5.6. EC Results

To present a clear picture of the effects of the scenarios on EC in Suisun Marsh and in the Delta, several types of plots are provided. These include time series plots of the scenario EC at selected locations in Suisun Marsh and the Delta; color contour plots of percent change from base; comparison plots of Base case and scenario EC in Suisun Marsh; and comparison plots of Base case and scenario EC in the Delta. For all of the scenarios, large percent changes calculated in the winter are due to very low values, i.e. relatively small increases in modeled EC can translate to large percent increases. Therefore, contour plots of % change during the winter are not provided.

5.6.1. **Martinez to Collinsville**

Tidally averaged EC at Martinez (Figure 5-19) is relatively uniform between scenarios. However, upstream at Chipps and Collinsville, Figure 5-20 and Figure 5-21 respectively, the effect of the Set 2 tidal restoration with breaches between Honker and Grizzly Bays is seen as a pronounced increase in EC throughout the year.

5.6.2. **Suisun Marsh**

Changes in the details of the EC profile for each scenario depended on the particular location examined, the operation of the SMSCG, and the season. Each of the scenarios resulted in EC increases in Montezuma Slough at Beldon’s Landing. Tidally averaged EC for the Base case and the four restoration scenarios are plotted in Figure 5-22 through Figure 5-34 for locations throughout Suisun Marsh.

The Set 1 scenario produced the greatest increases in EC throughout much of Suisun Marsh, as most of the tidal marsh restoration occurs in the interior portions of the marsh and off of Montezuma Slough. See for example, stations S-49 at Beldon’s Landing, S-40 at Boynton Slough, and S-97 at Ibis in Figure 5-22 through Figure 5-24. At Beldon’s Landing, the Zone 4 breaches pull high salinity water in from western Montezuma Slough increasing EC there year-round. The Set 1 breaches in north-western Suisun Marsh increase EC near those locations, again through the increased volume of higher salinity moving up western Montezuma Slough.

Effects from Set 1 restoration in the western portions of the marsh primarily result from the breaches in that area, as can be seen when comparing results with the Zone 4 scenario results at station S-97, Figure 5-24. Zone 4 had very little effect on EC in the western and northern marsh when the SMSCG was open and decreased EC when SMSCG was operating, as illustrated in Figure 5-24 through Figure 5-31.

Zone 4 increased EC at Beldon’s landing regardless of the SMSCG status. In eastern Montezuma Slough at National Steel (Figure 5-33) and Roaring River (Figure 5-34), EC decreased when SMSCG was open and increased when the gates were operating.

In eastern Montezuma Slough, Set 1 reduced EC when the SMSCG was open (see station S-64 at National Steel, Figure 5-33 and station S-71 at Roaring River, Figure 5-34). The

Zone 4 breaches on Montezuma Slough pull high EC water into the marsh from the west during flood tide. Ebb flows on the upstream side of the breaches pull additional lower EC Sacramento River water into the eastern end of Montezuma Slough. This is illustrated in Figure 5-40, which shows color contours of EC for the Base case and Zone 4 scenario at the same timing on a flood tide and on an ebb tide.

The Zone 1 restoration increased EC throughout much of the marsh. As shown in the color contour plot of percent change in EC in Figure 5-47, % EC in Grizzly Bay at the mouth of Montezuma Slough is about 4.5% higher than the Base case with similar increases at the mouth of Suisun Slough. The flows that progress up Suisun Slough past the Zone 1 breach are smaller than in the Base case due to the breach, and the marsh is being filled with higher EC water from the mouth of Montezuma Slough in the west.

The Zone 1 scenario EC results were the most similar to the Base case, showing little difference from the Base case in the eastern Marsh (station S-64 at National Steel and station S-71 at Roaring River) and at Morrow Island (station S-35, Figure 5-26), but resulted in at least some EC increase in the western Marsh (for example, S-42 in Volanti Slough, Figure 5-27 and S-21 on Sunrise Slough, Figure 5-25) and in Montezuma Slough near Beldon's Landing.

The Set 2 scenario, which incorporates Zone 1, increased EC when the SMSCG was operating. In the western and central marsh (for example S-21 and S-49), EC was increased throughout the simulation, but at Morrow Island, Set 2 resulted in little change when the SMSCG was not operating. When the SMSCG was not operating, EC decreased appreciably only in eastern Montezuma Slough at S-64 and S-71.

Operation of the SMSCG acts to decrease EC in comparison to the Base case. Specific locations on Montezuma Slough illustrate the effect of SMSCG operation and changes in tidal flow due to the breaches.

- S-49 – Beldon's Landing (Figure 5-22): For the Set 2 scenario, the breaches north of Montezuma Slough only affect EC at Beldon's Landing when the SMSCG is operating. This can be seen because Set 2 and Zone 1 EC are nearly the same at this location when the gates are open.
- S-64 – National Steel (Figure 5-33): In general, all of the scenarios decrease EC at S-64 when the SMSCG is open because they decrease the flood tide flow of higher EC water to this location. When the gate is operating, EC increases for Set 2 because EC at the eastern end of Montezuma Slough near Collinsville is higher due to the breaches in Suisun Bay. On ebb tide, this higher EC water flows past S-64. For the Zone 1 scenario, the same thing occurs only the effect is much smaller. For the Set 1 and Zone 4 scenarios, the increase in EC is the result of a change in phasing. The breaches off of Montezuma Slough changed the tidal phasing and amplitude so that flow from Collinsville into Montezuma Slough occurs at high tide, when EC at Collinsville is highest.

5.6.3. **Delta**

Scenarios that tended to increase EC in Suisun Marsh tended to decreased Delta EC. Delta EC was similar to the Base case in all of the scenarios during early winter through spring, but changed in relation to the Base case during summer through fall. This can be seen in plots of tidally averaged EC for the Base case and four marsh restoration scenarios at several Delta stations in Figure 5-35 through Figure 5-39, and in contour plots of % change from base in Figure 5-41 to Figure 5-53.

The two scenarios incorporating Zone 4 (Zone 4 and Set 1) resulted in a decrease in Delta EC, while the two scenarios incorporating Zone 1 (Zone 1 and Set 2) resulted in an increase in summer through fall Delta EC. This is seen at locations from Jersey Point, Figure 5-35, to various locations in the central and south Delta - at Old River near Rock Slough (5-36), in Victoria Canal (5-37) and at the CVP (Figure 5-38) and SWP (Figure 5-39) export locations.

The Set 2 scenario causes the greatest increase in Delta EC, as shown in Figure 5-41 through Figure 5-46 for the months with the highest EC changes. An example is seen in the color contour plot of percent change from Base case EC for the Set 2 scenario on September 1, 2002 in Figure 5-42. At this time, EC at the SWP is 12% greater than Base and at the CVP, it is 10% greater than Base. These changes are due to tidal mixing in the breaches off of Suisun Bay, which causes increased EC there, and later in the year increased EC up the San Joaquin River into Franks Tract and the western Delta. A similar plot for the Zone 1 scenario, in Figure 5-47, shows that it has minimal change to Delta EC, as the largest increases at the export locations are approximately 2% during the at this time.

The Set 1 and Zone 4 scenarios generally reduce EC at the export locations and in the western Delta summer through fall, as shown in Figure 5-48 through Figure 5-53. The Set 1 scenario produces the largest reductions – approximately 10% near the export locations on September 1, 2002, as shown in the color contour plot in Figure 5-49, while the Zone 4 restoration area alone reduces EC by 5 – 6% near the exports (not shown).

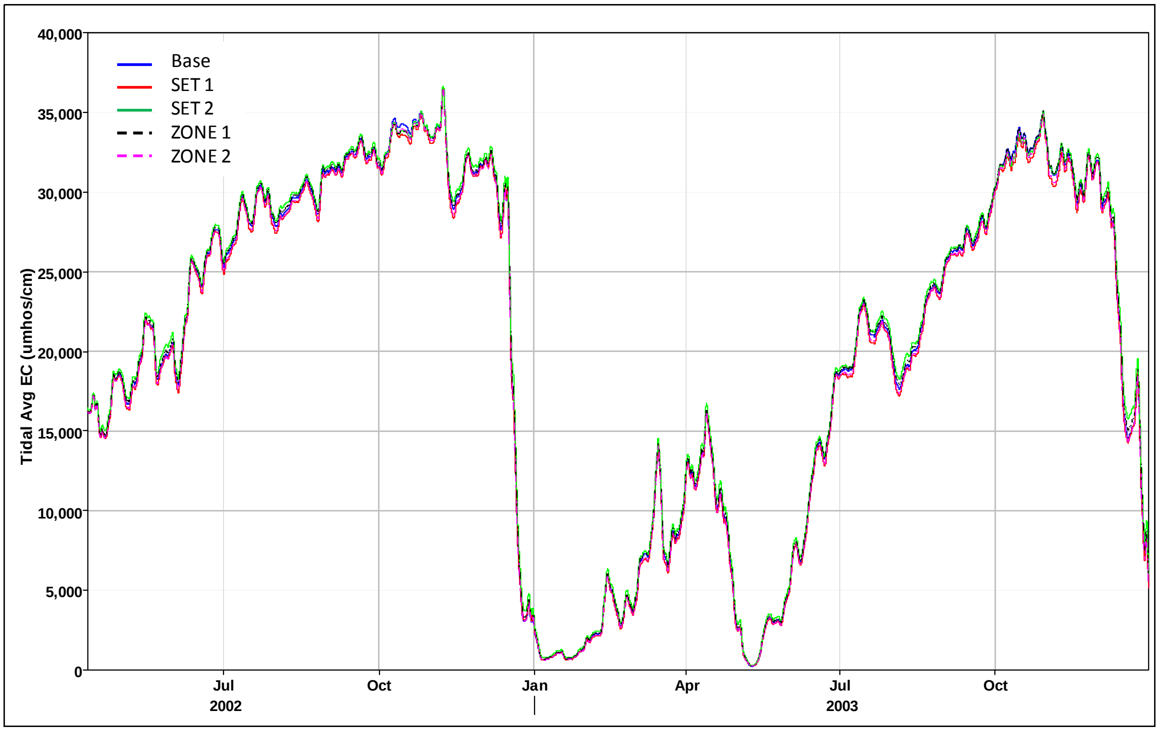


Figure 5-19 Tidally averaged computed EC at Martinez.

