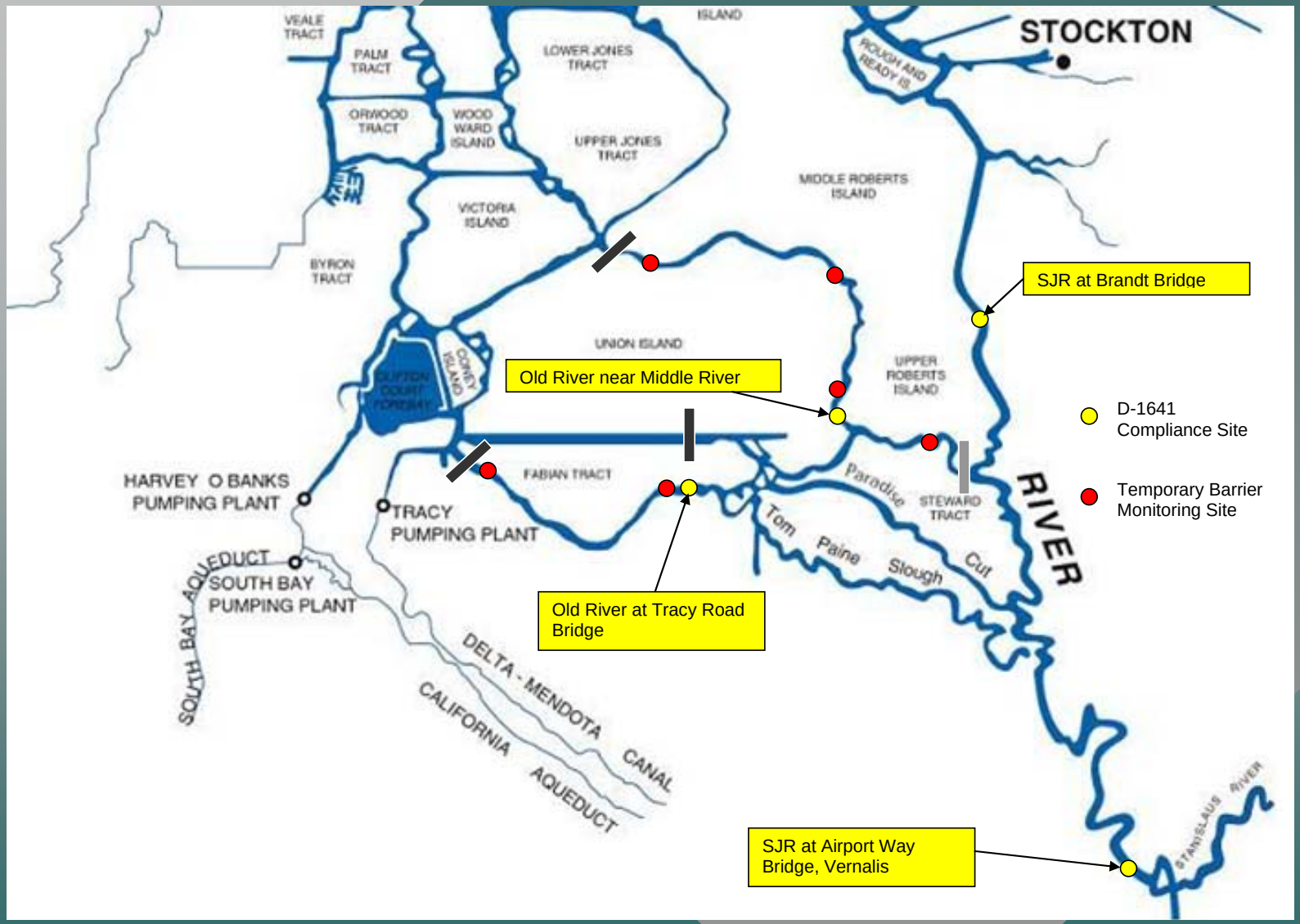
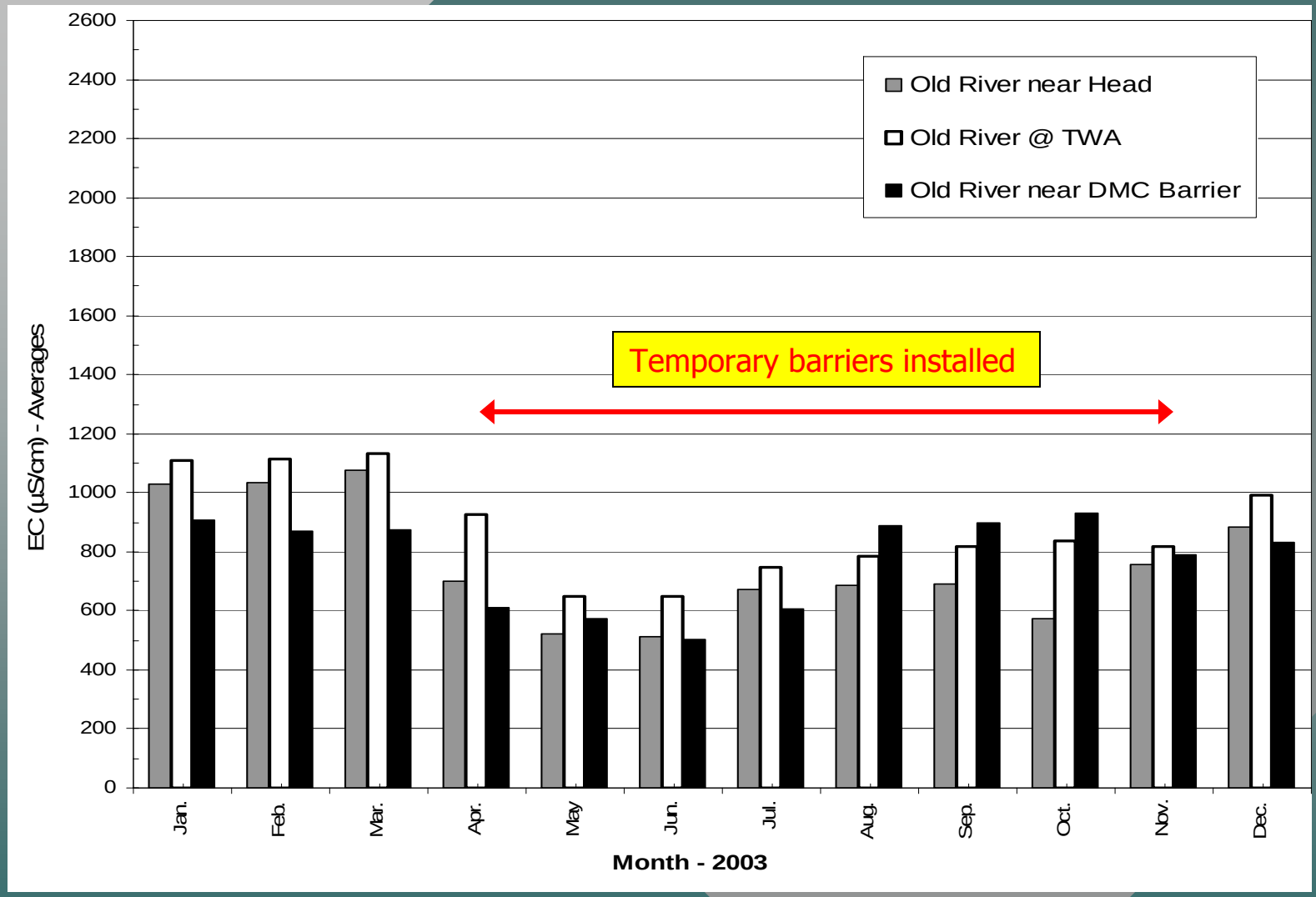


Water Quality Compliance/Monitoring Sites

Figure 12



Typical TBP Water Quality Improvements

Figure 13