While advanced wireless systems exploit fast channel variations through opportunistic scheduling, we show that slow channel variations due to mobility can be exploited as well in the presence of elastic traffic. Specifically, since mobile users in poor radio conditions are likely to move and to be served in better radio conditions, we propose a mobility-aware scheduler that deprioritizes those users. We compare the performance of this scheduler to that of other usual scheduling schemes in a dynamic setting with a random number of active users and various scenarios of mobility. While the proportional fair scheduler is considered as the best algorithm in the absence of mobility, the system performance improves under more opportunistic schedulers like max C/I in the presence of mobility. It turns out that the proposed mobility-aware scheduler outperforms these two scheduling policies by adapting its behavior to the observed mobility of active users. The results are based on the analysis of flow-level traffic models based on networks of coupled queues with routing, and validated by system-level simulations.