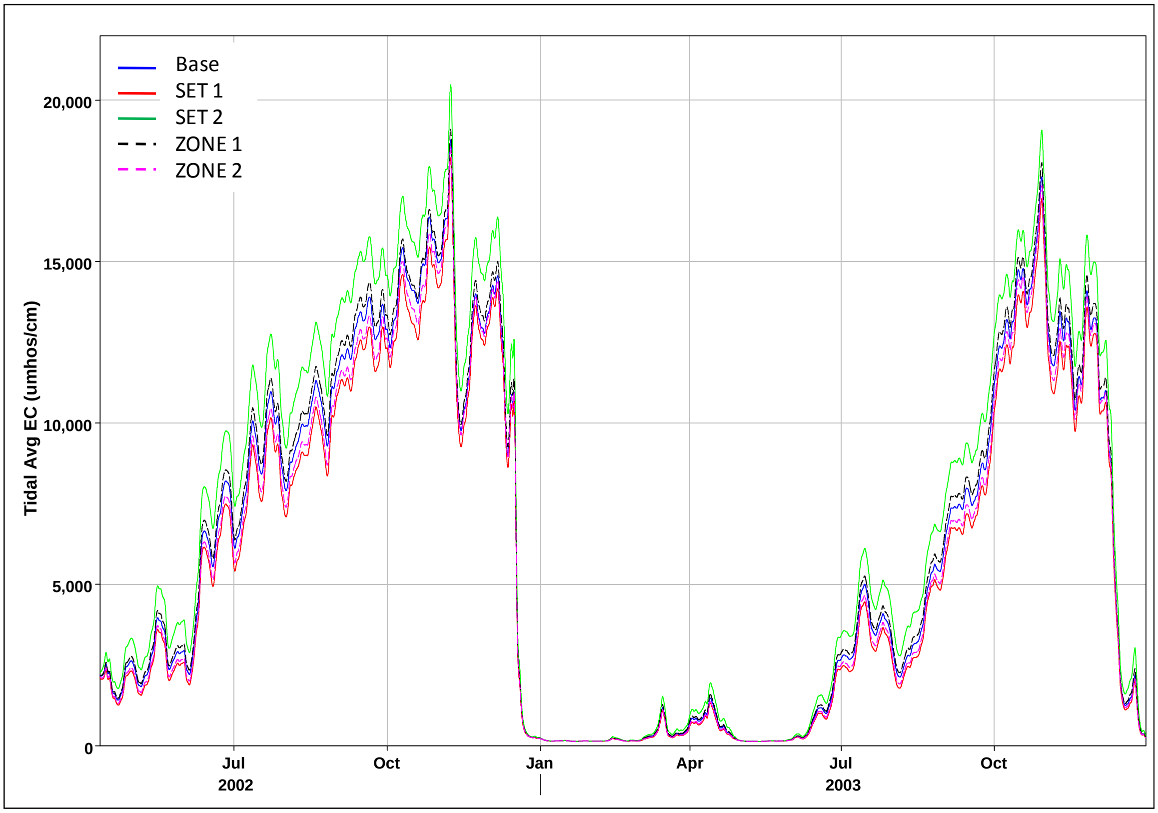


Figure 5-20 Tidally averaged computed EC at Chipps.

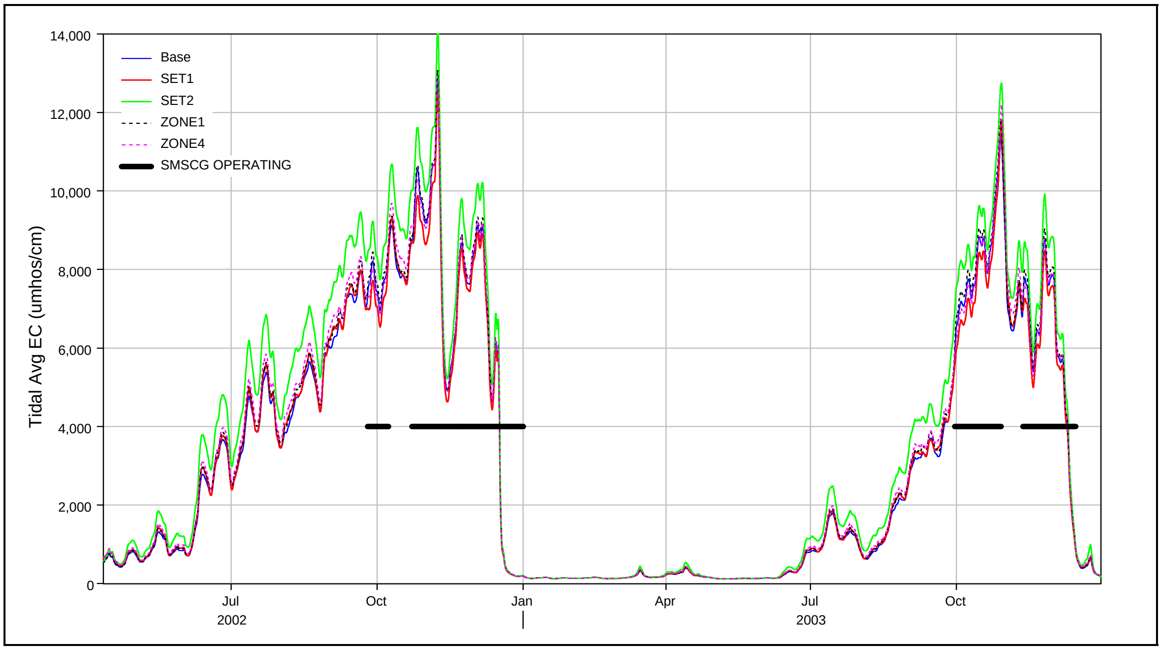


Figure 5-21 Tidally averaged observed and computed EC at Collinsville.

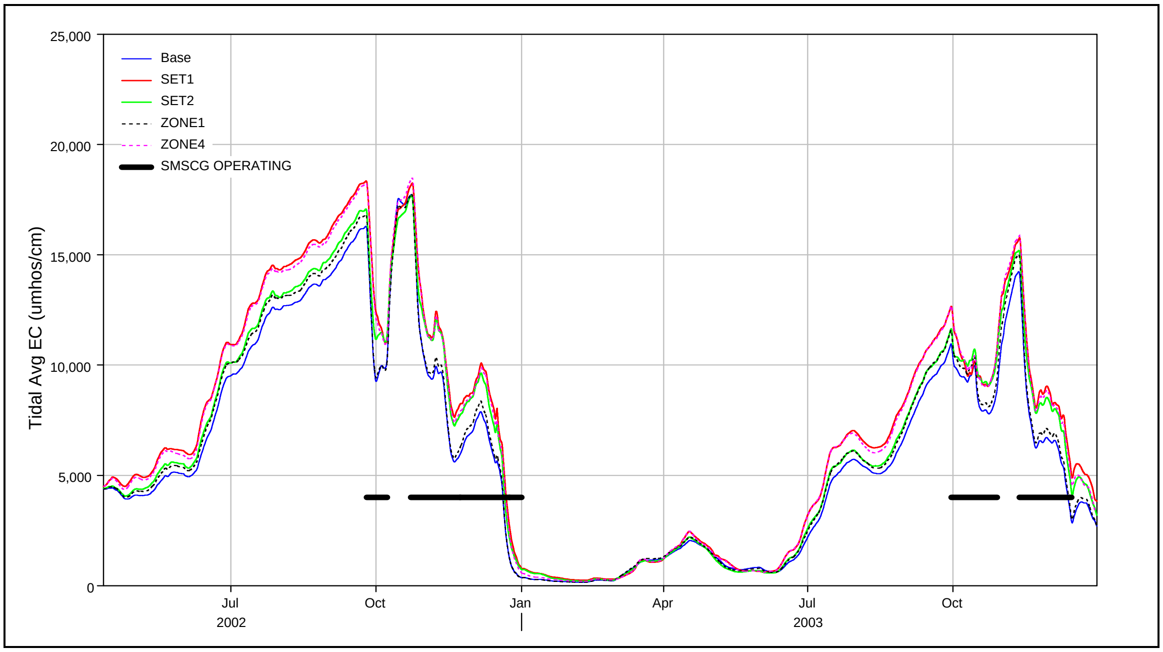


Figure 5-22 Tidally averaged computed EC at Beldon's Landing at monitoring station S-49 in Montezuma Slough.

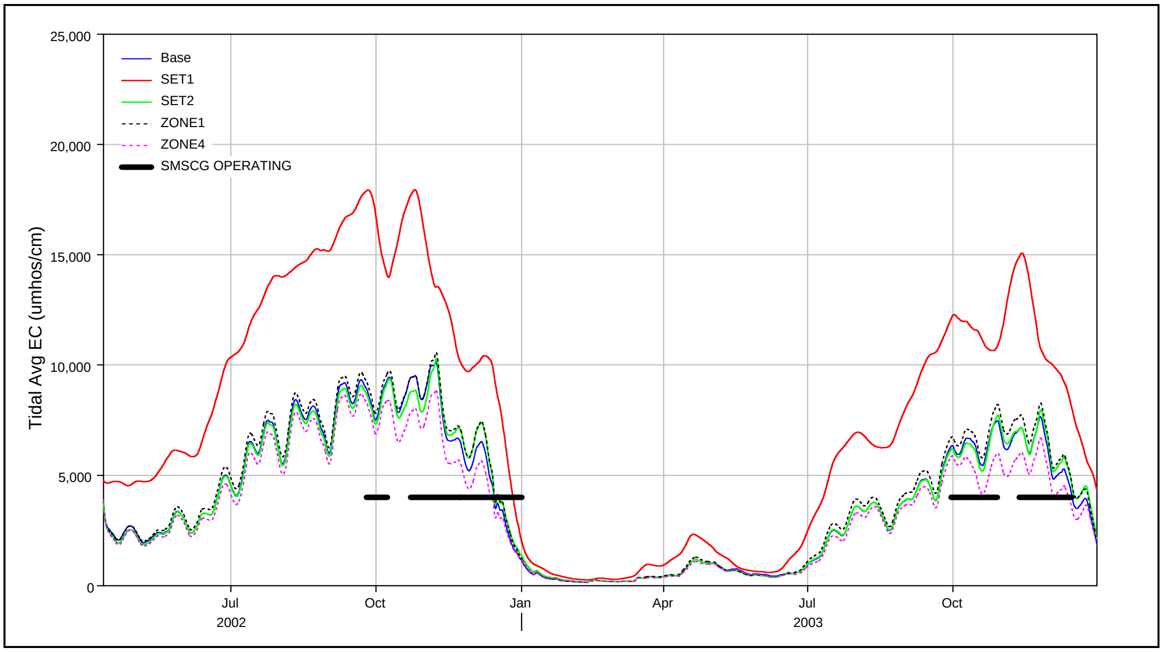


Figure 5-23 Tidally averaged computed EC at station S-40 on Boynton Slough.

