To evaluate ecological risks and existing forms of heavy metals in the Jialu River of China, sediments samples were collected from 22 sites along this river. A BCR-sequential extraction procedure was applied to analyse the chemical speciation of heavy metals (i.e., Cr, Mn, Co, Ni, Zn, Cu and Cd) in sediment samples, including acid extractable, reducible, oxidisable and residual fractions. The geo-accumulation index, risk assessment code and enrichment factor were used to evaluate the pollution situation of these heavy metals. The results showed that the speciation of Cr was mainly associated with the exchangeable fraction with a mean percentage of 54.23%. Mn and Zn mainly occurred in the reducible fraction, accounting for 42.72% and 37.71% of the total contents, respectively. Co, Ni, Cu and Cd were mainly associated with the residual fraction with mean percentages of 58.75%, 59.02% and 48.21%, respectively. The sediment samples in the lower reach had higher heavy metals levels, and Cd showed a considerable risk relative to other metals.