

7 Salinity targets

The performance of the whole catchment has been assessed under a number of different ‘scenarios’, according to the dryland salinity hydrology explained in chapter 6. Basically, saline deep groundwater discharges to the surface in quantities related to area of agricultural land clearing. This renders inflow to Wellington Reservoir each year proportionately more saline than would result from just the salt in the current year’s rainfall.

Fig 7.1 shows the historical record of inflow salinity to Wellington Reservoir with projections according to three different scenarios:

- i) if clearing continued unrestricted and no reforestation (‘without Clearing Controls’);
- ii) if clearing stopped when clearing controls were introduced but no reforestation occurred (‘without reforestation’); and
- iii) if clearing stopped and land acquired by the government was fully reforested (‘with WRC land replanted’).

Fig. 7.1 also shows the target inflow salinity.

The estimated contributions from the Management Units for various scenarios are given in tables. The estimates are in the form of annual averages to be expected if the catchment has been in a particular condition for a very long time. The scenarios presented are:

- i) Scenario iii) illustrated on Fig. 7.1 above;
- ii) Naturally fully-forested catchment; and
- iii) 4 options for reducing salt output to meet the salinity target for inflow to Wellington Reservoir.

The last four options assume varying degrees of reforestation to achieve the salt load reduction, but do not address the practicality of implementing the treatment. Chapter 8 examines the practical limits to implementation of various treatment options.