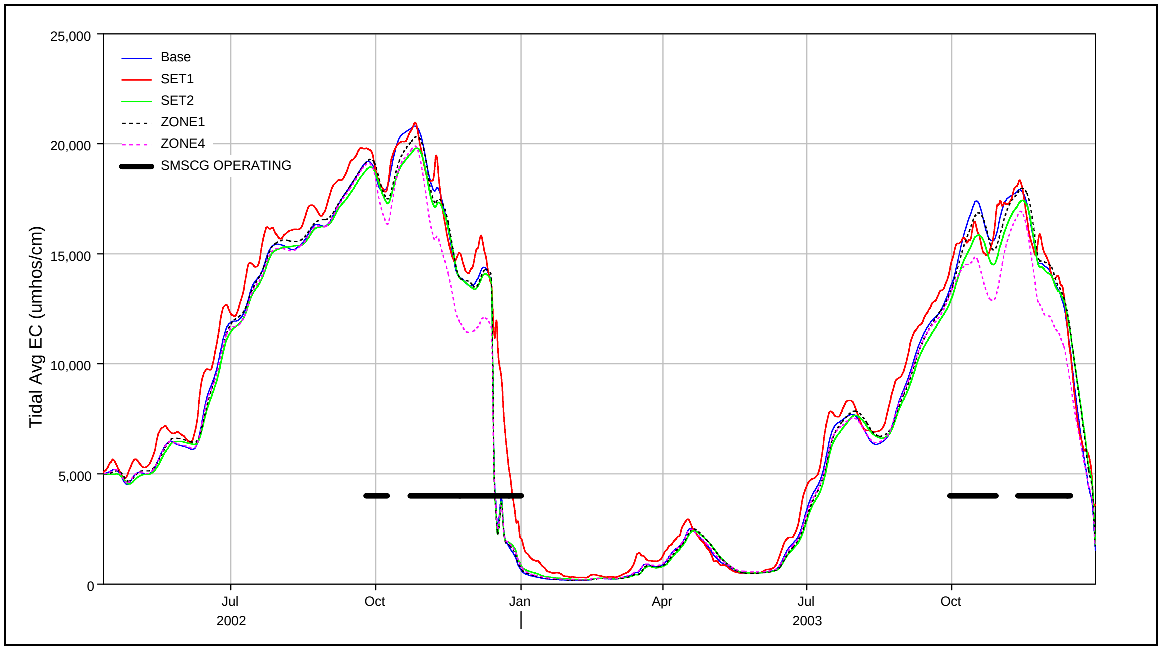


Figure 5-24 Tidally averaged computed EC at station S-97 on Ibis Slough.

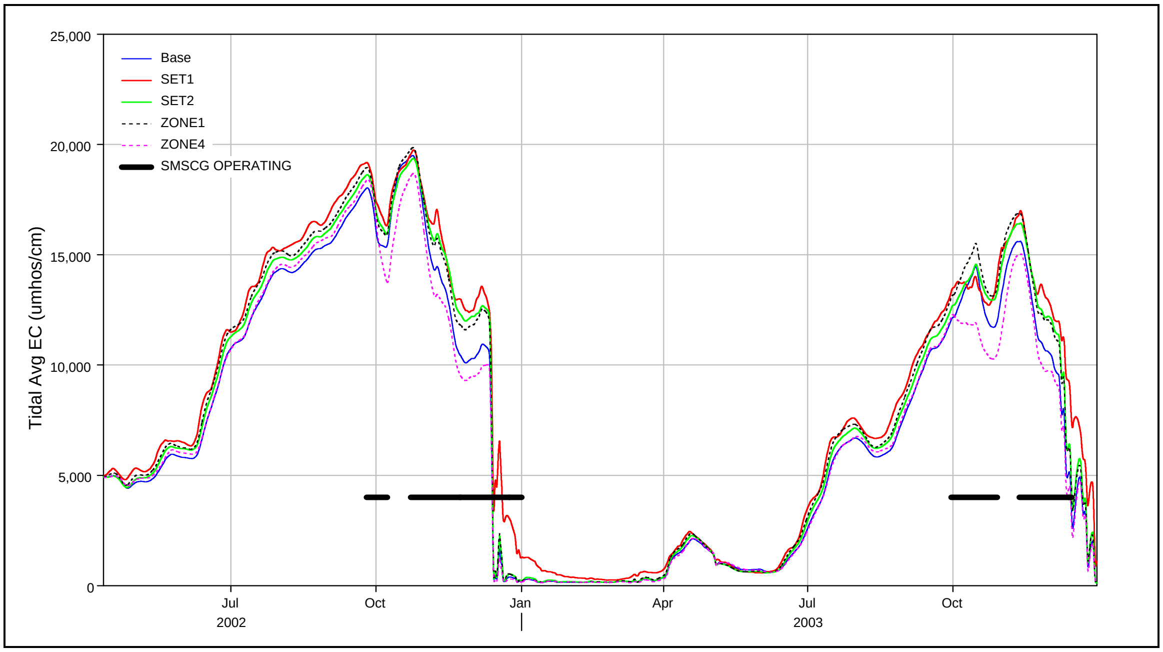


Figure 5-25 Tidally averaged computed EC at station S-21 in Sunrise Slough.

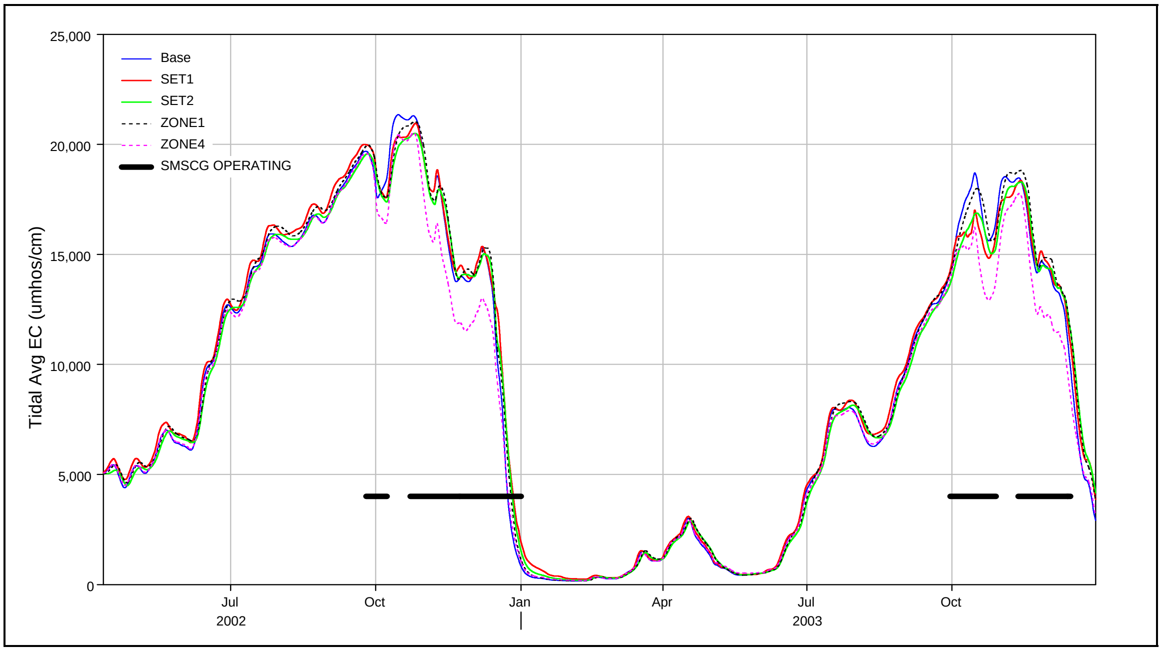


Figure 5-26 Tidally averaged computed EC at station S-35 at Morrow Island.

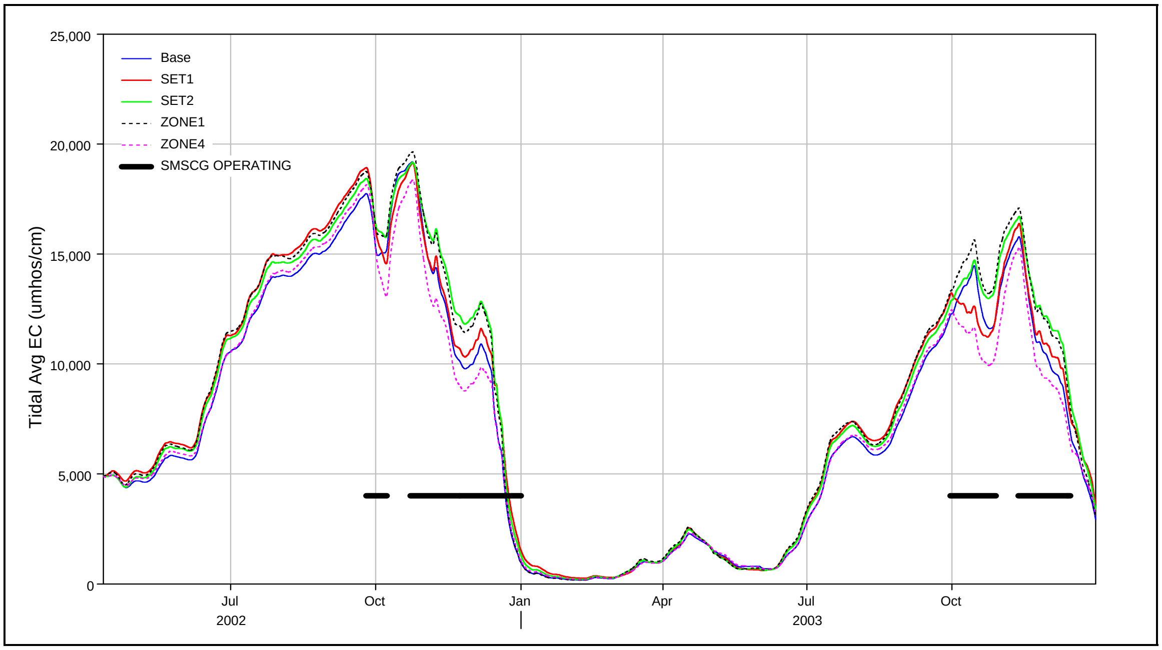


Figure 5-27 Tidally averaged computed EC at station S-42 on Volanti Slough.

