The Impact of a Single North Delta Drought Barrier Below the Confluence of Sutter Slough and Steamboat Slough Versus Barriers in Sutter Slough and Steamboat Slough

January 28, 2015

In the spring of 2014, State and federal agencies considered the installation of emergency drought barriers across three channels in the Sacramento-San Joaquin Delta in order to help limit salinity intrusion in the central Delta. Storms in February and March allowed the California Department of Water Resources to avoid installation of the barriers in 2014, but planning continues in case future conditions turned so dry that rock barriers are needed to physically limit salinity encroachment. Such an emergency measure could help conserve water in upstream reservoirs that otherwise would need to be released to repel saltwater from San Francisco Bay and protect the quality of water used by millions of Californians from the Delta to San Diego.

As DWR considered emergency drought barriers in 2014, several north Delta landowners asked the Department to evaluate the option of installing two, rather than three barriers. Rather than installing three separate barriers on West False River, Steamboat Slough, and Sutter Slough, they asked the Department to consider the efficacy of a barrier at West False River and a second just downstream of the confluence of Steamboat and Sutter sloughs.

Using computer models and assuming extremely dry conditions, DWR considered the two-barrier alternative and found that it would not be as effective as the original three-barrier proposal. The results of that modeling are described here.

A scenario with a single north Delta drought barrier (one culvert open) below the confluence of Sutter Slough and Steamboat Slough (Figure 1) was evaluated against two other scenarios – without drought barriers and with two drought barriers (one each on Sutter and Steamboat Sloughs, each with one culvert open) using the same hydrology that was used for EDB IS-MND modeling (Table 1). A drought barrier was modeled in the central Delta at West False River in both of the with-barriers scenarios. The single-north Delta-drought barrier scenario is not as effective as the two-drought barrier scenario in improving salinity in the central/south Delta while keeping salinity below 400 EC in the Barker Slough area because flow through Miner Slough is not constrained.

Figures 2-6 show forecasted EC at different locations for the three scenarios. Table 2 shows maximum, average, and minimum EC for the period when barriers are in place. When three barriers are in place, the average EC change is -37.3%, -31.1%, -25.3%, -35.9% and 36.0% for the five locations - Rock Slough, CLFCT, Victoria Canal, Old R @ HY4 and Barker Slough, respectively. For the two barrier scenario, the average EC change is -30.4%, -23.6%, -17.0%, -28.2% and 12.8%. Based on these results the single-north Delta-barrier scenario provides significantly less improvements in water

quality within the South and Central Delta compared with the two-north Delta-barrier scenario and was therefore not further considered.

Fig 1. Drought Barrier below the confluence of Sutter Slough and Steamboat Slough

