Studies are presented investigating the ability to enhance aryl nitro-reduction processes in sediments through electron donor addition. In particular, high molecular weight (starch and guar gum) and/or low aqueous solubility electron donors (oleic acid) were studied, since they should be less prone to diffusive loss to the water column after addition to contaminated areas. For comparison, complimentary studies were conducted with water-soluble electron donors (acetate and dextrose). The ability to enhance activity was measured by methane production and reduction of either nitrobenzene or 1,3,5-trinitrobenzene to aniline or dinitroaniline. The results demonstrate that all electron donors resulted in increased methane production after a lag phase. The highest level of methane production and the shortest lag phase in uncontaminated sediment microcosms was observed in acetate-fed systems. Sorption studies of all electron donors showed that starch was partitioning the least into the water phase. In microcosms containing nitrobenzene, trinitrobenzene and acetate, methane production did not occur and nitro-reduction was not observed. Conversely, the addition of dextrose or starch yielded methane production and aryl nitro-reduction with each contaminant tested. Neither nitrobenzene nor trinitrobenzene was significantly reduced in $HgCl_2$-killed controls. From these studies, it appears that starch may be well suited for applications of in-place, anaerobic sediment bioremediation.