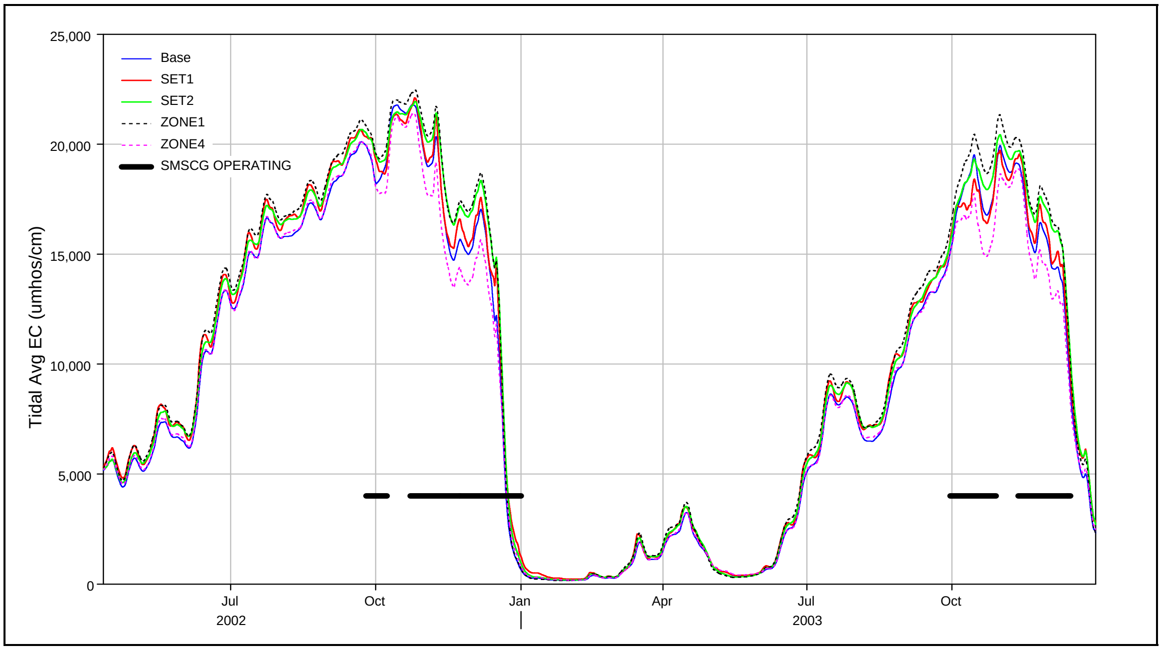


Figure 5-28 Tidally averaged observed and computed EC at station S-37 on Godfather Slough.

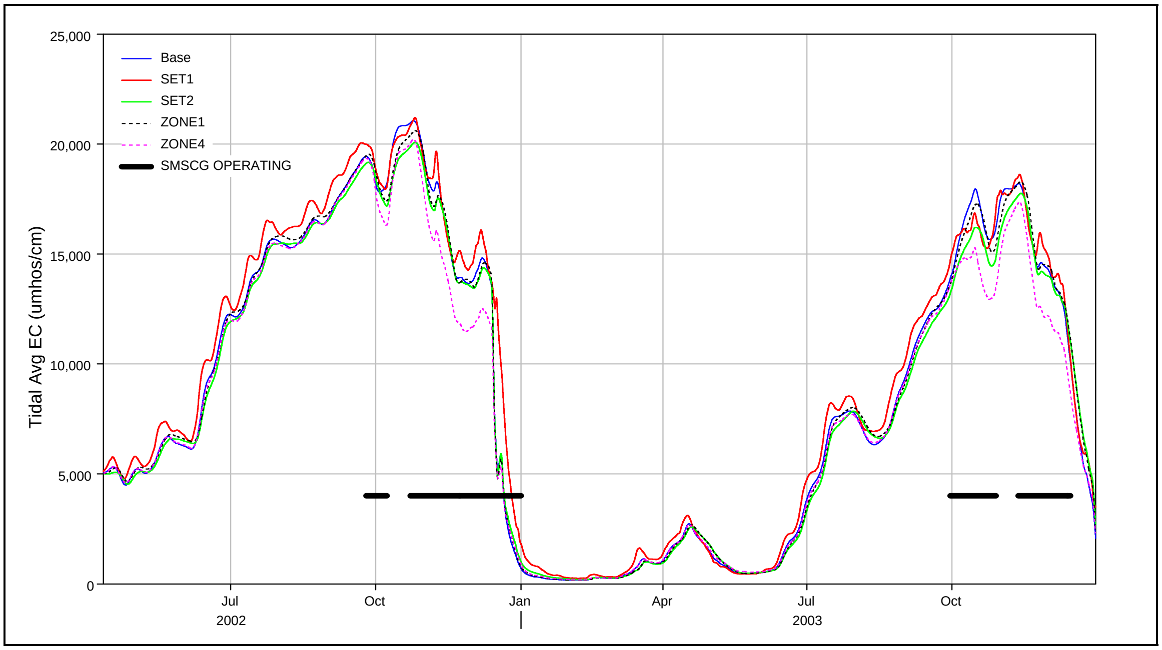


Figure 5-29 Tidally averaged observed and computed EC at station S-33 on Cygnus Slough.

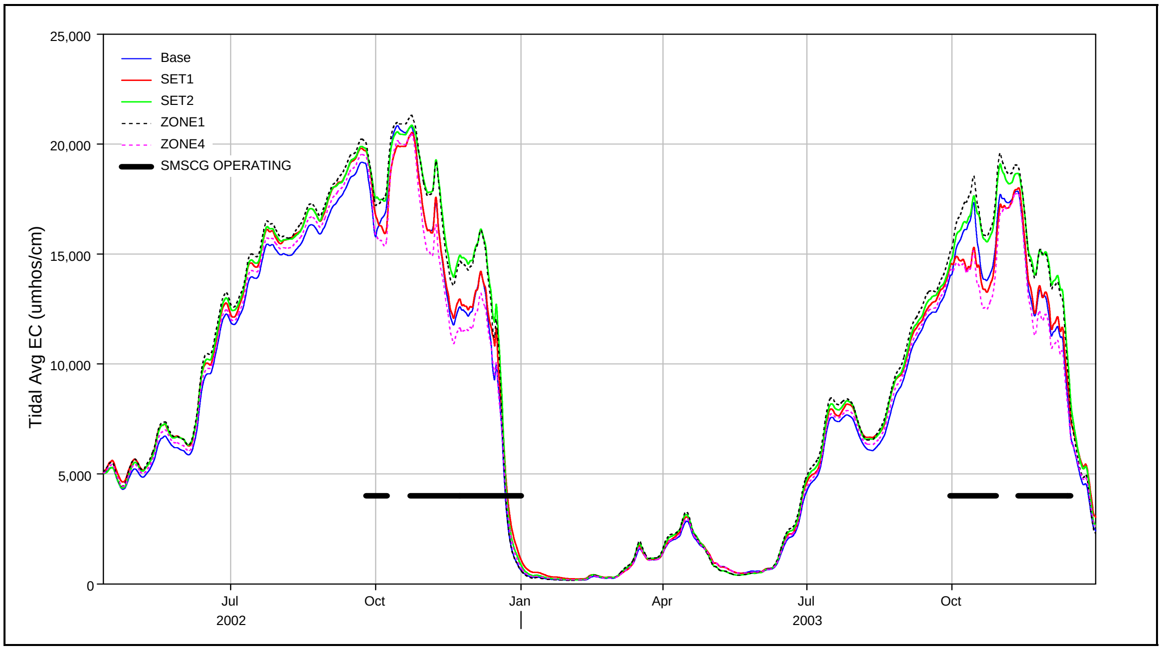


Figure 5-30 Tidally averaged observed and computed EC at station S-54 on Hunter Cut.

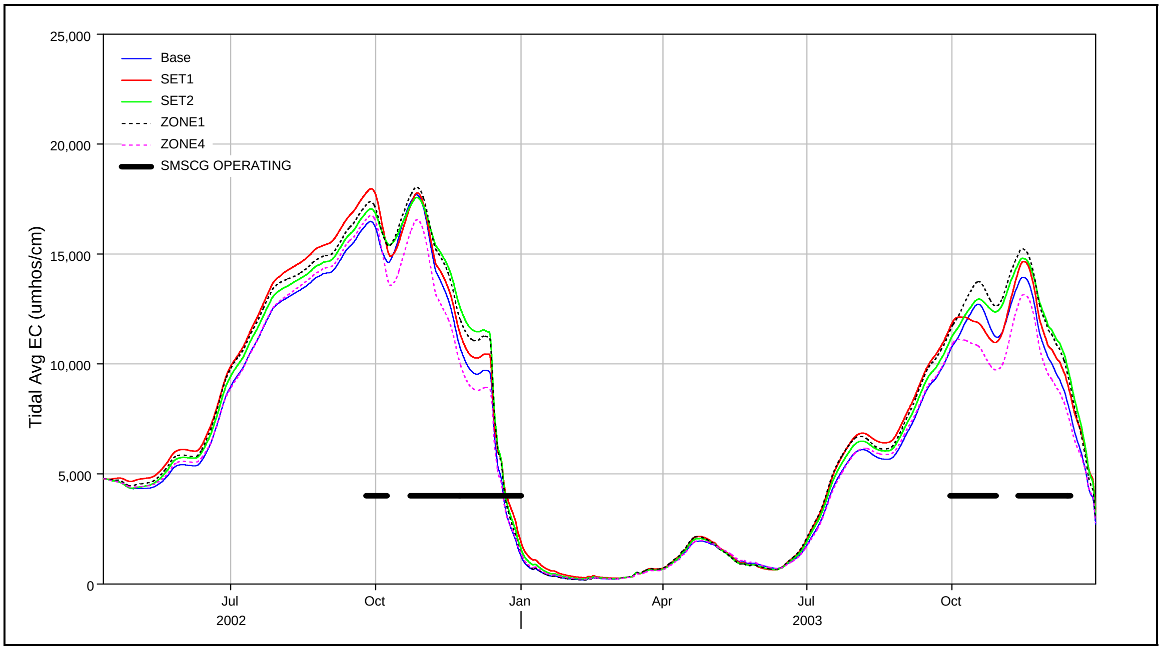


Figure 5-31 Tidally averaged observed and computed EC at station S-4 on Hill Slough.

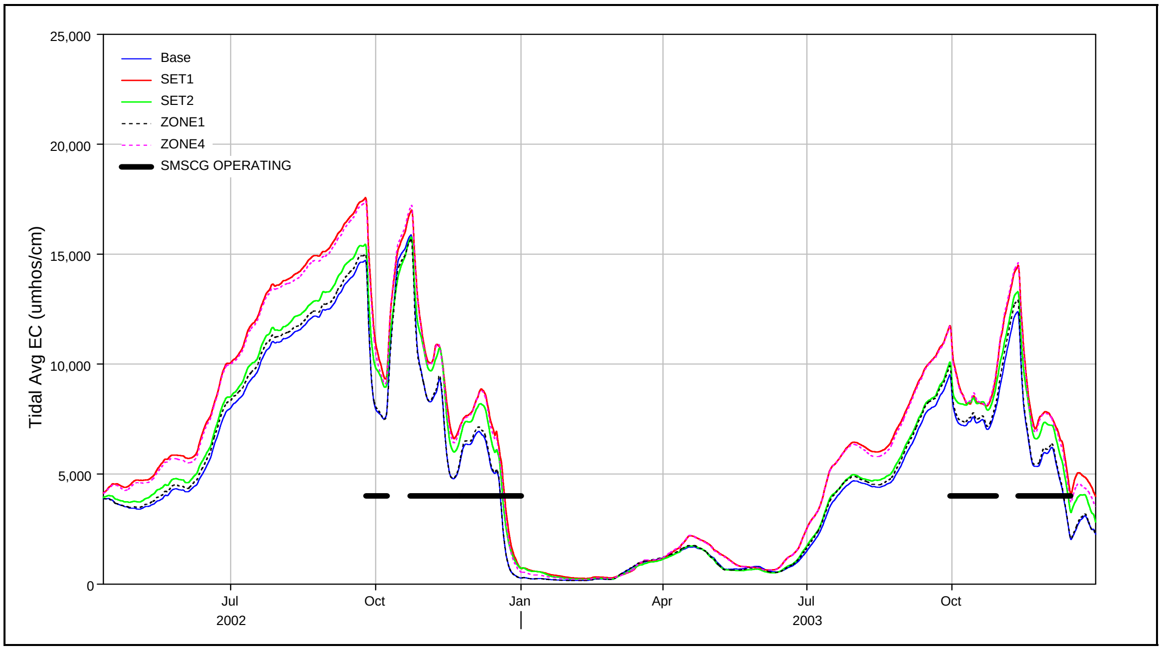


Figure 5-32 Tidally averaged observed and computed EC at station NS-1 on Nurse Slough.

