2.2 Salinity due to the permanent entrance to the Gippsland Lakes

In 1889, a permanent entrance was formed between the Gippsland Lakes and the ocean at the location of the current settlement of Lakes Entrance. Prior to 1889, records of early settlers indicate that the lakes fluctuated between fresh and brackish. Specifically, Lake Wellington was reported to be essentially a fresh water lake with infrequent periods of brackish conditions (Collett, 1987). Intermittent connection between the lakes and the ocean occurred during periods of high river flows and consequently high lake levels. These high lake levels caused a breach in the dune barrier separating the lakes from the ocean which would remain open for varying periods from weeks to years (Collett, 1987). In between these events, the connection between ocean and lakes was blocked by sand moving laterally along the Ninety Mile Beach (Bird 1965). The high throughflow during periods of ocean/lakes connection meant that the volumes of ocean water entering the lakes system were substantially reduced compared to current conditions. In drier conditions, it is highly likely that the entrance to the lakes was blocked and that no seawater entered the lakes (Collett, 1987). Therefore, the lakes' ecosystem was protected from salinity stresses by the natural shoreline processes. However, after the construction of the permanent entrance to the lakes in 1889, these natural processes were altered, seawater was allowed to enter the lakes at any time and river throughflow was insufficient to hold the seawater back. Compounding the problem, river flows entering the lakes have reduced since European settlement due to the demand for water supply. The combined result of reduced river flows and the permanent entrance to the lakes is now a predominantly saline lakes system. The salinity of Lake Wellington is now generally in the range of 5,000 to 20,000 EC.

Numerous wetlands fringe the shoreline of Lake Wellington and have a very strong hydraulic relationship with the lake water. Some of the wetlands receive water directly from the lake. For example, Lake Coleman and the eastern section of Clydebank Morass have a very strong hydraulic connection with Lake Wellington. In other cases such as Dowd Morass, the Heart Morass and the western section of Clydebank Morass, the hydraulic connection between lake and wetland only occurs during periods of very high lake levels (GHD 1991, SKM 2003c and SKM 2003d). Prior to European settlement, these inflows to the wetlands from Lake Wellington would have been part of the natural flushing process. However, since the opening of the entrance in 1889, the influx of Lake Wellington water to the fringing wetlands has resulted in increasing wetland salinity and changing ecological values. However, it is important to note that the influx of saline water from Lake Wellington to the wetlands is not the only process causing increased wetland salinity. Changed land management resulting in an elevated water table has also played a role (see Section 2.1).

Increased lake salinity has also resulted in the salinisation of the lower reaches of the Avon and Latrobe Rivers. The low topographic gradient in these lower river reaches means that during periods of low river flows and/or high lake levels, water from Lake Wellington can back up significant lengths of the river. In the case of the Latrobe River, Lake Wellington water can back up as far as the confluence of the Thomson River approximately 14 kilometres from Lake Wellington. This not only affects the in-stream ecology but also has the potential to affect the adjacent wetlands which receive water from the rivers through engineering structures (such as Sale Common, Dowd Morass and Heart Morass).