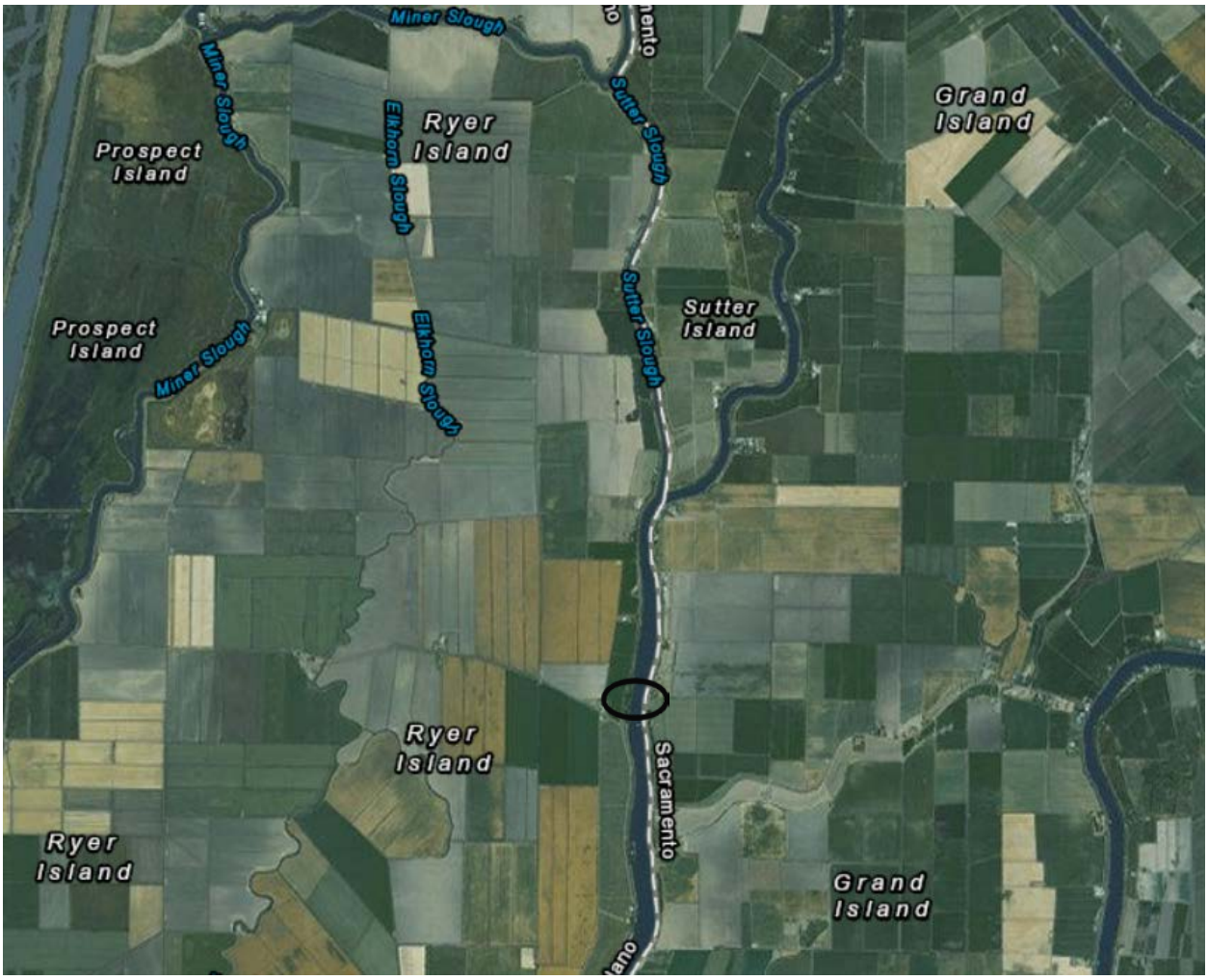

Table 1: Inflows and exports used for EDB IS-MND modeling

Month 2015	Sacramento River	San Joaquin River	Cosumnes-Mokelumne	Delta CU	CVP Exports	SWP Exports	CCWD Diversions	Approx NDO
January	6,093	862	244	449	439	1,123	81	5546
February	10,411	828	504	1,731	1,296	1,314	54	6679
March	5,339	1,668	244	2,935	733	733	114	2994
April	6,580	1,721	252	3,524	756	756	108	3000*
May	6,919	1,713	244	3,660	748	829	104	3000*
June	7,324	1,082	252	4,430	807	773	108	2175
July	7,064	933	244	4,607	797	781	210	2674
August	6,281	807	244	2,938	719	781	221	3554
September	5,114	811	252	1,731	744	756	242	2870
October	5,201	638	50	1,403	751	749	244	2429
November	5,000	694	60	1,127	755	745	275	2868
December	8,847	623	40	1,096	1,545	2,423	280	3975

Table 2: Maximum, average and minimum forecasted EC at different locations

Location	No Drought Barrier			3 Barriers 1 culvert Open			2 Barriers 1 Culvert Open		
	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min
Rock Slough	1,557	1,325	997	1,035	831	756	1,035	922	851
CLFCT	1,267	1,090	850	876	751	704	891	833	780
Victoria Canal	1,050	933	777	787	697	660	816	774	732
Old R @ HY4	1,407	1,200	911	935	769	709	935	862	805
Barker Slough	228	212	204	390	288	217	272	239	213