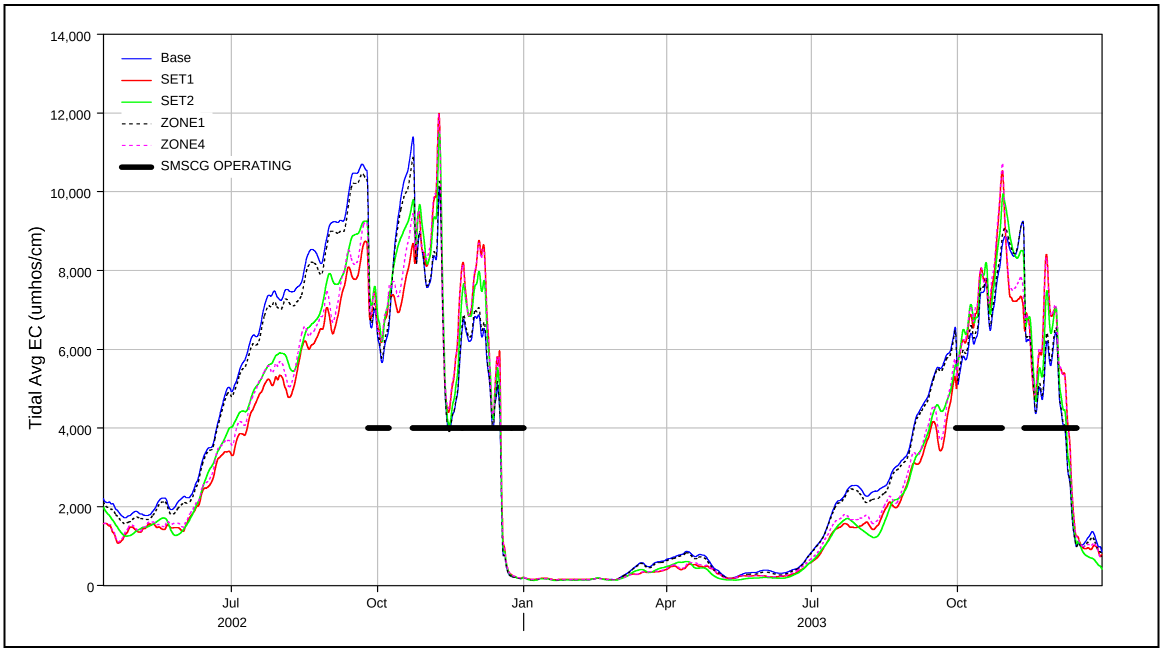


Figure 5-33 Tidally averaged computed EC at the S-64 monitoring location near National Steel on Montezuma Slough.

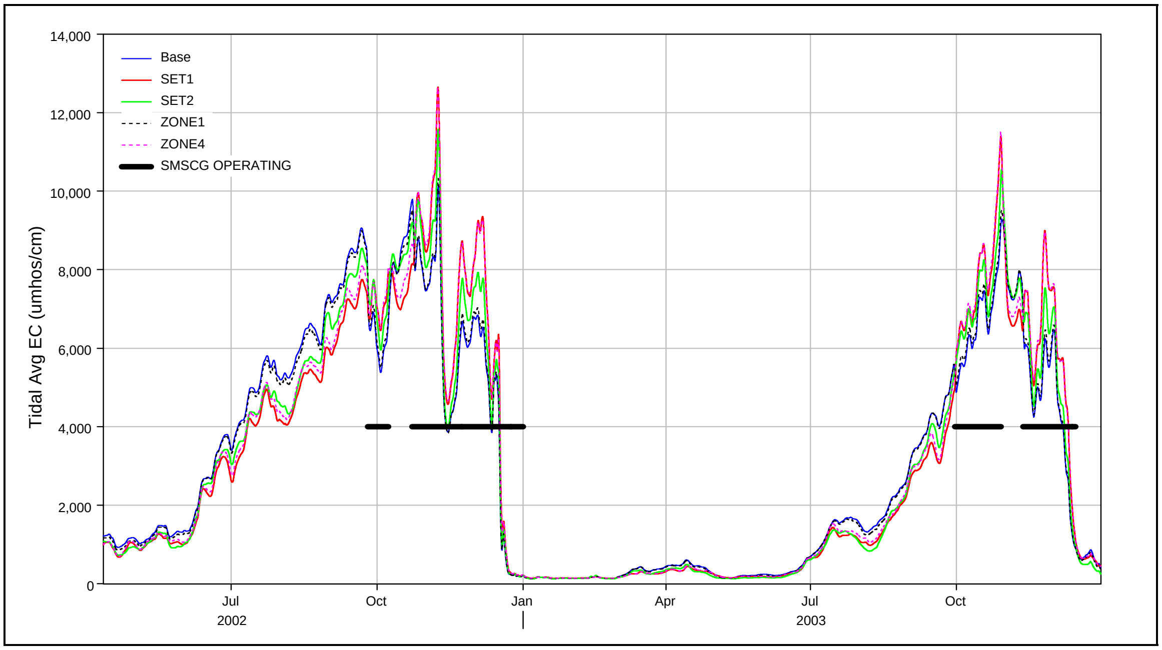


Figure 5-34 Tidally averaged computed EC at the S-71 monitoring location at Roaring River on Montezuma Slough.

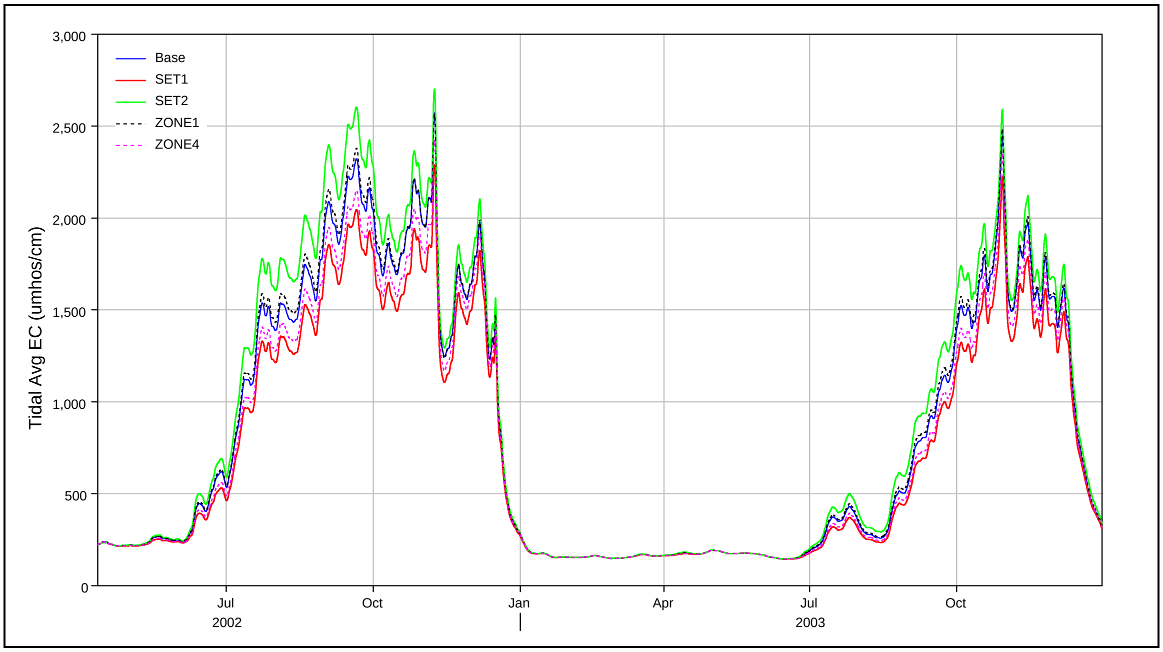
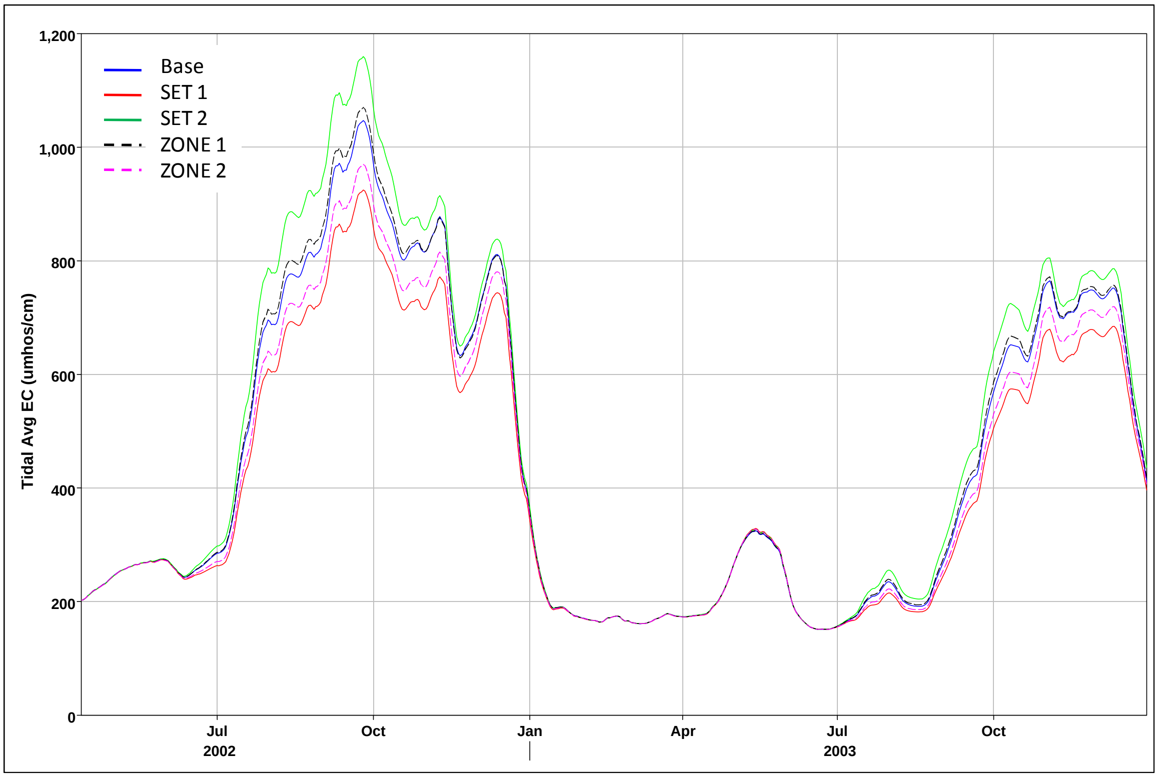
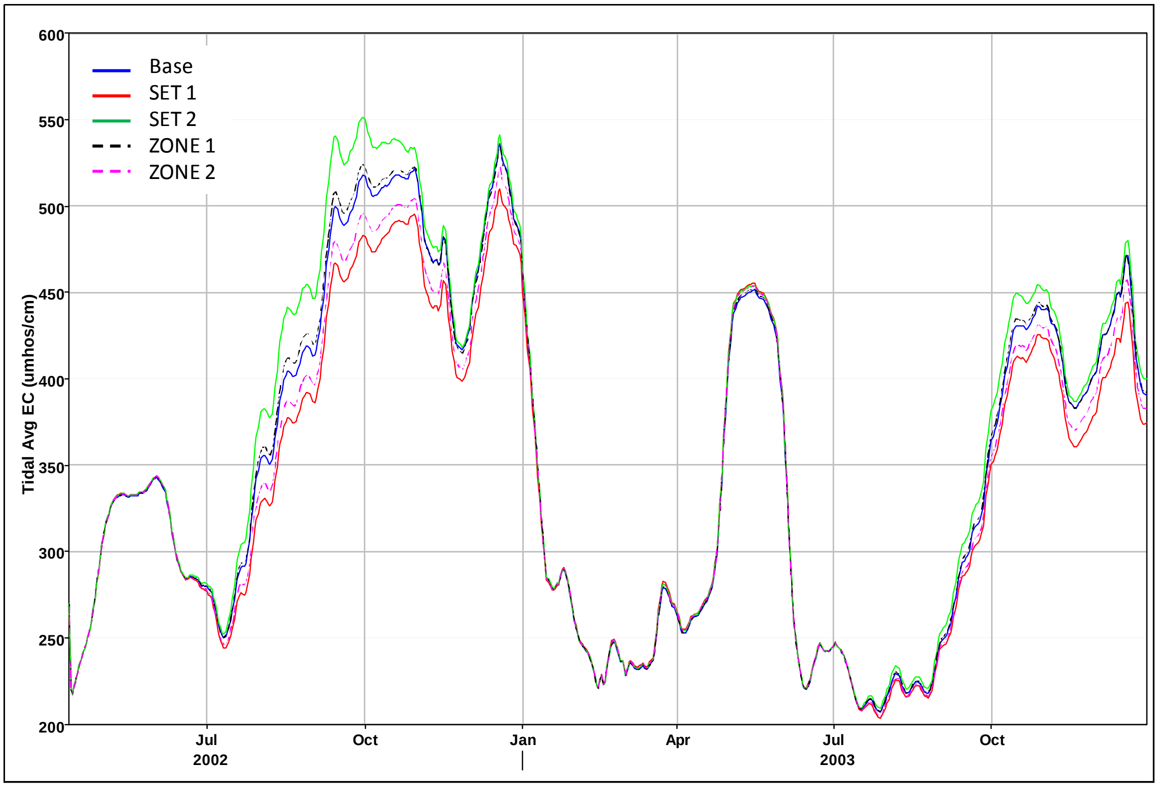


