After the Fukushima Daiichi Nuclear Power Plant (FDNPP) accident in March 2011, marine organisms, seawater and sediment near Fukushima were contaminated with both ^{134}Cs and ^{137}Cs that was released into coastal waters. The relatively long half-life (30.17 years) of ^{137}Cs has led to closures of fisheries and continuing concern about public health from seafood consumption. The pattern of contamination evident among almost 100 fish species indicates that ^{137}Cs concentrations in benthic fish generally declined more slowly than in pelagic fish in the same region. We analyzed publicly-available data of ^{137}Cs concentrations in pelagic, benthopelagic and benthic fish with surface waters, bottom waters, and marine sediments in regions most subject to the radionuclides released by the damaged FDNPP. While there was considerable interspecific variability, exponential regression analysis showed that within the first year of the accident, pelagic fish lost ^{137}Cs at much faster rates (mean of ~1.3% day^{-1}) than benthic fish (mean of ~0.1% d^{-1}), with benthopelagic fish having intermediate loss rates (mean of ~0.2% d^{-1}). Temporal declines in ^{137}Cs in sediments in the first year were 0.03% d^{-1}, while in surface and bottom waters it was 2.3% d^{-1} and 0.9% d^{-1}, respectively. Thus, in comparing temporal trends, the loss rates of ^{137}Cs in benthic fish were more comparable to the decline rate of ^{137}Cs concentrations in sediments, whereas the declines in pelagic fish were more comparable to the declines in seawater. In the following 4 years, declines in sediment and benthic fish continued to be significantly less than in the first year but also significantly less than in pelagic fish and water. These field data, based on about 41,000 data points, are consistent with laboratory experimental results that demonstrate that benthic fish are capable of acquiring ^{137}Cs from sediments, primarily through benthic invertebrates that contribute to the diet of these fish. Thus, it appears that sediments are not only a sink for ^{137}Cs but can also serve as a source of ^{137}Cs for marine animals.