Fig2. Forecasted daily EC at Rock Slough

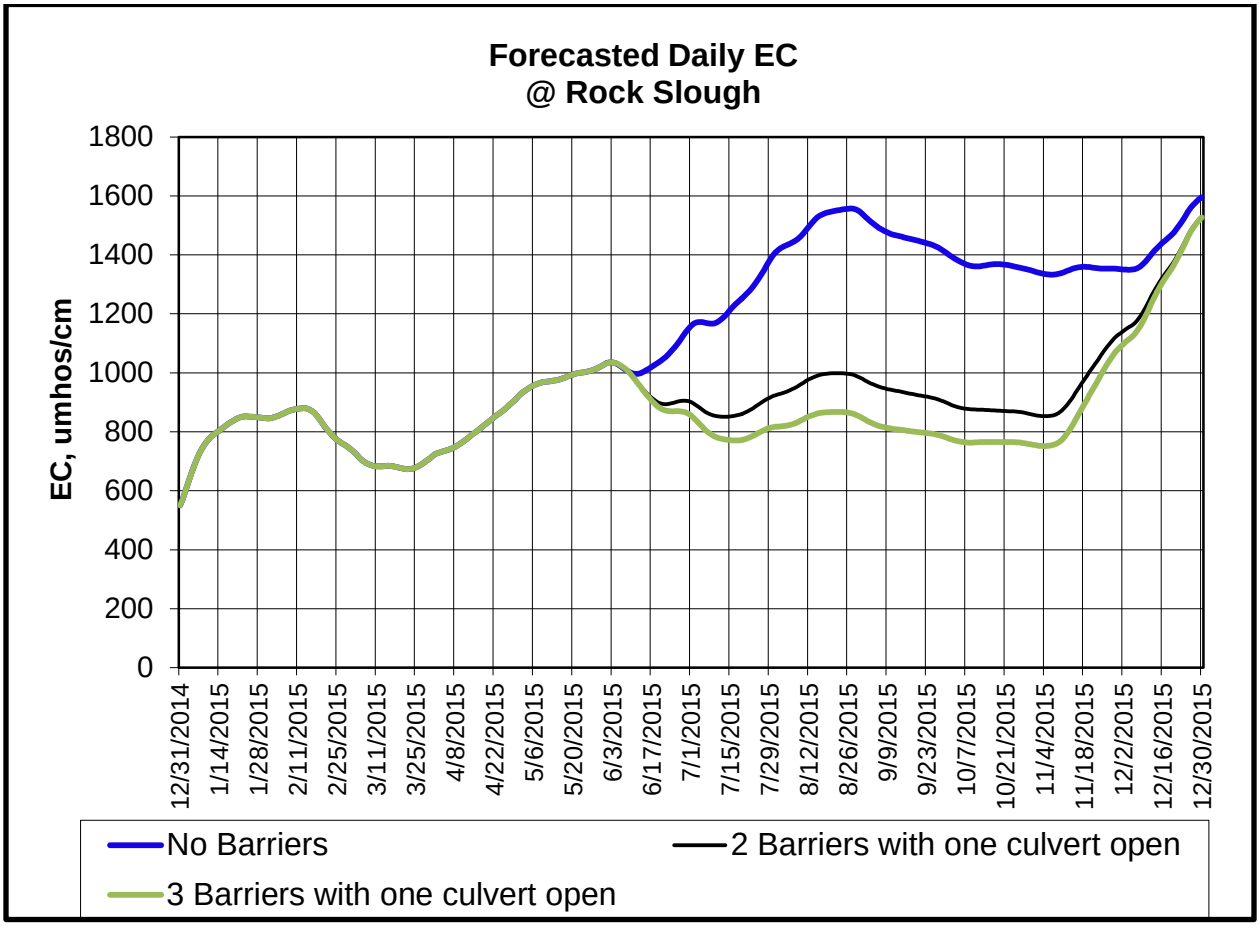

Fig3. Forecasted