Figure 5-35 Tidally averaged computed EC time series at Jersey Point.



5-36 Tidally averaged computed EC time series at Old River at Rock Slough.



5-37 Tidally averaged computed EC time series at the CCWD Victoria Canal export location for Los Vaqueros.

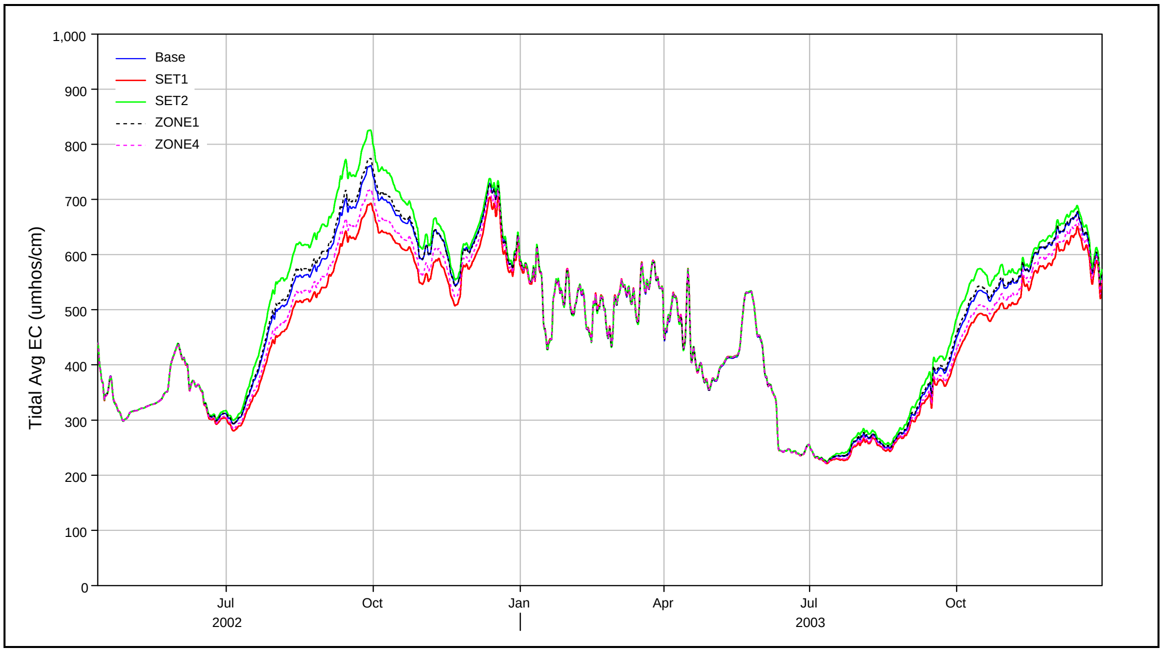


Figure 5-38 Tidally averaged computed EC time series at the CVP export location.

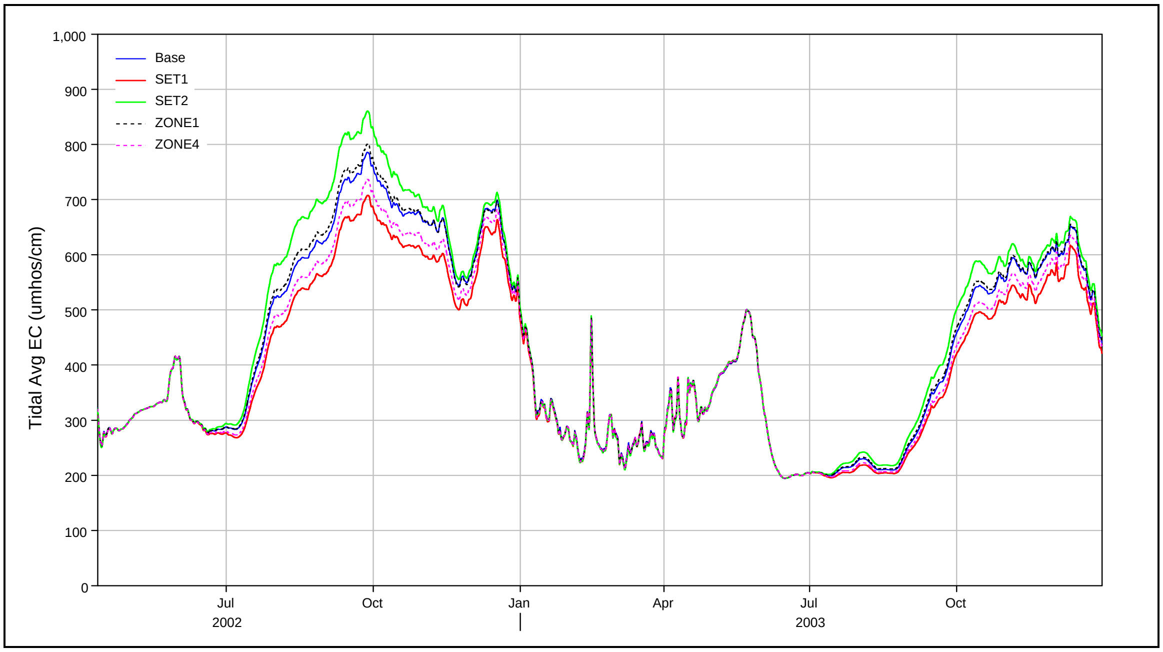


Figure 5-39 Tidally averaged computed EC time series at the SWP export location.

