After the Fukushima Daiichi Nuclear Power Plant accident on 11 March 2011, we sampled the lake water, a freshwater snail (Sinotaia quadrata histrica) and a freshwater mussel (Limnoperna fortunei) at two stations in the littoral zone of Lake Kasumigaura, for measurement of cesium-137 (137Cs) concentrations. We determined changes in the activity concentrations of 137Cs in these mollusks between July 2011 and March 2014 and calculated their concentration factors and ecological half-lives. The activity concentrations of 137Cs in the lake water and in the mollusks declined during the sampling period and did not differ between the sampling stations. The activity concentration of 137Cs in the snail was significantly higher than that in the mussel. The concentration factor of the snail (a verage 570)was also higher than that of the mussel (a verage 310). These differences in the fate and trends of 137Cs may reflect the well-documented differences in the foraging strategies and the diets of snails and mussels. The ecological half-lives of 137Cs in snails and mussels were estimated to be 365-578 days and 267-365 days, respectively. These values are much larger than the biological half-lives reported in earlier experimental studies, suggesting that 137Cs is still accumulating in these mollusks and that dietary uptake dominates the total uptake of 137Cs.