daily EC at Clifton Court Forebay

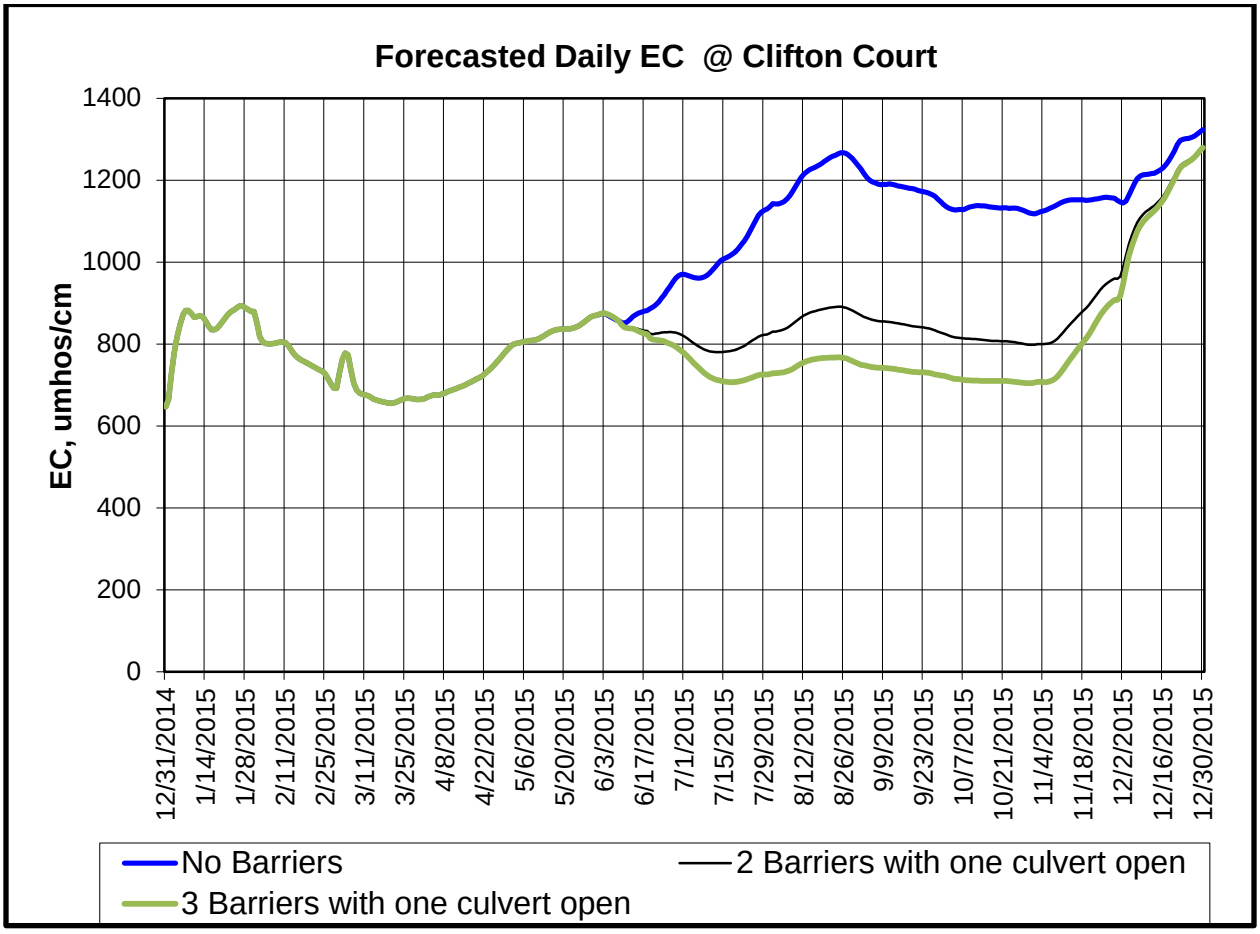

Fig4. Forecasted daily