

## Conversions between EC, TDS, Chlorides, Bromide and Sodium

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For the range of conditions at Rock Slough, i.e.  $EC < 1.8$  mS/cm the following equations apply. These were derived from CCWD using the reported daily values of EC and Cl at Rock Slough from the DWR (now CDEC) Daily Report, and from DWR's Municipal Water Quality Investigation grab samples from Rock Slough, Mallard Island, Jersey Point and Vernalis. When considering the much larger range of salinities, at say Mallard Island, linear relationships no longer apply and a quadratic or cubic fit should be used.

### Seawater Intrusion

When Delta outflow is low, Rock Slough salinity will primarily be caused by seawater intrusion. The same relationships would be expected to apply at Mallard Island and Jersey Point, and indeed do.

TDS	to	Cl	(both in mg/l)	$Cl = 0.547 * TDS - 65$
EC	to	Cl	( $\mu$ S/cm to mg/l)	$Cl = 0.285 * EC - 50$
EC	to	Na	( $\mu$ S/cm to mg/l)	$Na = 0.15 * EC - 10$
Cl	to	Br	(mg/l to mg/l)	$Br = 0.00341 * Cl + 0.033$
EC	to	TDS	( $\mu$ S/cm to mg/l)	$TDS = 0.52 * EC + 20$

### Agricultural Drainage

There are also times when the water at Rock Slough contains a large proportion of agricultural drainage. This typically coincides with high flows out of the San Joaquin. The relationships at Rock Slough during times of agricultural drainage are almost identical to the relationships for MWQI data collected at Vernalis on the San Joaquin River.

TDS	to	Cl	(both in mg/l)	$Cl = 0.245 * TDS - 7.4$
EC	to	Cl	( $\mu$ S/cm to mg/l)	$Cl = 0.15 * EC - 12$
EC	to	Na	( $\mu$ S/cm to mg/l)	$Na = 0.125 * EC - 5$
Cl	to	Br	(mg/l to mg/l)	Surprisingly similar to the seawater Eq.
EC	to	TDS	( $\mu$ S/cm to mg/l)	$TDS = 0.62 * EC + 0$

### Mallard Island (Chipps Island) Relationship

At Mallard Island and other Suisun Bay stations, salinity will be dominated by seawater intrusion and salinity will vary over a much larger range. The simple linear relationship used for Rock Slough will not work and quadratic equation is needed. The two relationships below give good agreement with the MWQI data for Mallard Island (and Jersey Point). Chloride is in mg/l.

$$Cl = 0.0000025 EC^2 + 0.294 EC - 50 \quad \text{for } EC > 300 \mu\text{S/cm}$$

$$Cl = 0.0004 EC^2 + 0.01 EC \quad \text{for } EC < 300 \mu\text{S/cm}$$