WATER QUALITY IN THE CORANGAMITE SALINITY REGION

The salinity monitoring program aims to:

- Monitor and assess long term changes in stream salinity and saltloads.
- Assess the effect of stream salinities on downstream water quality and water users.
- Measure the effect of dryland salinity reduction measures and land use changes on stream salinity and salt loads, and provide feedback for revision of Salinity Plan implementation strategies.
- Provide essential data for further studies which may include the prediction of future stream salinities.

Prepared by Sinclair Knight Merz on behalf of Corangamite Salinity Implementation Group

Natural Resources and Environment
AGRICULTURE • RESOURCES • CONSERVATION • LAND MANAGEMENT

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Salinity and nutrient statistics at key monitoring sites
Corangamite Salinity Region

Colour Code Table

COLOUR	EC RANGE	TP RANGE	TN RANGE	POTENTIAL FOR USE
	Below 800	Below 0.025	Below 0.1	Salinity levels good for human consumption. Healthy levels of TP and TN for the environment.
	800 - 2,500	0.025 - 0.05	0.1 - 0.3	Salinity levels necessitate special management when used for irrigation.
	2,500 - 10,000	005 - 0.10	0.3 - 0.7	Salinity levels not normally suitable for irrigation. Detectable level of environmental degradation from TP and TN likely.
	Over 10,000	Over 0.10	Over 0.7	Salinity level limits usefulness for agricultural uses. Some environmental degradation likely due to levels of TP and TN.

233224

Continuous Salinity Monitoring Site
(with spot nutrient monitoring)

93,323[a]	Average Annual Flow Unit: ML/year
817	Median Salinity Unit: EC(µS/cm)
0.05	Median Total Phosphorous (TP) Unit: mg/l
0.66	Median Total Nitrogen (TN) Unit: mg/l

233250

Continuous Salinity Monitoring Site

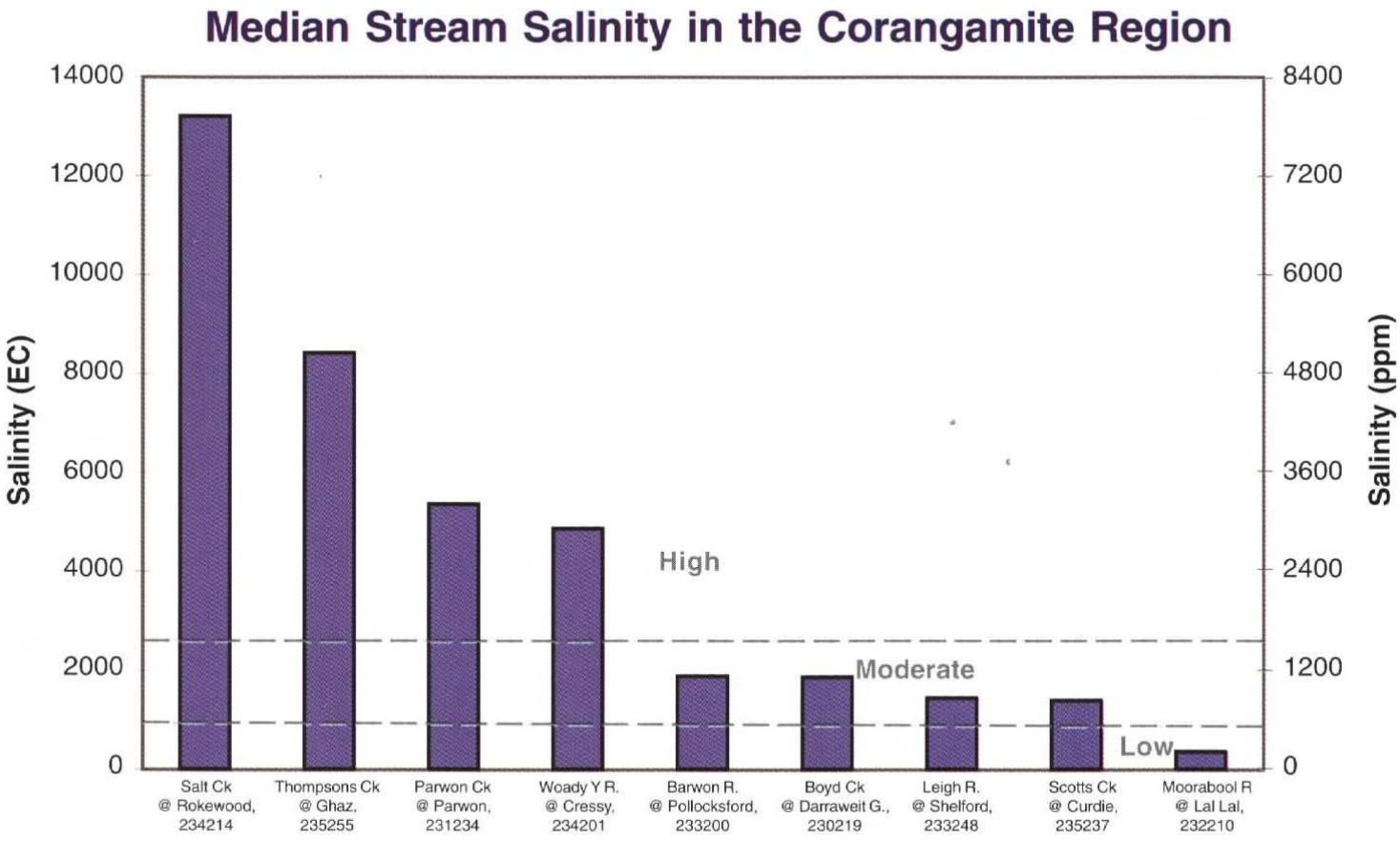
303[c]	Average Annual Flow Unit: ML/year
2,265	Median Salinity Unit: EC(µS/cm)

NOTES:
- TP and TN ranges shown in the Colour Code Table have been formulated based on the ANZECC 1992 Guidelines, and the E.P.A Guidelines (Pub No.478, June 1995). Salinity ranges shown were extracted from the Saltwatch publication.
- Annual average flow data was calculated over the period shown in the accompanying table.
- Refer to back page for definition of terms.
- Salinity and nutrient statistics are based on the available period of data (refer to 'Data Quality Review, Corangamite Region. SKM 1998'.)

