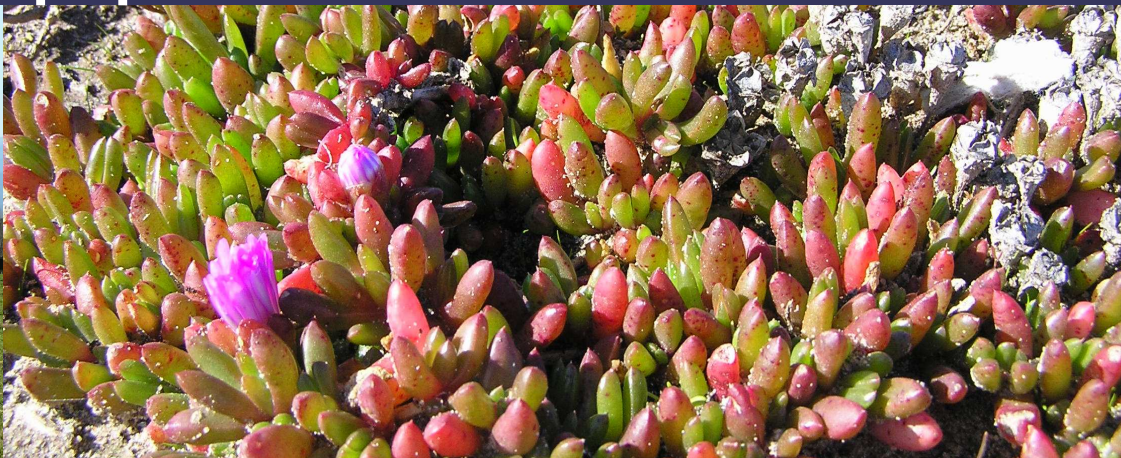


# West Gippsland



# Salinity Management Plan

2005

## Contents

<b><u>Abbreviations</u></b>	<b>vii</b>
<b><u>Glossary</u></b>	<b>viii</b>
<b>Executive Summary</b>	<b>x</b>
<b>1. Introduction</b>	<b>1</b>
1.1 Planning framework	3
1.2 Process of development	4
1.3 The review of the Lake Wellington Catchment Salinity Management Plan	6
1.4 South Gippsland Salinity Strategy	7
1.5 Community consultation	8
<b>2. Salinity causes and processes</b>	<b>10</b>
2.1 Salinisation caused by land clearing and irrigation	10
2.2 Salinity due to the permanent entrance to the Gippsland Lakes	14
2.3 Salinity due to irrigation with saline water and irrigating with shallow groundwater	15
<b>3. Salinity Management Areas</b>	<b>16</b>
<b>4. The effect of salinity on the region's assets</b>	<b>17</b>
4.1 The region's assets	17
4.2 Vulnerability of assets to salinity	17
4.3 Impact of salinity on assets	18
4.3.1 Land and Production Assets	18
4.3.2 Water Assets	24
4.3.3 Infrastructure Assets	34
4.3.4 People and communities	35
4.3.5 Biodiversity Assets	36
4.4 The current social, economic and environmental impact of salinity	37
4.4.1 Total economic costs of salinity	37
4.4.2 Overall impacts of salinity	40
4.5 The likely future social, economic and environmental impacts of salinity without a plan	41
4.5.1 Future depth to water table	41
4.5.2 Future salinity impacts without a plan	44
4.5.3 Impacts of climate change	46
<b>5. Analysis of Management Options</b>	<b>47</b>
5.1 Types and characteristics of management options	47
5.2 Mechanisms to implement management actions	47
5.3 Scale and timing of effect	48