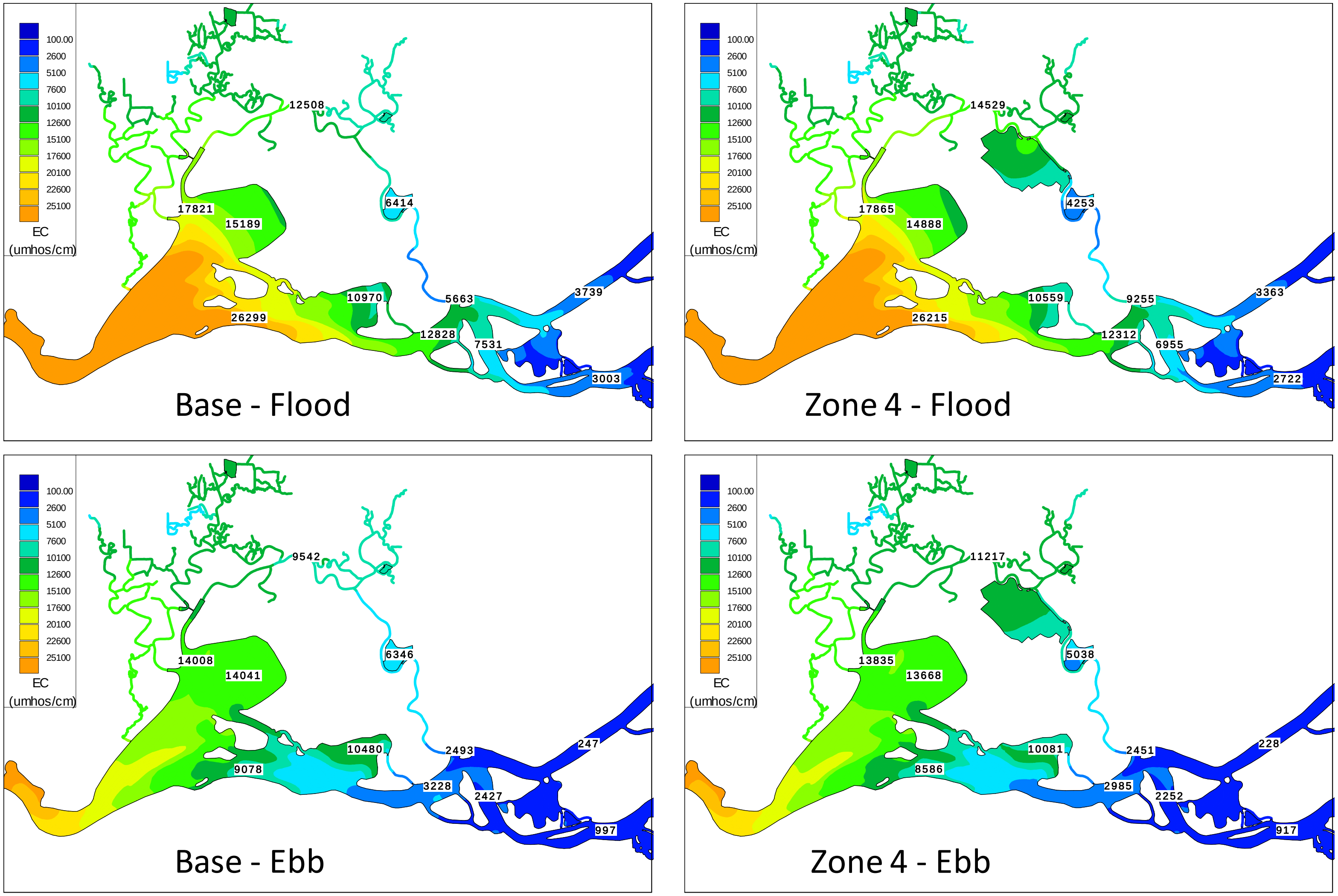


Figure 5-40 Color contour plots of EC for the Base case (left) and Zone 4 scenario (right) at the same timing on a flood tide (upper) and ebb tide (lower).

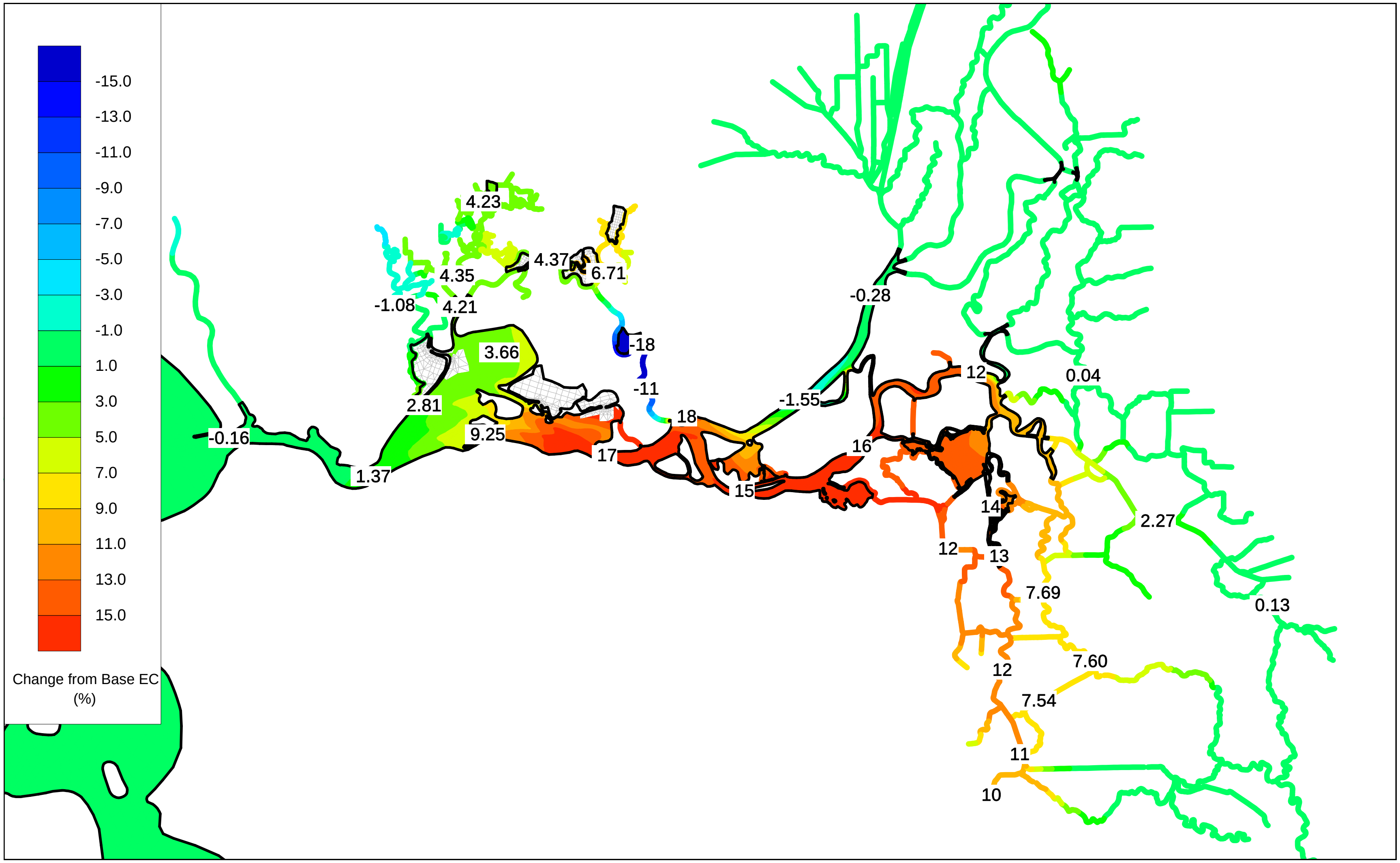


Figure 5-41 Set 2 EC % change from Base case – August 1, 2002.

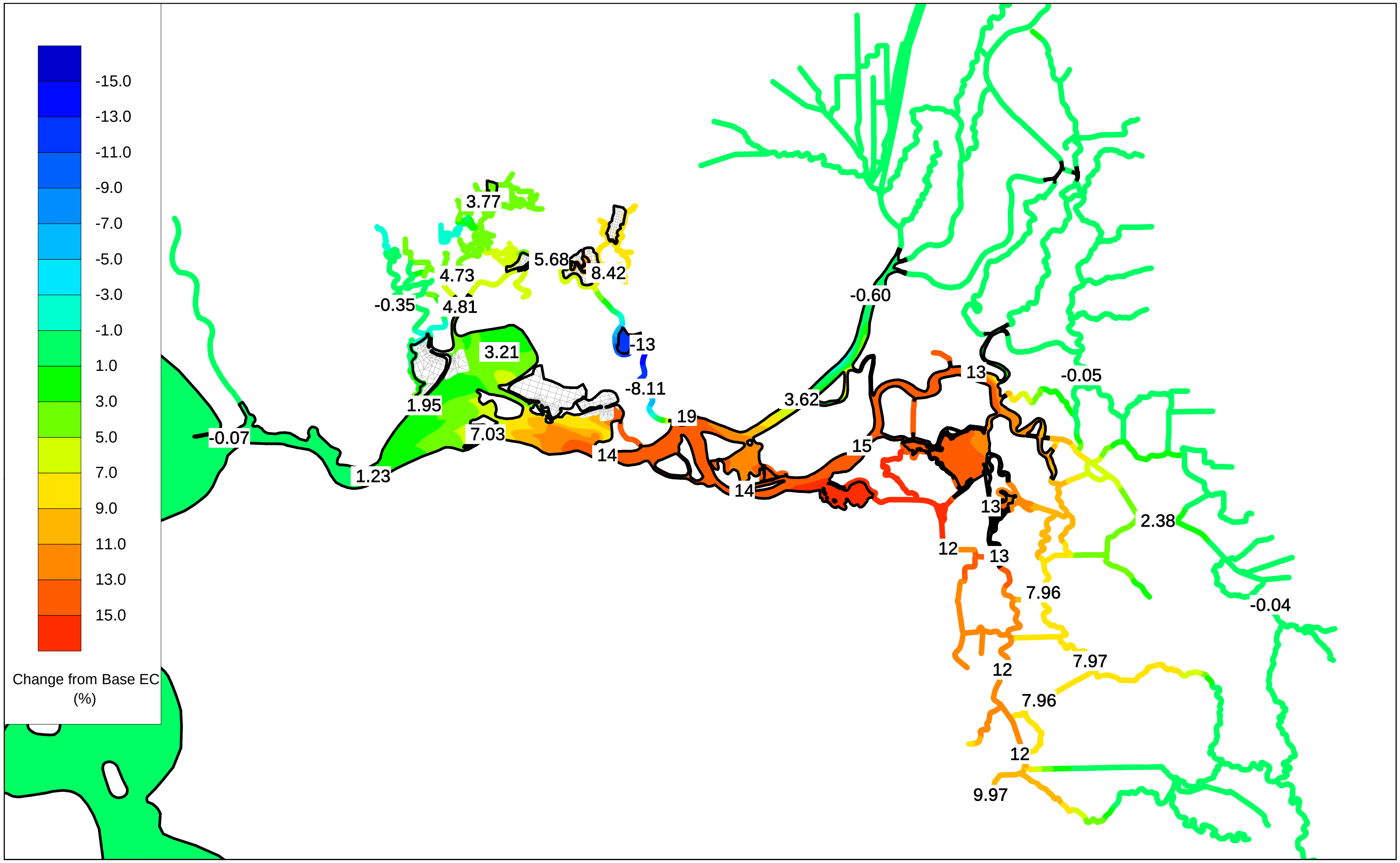


Figure 5-42 Set 2 EC % change from Base case – September 1, 2002.

