The present low flows in the Lower Mekong Basin

The lower Mekong River is currently experiencing lower than average flows. The MRC has approximately 15,000 daily measures of river height taken at Chiang Saen since 1960, and only12% of these measures are equal to or lower than the lowest level measured this month (March 2004), however lower river heights have occurred in March in 26 of the past 44 years. River heights and flows are low throughout the basin and the situation becomes more extreme downstream. For example at Pakse, in southern Lao PDR, only 5% of 16,000 daily readings are equal to or lower than the lowest readings for this month 2004, and lower river heights have occurred in March in 14 of the past 44 years.

The cause of the low flows has been the dryer than usual wet season in 2003. Comparing rainfall averaged over 16 sites from across the basin (Fig. 1) with data for 1992 (the lowest flow year since 1960), 1998 (another drought year) and 2000 (a year of extensive floods) it is clear that lower than normal rainfall occurred in the first two months of the wet season, and that rainfall in November was also unusually low. Dryer than usual conditions appear to have persisted in the first half of 2004.

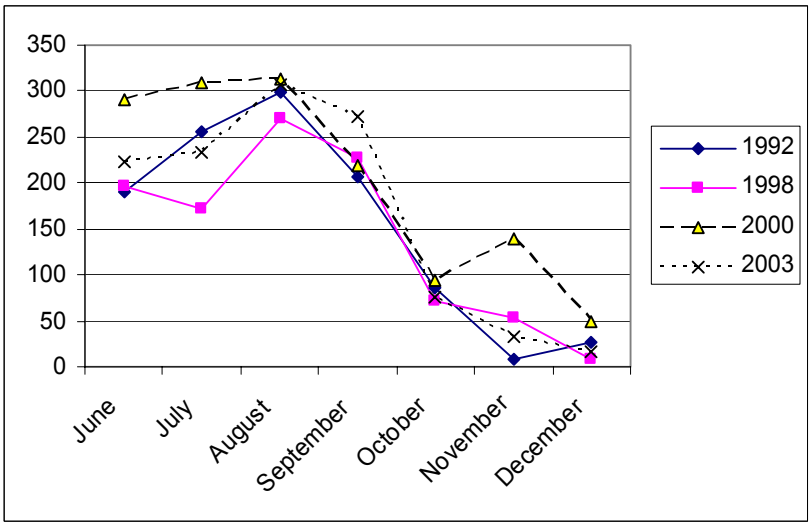

Figure 1. Rainfall average from 16 sites across the lower Mekong Basin during the wet season in 2003.

If low flows in the lower Mekong were caused by retention of water in dams in China we would expect to see flows at Chiang Saen more strongly affected than flows further down the basin where inflows from tributaries would ameliorate the impact. But as the comparison of data from Chiang Saen and Pakse shows, this is not the case.

The existing dams in China are hydropower dams, not dams used for irrigation water supply. Hydropower dams release all the water they retain, although usually with a different pattern of flow to the natural river. In general hydropower dam operators attempt to store 'excess' water in the wet season and release more water than usual during the dry season because natural dry season flows are often insufficient to provide the generating capacity needed. So

the expected impact of Manwan and Dachaosan dams would be to increase the dry season flows rather than decrease them.

Both the existing dams on the mainstream in China are quite small. The total capacity of Manwan dam, 1,000 million m^3, is equivalent to about 14 days flow of the Mekong at Chiang Saen in April, the lowest flow month, or less than 2 days flow in August, the highest flow month. It would not be expected that a dam of this size would have a large impact on the seasonal patterns of flow. That may not be the case for Xiaowan Dam, currently under construction, which is far larger.

Manwan Dam is known to have an impact on the Mekong River downstream. Two distinct effects are evident. The first is a change in the flow regime. After power generation at Manwan commenced in 1993, a pattern of irregular small changes in river height became apparent at Chiang Saen, 200 km downstream from the Chinese border. The change in pattern can be seen clearly if the river height data for the first 3 months of 1991 (before the dam) and 1997 (after the dam) are compared (Figs 2 & 3). This change will undoubtedly have an impact on fish and other aquatic life in the river. By Luang Prabang, further downstream, this pattern has been ameliorated by tributary inflows and is no longer evident.