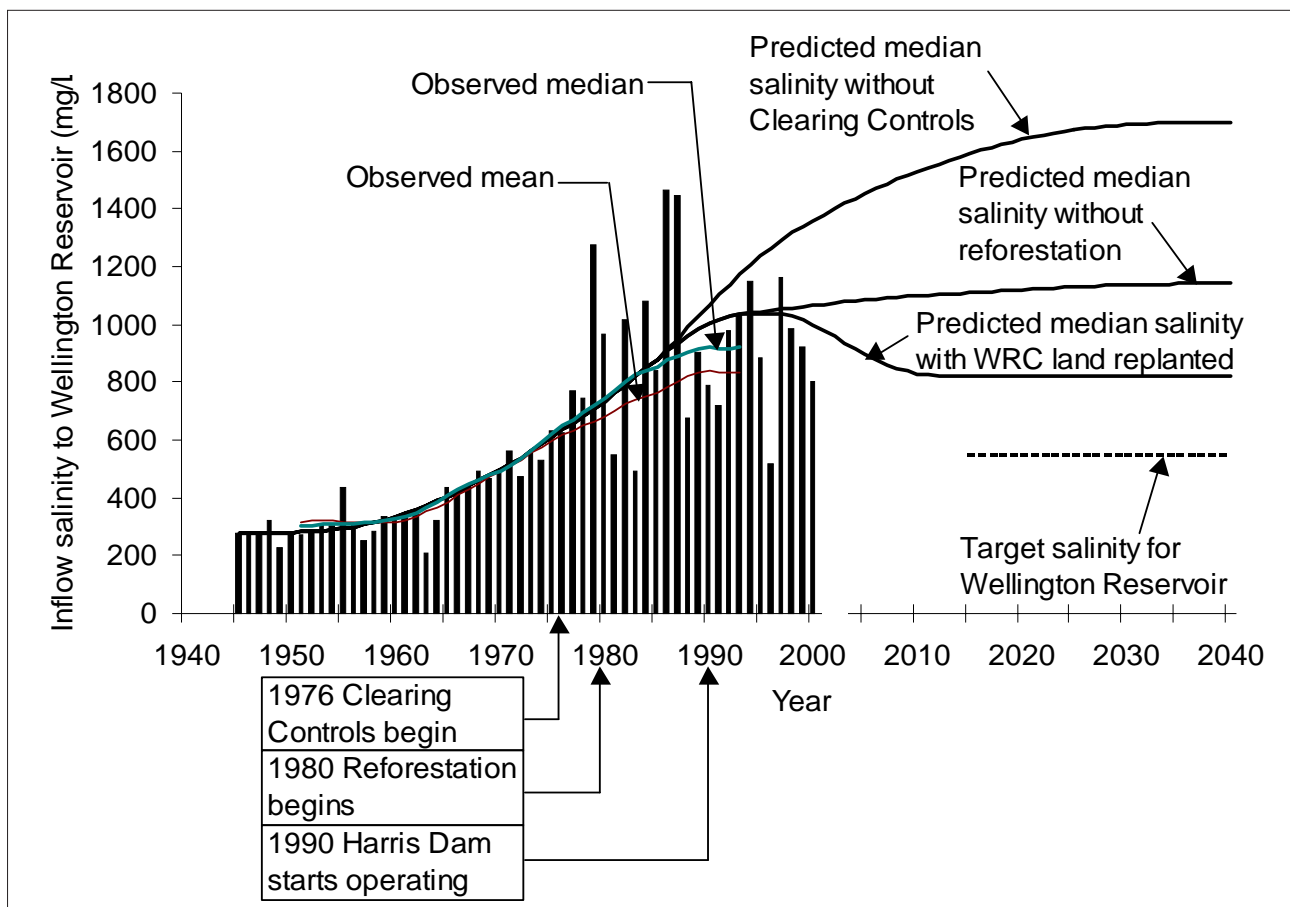


Figure 7.1 Surface water quality in the Collie Catchment



Table 7.1 Average annual hydrologic data with government land reforested (=1995 record)

Shires (areas in km ²)	Management units								Mungilup Tower	Reservoir Total
	Collie River South	James Well	Collie River East	Bingham River	Collie River Central East	Collie River Central	Harris River	Wellington Reservoir		
Area (km ²)	663	183	402	514	246	216	327	280	2550	2830
Rainfall (mm)	757	656	644	770	751	909	862	1050	759	789
Flow (GL/yr)	23.3	5.5	14.5	7.3	14.3	29.3	7	43.62	101.2	144.8
Salt (tonnes/yr)	23978	19228	49420	1572	10566	13199	1460	8655	119243	128078
Salinity (mg/L TDS)	1031	3466	3418	216	741	450	209	198	1180	885

Table 7.2. Fully forested average annual hydrologic data

Forested condition	Management units								Mungilup Tower	Reservoir Total
	Collie River South	James Well	Collie River East	Bingham River	Collie River Central East	Collie River Central	Harris River	Wellington Reservoir		
Salt (tonnes/yr)	4043	843	1772	1572	1897	1595	3435	3032	15157	18189
Flow (GL/yr)	11.55	1.87	7.09	7.28	8.62	6.38	15	16.84	58	74.64
Salinity (mg/L TDS)	350	450	250	216	220	250	229	180	262	244

Table 7.3. Effects of salinity reduction options on average annual hydrologic data

	Management units								Mungilup Tower	Reservoir Total
	Collie River South	James Well	Collie River East	Bingham River	Collie River Central East	Collie River Central	Harris River	Wellington Reservoir		
OPTION 1										
Salt (tonnes/yr)	10172	6496	16422	1572	4562	5163	1460	4761	46639	51400
Flow (GL/yr)	18.05	3.63	9.45	7.29	9.32	19.19	7	28.52	76.49	102.8
Salinity (mg/L TDS)	564	1791	1737	216	489	269	209	167	610	500
OPTION 2										
Salt (tonnes/yr)	23978	842	1772	1572	10566	13199	1460	8655	54275	62930
Flow (GL/yr)	23.26	1.87	7.09	14.19	14.26	29.35	7	43.62	90.12	133.74
Salinity (mg/L TDS)	1031	451	250	216	741	450	209	198	602	471
OPTION 3										
Salt (tonnes/yr)	23978	2313	4746	1572	10566	13199	1460	8655	58720	67375
Flow (GL/yr)	23.26	2.16	7.68	14.19	14.26	29.35	7	43.62	91	134.62
Salinity (mg/L TDS)	1031	1070	618	216	741	450	209	198	645	500
OPTION 4										
Salt (tonnes/yr)	9087	5494	12989	1572	10566	13199	1460	8655	55253	63907
Flow (GL/yr)	14.51	2.8	8.95	14.19	14.26	29.35	7	43.62	84.16	127.79
Salinity (mg/L TDS)	626	1963	1451	216	741	450	209	198	656	500

OPTION 1 Salt load from each area reduced in proportion to present salt load in deep groundwater discharge

OPTION 2 Maximum reduction from James Well and Collie R East

OPTION 3 Reduction only from James Well and Collie R East to achieve 500 mg/L

OPTION 4 James Well Collie R East and Collie R South to achieve 500 mg/L