5.4	Priority setting and risk analysis process	51
<b>6.</b>	<b>The Strategy</b>	<b>52</b>
6.1	Vision	52
6.2	Aspirational Targets	52
6.3	Introduction to the Management Actions	53
6.4	Irrigation Salinity Management	55
6.4.1	Management Actions and Resource Condition Targets	55
6.4.2	Strategy	59
6.4.3	Irrigation Management Program	60
6.4.4	Vegetation program	72
6.4.5	Sub-surface drainage program	75
6.4.6	Surface drainage program	84
6.4.7	Living with Salt Program	85
6.4.8	Monitoring, evaluation and reporting	90
6.5	Dryland salinity management	92
6.5.1	Management Actions and Resource condition targets	92
6.5.2	Strategy	96
6.5.3	Salinity Mapping and Investigation Program	99
6.5.4	Whole Farm Planning	102
6.5.5	Perennial pasture program	104
6.5.6	Tree and native vegetation program	105
6.5.7	Groundwater pumping program	113
6.5.8	Living with Salt Program	115
6.5.9	Monitoring, evaluation and reporting	118
6.6	Ocean induced salinity	120
6.6.1	Engineering Structures in the Gippsland Lakes	121
6.6.2	Coastal Sea walls	123
6.7	Surface water salinity (including wetlands)	124
6.7.1	Management Actions and Resource Condition Targets	124
6.7.2	Monitoring, evaluation and reporting	134
6.8	Community and agency engagement	136
6.9	Cost sharing	138
6.9.1	Generalised economic and cost sharing approach	138
6.9.2	Cost sharing for management actions	139
6.10	Summary of Cost Benefit Analysis	147
6.11	Total Cost of Plan	154
6.12	Roles and responsibilities	166
6.13	Conflicts and synergies with other natural resource management programs	168
6.14	Adaptive Management	171
6.15	Plan assumptions	171
6.16	How the plan will address climate change impacts	173

<b>7. References</b>	<b>174</b>
<b>Appendix A: Descriptions of Salinity Management Areas</b>	<b>179</b>
<b>Appendix B: Tables of impact of salinity on assets</b>	<b>182</b>
<b>Appendix C: Future depth to water table</b>	<b>184</b>
<b>Appendix D: Management options description</b>	<b>191</b>
<b>Appendix E: Benefit - risk assessment criteria</b>	<b>201</b>
<b>Appendix F: Discussion on cost sharing</b>	<b>203</b>
<b>Appendix G: Soil Permeability Map</b>	<b>212</b>
<b>Appendix H: Implications of <i>Our Water Our Future</i></b>	<b>214</b>

### **Table of Figures**

▪ Figure 1: Salinity Management Areas	2
▪ Figure 2: Framework for Salinity Management in West Gippsland	3
▪ Figure 3: Summary of the three key processes causing secondary land and water salinisation in West Gippsland	10
▪ Figure 4: Change in recharge/discharge relationship after the clearing of land	12
▪ Figure 5: Depth to water table map for the WGCMA region for 2003	13
▪ Figure 6: Extent and severity of mapped land salinity	22
▪ Figure 7: Estimated Current Cost of Salinity to Agricultural Production (\$ per year)*	24
▪ Figure 8: Distribution and salinity type of saline lakes and wetlands in the region	27
▪ Figure 9: Stream water salinity in the WGCMA region	31
▪ Figure 10: Approximate water table salinity in West Gippsland (modified from DCNR, 1995)	33
▪ Figure 11: Bioregional Conservation Status of Native Vegetation in West Gippsland	38
▪ Figure 12: Estimated current and future costs of salinity in West Gippsland*	40
▪ Figure 13: Predicted 2032 depth to water table for Heyfield, Maffra, Nambrok and Clydebank assuming full conversion to spray irrigation by 2014	78
▪ Figure 14: Road map for the long term strategy to address dryland salinity management	97
▪ Figure 15: Predicted 2032 depth to water table for Heyfield, Maffra, Nambrok and Clydebank	188
▪ Figure 16: Predicted 2032 depth to water table in the Bengworden Salinity Management Area	189

- Figure 17: Predicted 2032 depth to water table for parts of the Foster and Port Albert Salinity Management Areas 190
- Figure 18: Relationship between annual rainfall and recharge for different vegetation types (Walker *et al*, 1999) 192
- Figure 19: Decision process in choice of public or private groundwater pumping investigations (modified from the MID Salinity Mitigation Procedure) 196
- Figure 20: Location of existing Groundwater Control Pumps 198
- Figure 21: Soil Permeability Map 213