coverage (1949, 1966, 1976, 1986, 1989). None of the other surveys provided coverage for more than 25% of the Site.

8.4 EVALUATION OF ACCURACY OF REPORTED HISTORIC DATA

The surveys selected as both useable and relevant to meeting project objectives were evaluated on the estimated accuracy of the sounding information at each of the locations selected for taking a core sample to be used in the chemical characterization of sediments in the Site. The accuracy evaluation included the following procedures;

- Historic information obtained from the USACE and from interviews with USACE personnel were utilized to evaluate the position uncertainty associated with methods of collecting sounding locations. The equipment and the methodology used for obtaining location information were examined in detail to provide an estimate of the relative accuracy of each survey. The 1986 and 1989 surveys used either laser- or microwave-based electronic distance measuring devices with a much higher degree of accuracy than the manual methods of triangulation from known landmarks and surveyed in survey line endpoints used in earlier surveys. An estimate of error was made based on the error expected for each of these devices.

- Positions were recalculated from raw data in the USACE field note books and compared to the location plotted on the USACE maps for representative data sets covering twenty survey lines using the manual positioning systems. A comparison of the recalculated and plotted locations allowed a numeric estimation of the error associated with calculating and plotting positions from the measured data used in the 1966 and 1976 surveys.

- A review of aerial photos was utilized to evaluate shoreline positions during the time of the bathymetric surveys. This permitted the evaluation of a few of the surveys on which it appears that soundings were apparently taken on shore when plotted on a map containing present river boundaries.

- Multiple independent generation of x,y coordinates from bathymetric survey sheets was performed to evaluate the precision with which one could obtain coordinates from plotted locations. A numeric estimate of error was obtained from the calculated variation.

From the numerous estimates of uncertainty from each of the above-described items, an estimate of total horizontal error was calculated for each survey. There is an associated vertical uncertainty related to these locations. Vertical errors were calculated based on the estimated slope of the sediment surface at the sampling location, multiplied by the horizontal error associated with a given survey event. The combination of position and vertical uncertainty becomes a factor in selecting time interval samples in areas of the river where the river bottom is steeply sloped. Thus, the primary uncertainty in the bathymetry for selecting time interval samples affects only those cores placed in locations where the channel bed is steeply sloped. Outside of these areas the degree of uncertainty is relatively low. Also, the use of bathymetry for evaluating sediment mobility modeling results will be primarily affected by this uncertainty for areas of the river which are steeply sloped.

Figure 8-2 presents an example of a stick diagram portraying the sediment depths corresponding to each of the selected bathymetric surveys. The estimated error limits associated with each survey depth are presented as the dashed lines of the same color as the surveyed depth. Appendix A contains analogous stick diagrams depicting the bathymetric survey depths and associated uncertainty in depth for all 78 vibracore

sampling locations. These data were utilized in selecting the time stratigraphic horizons as discussed in detail in Section 5.0.

TABLE 8-1

SUMMARY OF USEABLE BATHYMETRY COVERAGE FOR THE SITE VICINITY

Passaic River Study Area, New Jersey

Year Bathymetric Survey Was Performed	Number of Useable Survey Sheets
1989	12
1986	12
1984	1
1983	7
1982	2
1980	2
1978	1
1976	4
1974	4
1973	1
1971	1
1970	4
1966	4
1965	3
1964	3
1962	2
1961	2
1960	1
1958	1
1950	3
1949	9
Total	79