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Bindy M. Datson Actis Environmental Services, Darlington, Australia

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The Effects of Mining on a Salt Lake in the Western Australian Goldfields

Bindy M. Datson¹

¹Actis Environmental Services, Darlington, Western Australia 6070, Australia; E-mail: bindy@actis.com.au

Lake Carey is a large ephemeral lake of an approximate area of 750 km² in the arid Eastern Goldfields of Western Australia. It is one lake in a chain that makes up the Carey palaeodrainage system, formed during the Tertiary period, about 65 million years ago. Lake Carey has recently (within the last 10 years) become the focus of interest of a number of mining companies, most of them operating gold mines. There is concern from a number of people that the joint activities of several mining operations may have an impact on the biological functions of the lake.

Mining activities with the potential to affect the natural lake functions include:

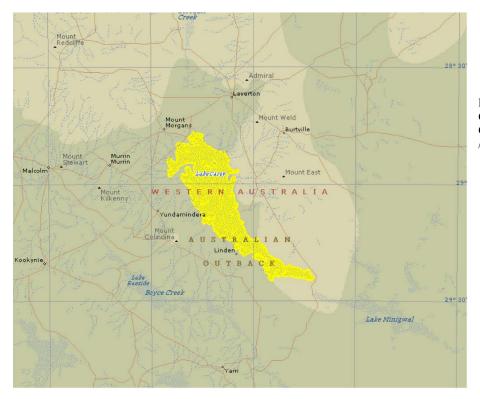
- •Hypersaline groundwater discharge from mine dewatering-extra salt load and extended hydroperiod.
- •Drawdown effect from dewatering bores—destabilization and mobilization of lake sediments.
- •Sediments in hypersaline discharge—fine sediments altering makeup of lake sediments.

- •Interception of palaeodrainage system–increased evaporation from open pits, local drawdown effect.
- •Mine infrastructure–pits, overburden, roads, and exploration vehicles.

After ten years of monitoring the lake, both physical and biological changes have been observed that have a high likelihood of being caused by hypersaline groundwater dewatering discharge, dewatering drawdown effects, sedimentation or a combination of some or all of these factors. As climatic conditions in the Goldfields are cyclic, biological changes may also be due to natural variations.

Environmental monitoring has indicated changes in fringing vegetation with little or no recruitment, and reduction in numbers of species. Fringing vegetation zonation has changed in areas affected by dewatering drawdown.

It has been thirteen years since the last major lake fill—there have been lake fills but not as large as the aftermath of Cyclone Bobby in 1995. Until there will be another similar event it is not certain if changes to the fringing vegetation have been caused by mining activities, natural fluctuations or a combination of the two.



Map of Lake Carey, Western Australia. Copyright © 1988-2004 Microsoft Corp. http://www.microsoft.com/virtualearth. Accessed January 2009.