

routine concerns of the Fish and Wildlife Service. It is strongly recommended that the District take a close look at the probable systemic effects of the protection plan itself. A more comprehensive understanding of the long term hydraulic and hydrodynamic effects of the engineering site protection planned can prevent a worse case scenario where the short term goal of protecting 200 feet of bank can result in even greater erosion, greater expense and greater controversy elsewhere. From what little information has been provided concerning the site protection plan designed by the Fish and Wildlife Service, it is not clear for example, if the present currents, shear stress, velocity, river geometry, and geomorphology have been fully considered for adequately tying back both ends of the protection to prevent the creation of eddying and increased erosion above or below the section targeted for protection.

Given the high probability of encountering cultural materials throughout this stretch of the Columbia River, it would seem advisable to be cautious about long term deleterious effects of engineering site protection measures. The Waterways Experiment Station has taken a leading role among Federal Agencies in research focusing on archaeological site protection as well as bank protection using bioengineering techniques. It is hoped that these comments will be viewed in the context of these research interests.

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EXHIBIT E