EC at Victoria Canal

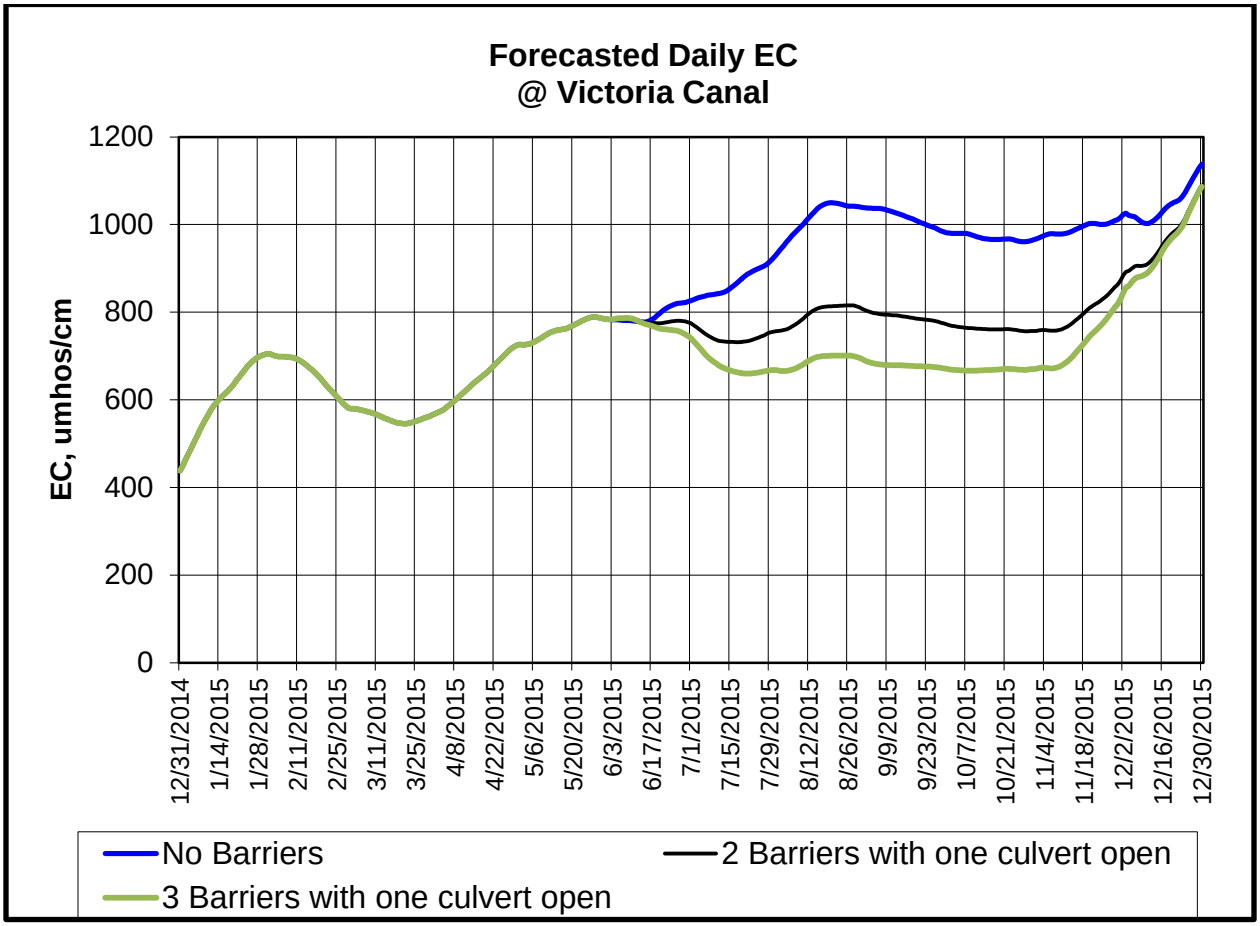

Fig5. Forecasted daily EC at Old River