Range over which Average Annual Flow is calculated:	Superscript
Jan 76 - Dec 97	a
Jan 94 - Dec 97	b
Jan 95 - Dec 97	c
Jan 79 - Dec 97	d
Jan 95 - Dec 96	e

Continuous monitoring of salinity at the sites shown on the map produces important information about salinity in the Corangamite region, particularly concerning catchment processes and trends in salinity, while also providing data for studies into the effectiveness of catchment management activities (eg. impact of changing land use on the water quality of rivers).

The graph below presents key statistics from data recorded at eight of the seventeen continuous salinity monitoring sites in the Corangamite salinity region. The median value is defined as the 'middle' value of all the measurements recorded. Streams in south west Victoria are generally characterised by long periods of low flow punctuated by relatively brief high flow events. Given this flow pattern, median salinities generally reflect the salinity of water during low flow periods.



Stream salinity in the region varies from being quite low on the Moorabool River at Lal Lal (median of 364 EC), to being very high on the Salt Creek at Rokewood (median of 13,203 EC).

Ranges of Salinity, Total Phosphorous and Total Nitrogen shown in the colour code table opposite have been broken into four components, from blue (good), to red (bad). The ranges for salinity were determined by their potential for use (eg. drinking, irrigation), whereas the ranges for Total Phosphorous and Total Nitrogen were primarily determined by their effects on the environment. Humans and animals have the ability to consume much higher levels of Total Phosphorous and Total Nitrogen than can be tolerated by the aquatic environment.

Serious algal blooms have occurred across the Corangamite region, caused by the high levels of nutrients present in the surface water. The levels of nutrients present in the surface water reflect the surrounding land use, and provide an indication of the general health of the catchment. The nutrient concentrations presented on the map show that the Total Nitrogen level is over 0.7 milligrams per litre (the 'worst condition' category) at all but one of the seven spot nutrient monitoring sites presented. Total Phosphorous medians range from 0.02 milligrams per litre to 0.18 milligrams per litre, with only two of the seven spot nutrient monitoring sites having a level in the 'worst condition' category. There are many more sites in the Corangamite region where spot nutrient monitoring is performed.

CORANGAMITE SALINITY IMPLEMENTATION GROUP

Salinity is one of the most serious land degradation problems in South West Victoria.

As part of Government and community action to address the problem, the Corangamite Region Salinity Forum released the Corangamite Regional Salinity Strategy in 1992.

The strategy aims to reduce the predicted cost of salinity by 85 per cent over the next 30 years by encouraging and assisting the adoption of salinity control activities. In order to achieve this aim, managers require a clear understanding of river salinity and nutrient levels, generation processes, and transport patterns throughout the region.

Continuous monitoring of salinity and flow at key sites enables the calculation of salt loads, and examination of the relationship between flow volumes and salinity concentrations.

Continuous salinity and flow monitoring is carried out at seventeen sites in the Corangamite region. At seven of these sites monthly monitoring of nutrients is undertaken. There are many other sites in the Corangamite region where continuous flow, spot salinity, and spot nutrient monitoring is carried out. In addition there are also some 1170 bores which monitor groundwater elevation and (in some cases) groundwater salinity within the region. Understanding local and regional groundwater behaviour patterns is essential, as groundwater interactions with surface water can have a major impact on salinity concentrations in surface waters.

In the Corangamite region the relationship between streamflow and salinity concentration is typical of streams that are affected by saline groundwater directly entering the stream. Typical behaviour includes:

- high salinity concentrations during the long low flow periods,
- a short, sharp increase in salinity concentrations at the start of a flow event, and
- lower salinity concentrations during the remainder of a flow event.

The relationship between streamflow and nutrient concentration is the reverse of the relationship between streamflow and salinity concentration. During high flows nutrient concentrations tend to increase, whereas during low flows nutrient concentrations generally decrease.

Salt load transport is affected mainly by the volume of stream flow. Although salinity concentrations are usually much higher during low flow periods, there is little salt load movement as the ability of the stream to transport salt is reduced. Most salt transport therefore occurs during high flow periods when there are greater volumes of water movement.

Information provided in this brochure comes from annual reporting of water quality monitoring carried out by THIESS Environmental Services and Sinclair Knight Merz on behalf of the Corangamite Salinity Implementation Group. The material presented provides only a small part of the information which could be obtained from stream monitoring across the region. If you would like more information please contact your local salinity coordinator Liz deVries on phone number (03) 5233 5533 .

Definition of terms:

Median - the middle value of the data set.

EC - a measure of electrical conductivity, which in turn provides an indication of how much salt is present in the water. EC units are in microsiemens per centimetre (µS/cm).

ppm - Parts per million. The number of grams of salt per million grams of water. One ppm is approximately equal to one milligram per litre (mg/l).

SINCLAIR KNIGHT MERZ
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