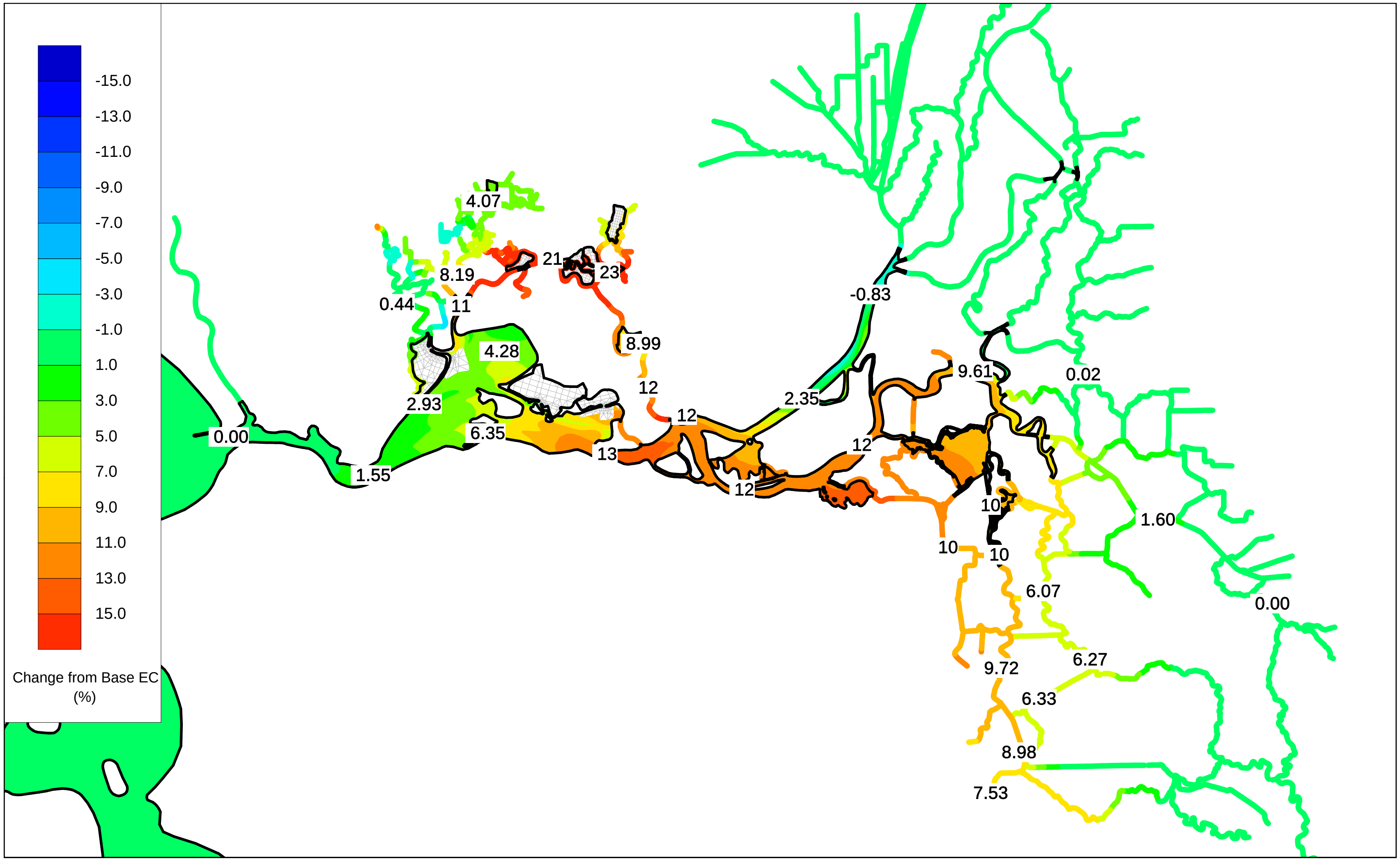


Figure 5-43 Set 2 EC % change from Base case – October 1, 2002.

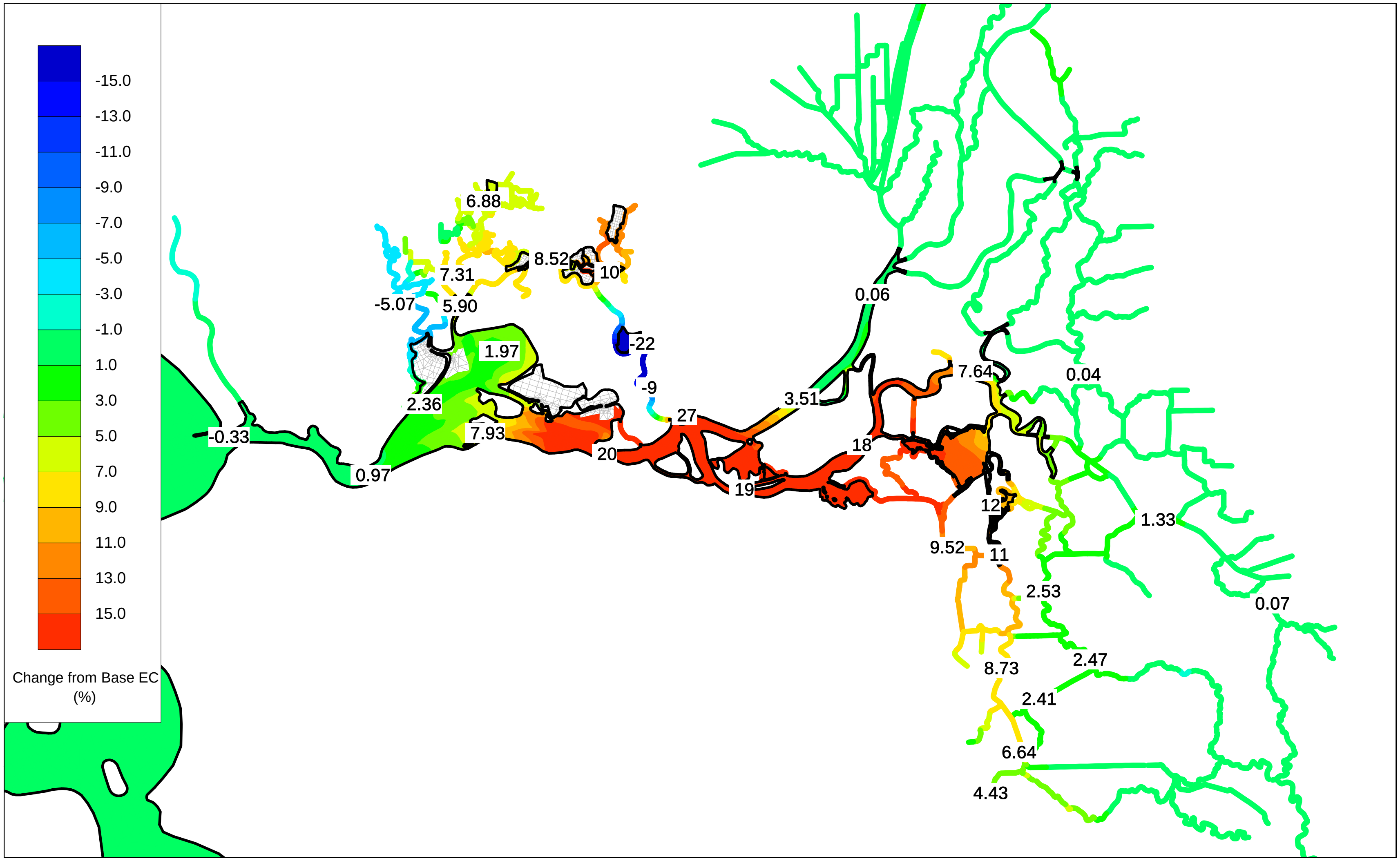


Figure 5-44 Set 2 EC % change from Base case – September 1, 2003.

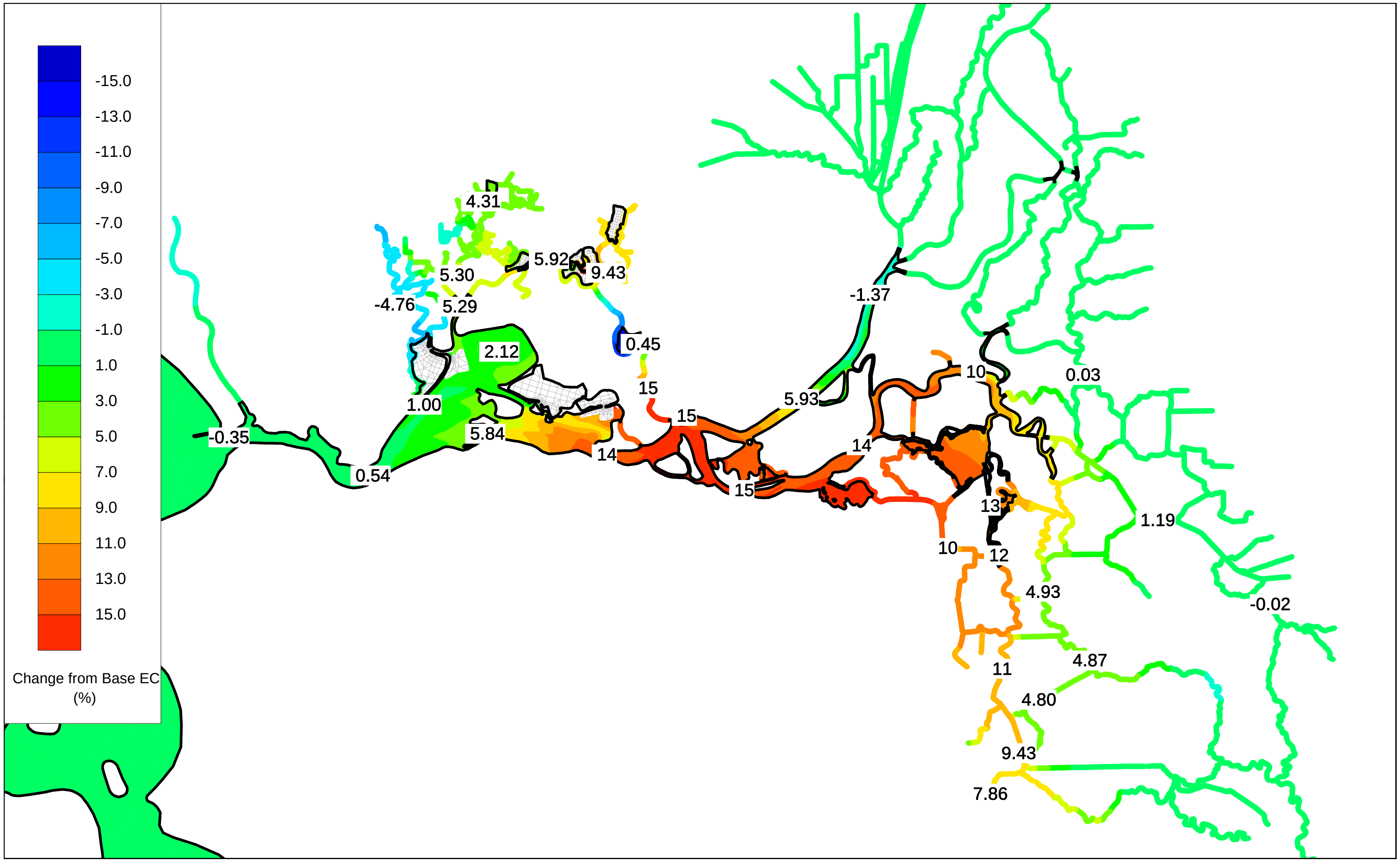


Figure 5-45 Set 2 EC % change from Base case – October 1, 2003.