near Highway 4

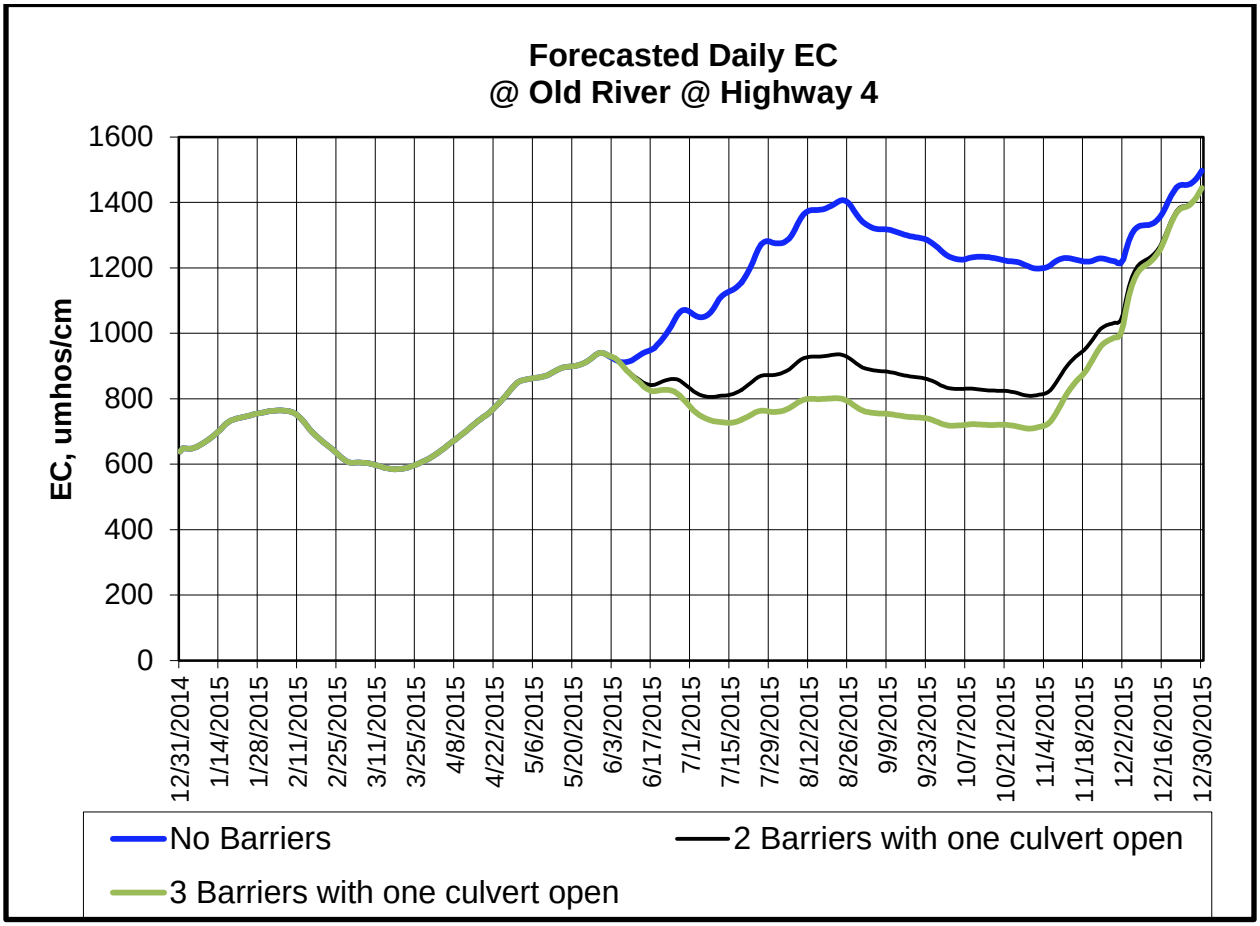

Fig 6. Forecasted daily EC at Barker Slough