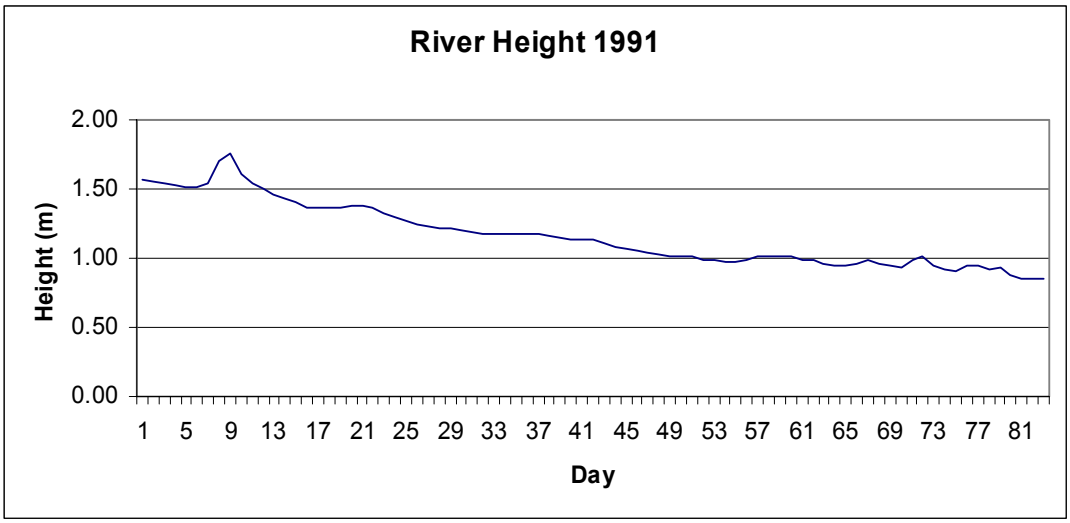

Figure 2. Plot of daily river heights measured at Chiang Saen, Thailand, during the first three months of 1991. Note the relatively smooth line.

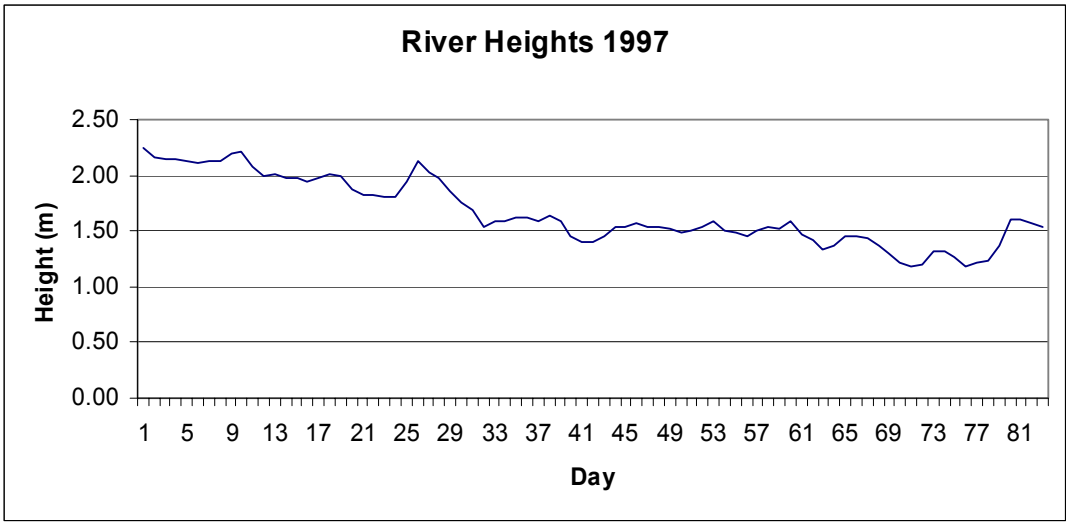

Figure 3. Plot of daily river heights measured at Chiang Saen, Thailand, during the first three months of 1991. Note that the line is no longer smooth, now indicating frequent but irregular change in river levels. This pattern commenced in 1994 following the closure of Manwan Dam in 1993.

The second impact of Manwan Dam has been a decrease in sediment concentrations in the river. The average concentration of suspended solids in river samples dropped by about 50% following the closure of the dam in 1992 (Fig. 4). This phenomenon is commonly encountered with dams which form sediment traps on rivers. The reduction in sediment is evident as far down stream as Pakse in southern Lao PDR where there has been a significant 30% reduction in sediment concentration since the closure of the dam.

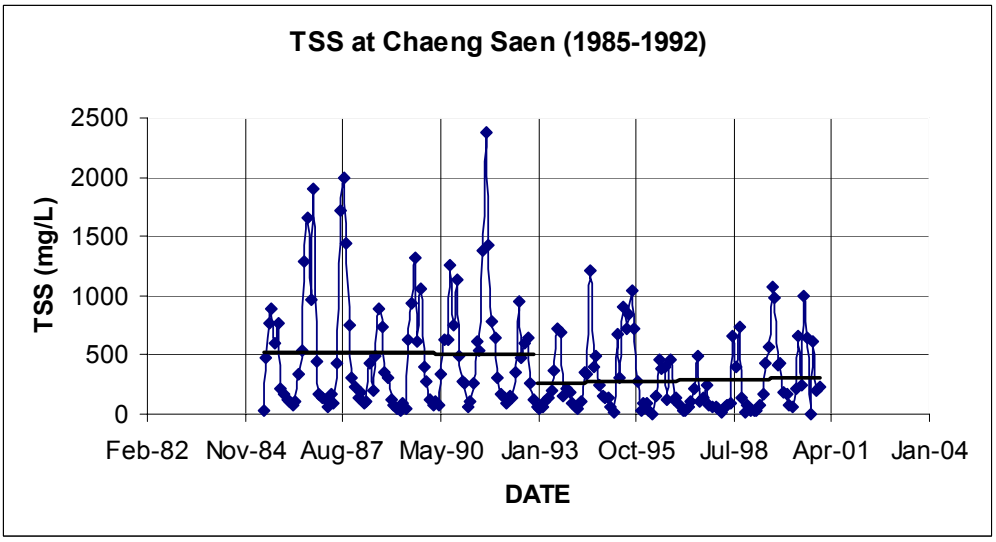

Figure 4. Total suspended solids (TSS) measured monthly at Chaeng Saen, Thailand before and after the closure of Manwan Dam, China.