Appendix D

Data Processing

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Several processing steps were applied to the current meter data to obtain processed data files from the raw data files downloaded from the meters. These processing steps were specific to the meter type. Following is a brief narrative outlining the steps taken to process the raw data retrieved from each meter type. Prior to each download or processing procedure the field logs for each meter were reviewed and compared with programmed deployment parameters or as additional input to processing software.

Aanderaa Current Meter

The Aanderaa RCM4 current meters log the data to a magnetic tape based on manual switches set inside the meter. Data from the tapes were converted to digital format using an Aanderaa Tape Reader 2650 and terminal communication software. The raw digital files are "cleaned" to remove duplicate lines and asterisks. Programs were written to convert the raw counts logged by the meter to engineering units based on the calibration coefficients specific to each meter (logged by serial number). The calibration coefficients include temperature, conductivity, pressure, speed, and direction. The coefficient for speed is dependant on the type of rotor that is installed on the instrument (savonious or paddle). Savonius = 1.5 x 42 x revs/count and paddle = 1.1 x 46.5 x revs/count. These converted text files (count to engineering) are considered the raw files on the data CD. The engineering files are loaded into Excel and QA/QC plots are produced. The out-of-water portion of the record and any obvious spikes in the data were eliminated. This edited file is saved as a comma separated variable (csv) file and is considered the final data file from which all the record statistics are calculated and all the plots are generated.

InterOcean S4 Current Meter

The InterOcean S4 current meters log data internally according to preset deployment parameters (Table B-1). In addition to these parameters, the meter was zero-tank tested prior to the initial deployment to verify or adjust the X/Y offsets and X/Y sensitivities. InterOcean S4 Application Software is used to download the data from the meter and convert the downloaded binary file to tabular text data. This text file is tab-delimited and considered the raw file on the data CD. In-house programs are used to reformat the data and run record statistics. The out-of-water portion of the record and any obvious spikes in the data were eliminated. This edited file is saved as a comma separated variable (csv) file and is considered the final data file.

SonTek ADP Current Meter

The SonTek acoustic Doppler profiler (ADP) current meters logged internally according to the deployment parameters listed in Table B-1. The binary log files downloaded from the meters are the raw files on the data CD. These binary files were converted to ASCII files using SonTek utility programs. The twelve separate ASCII file were then merged into one file using in-house programs. During the file merge two adjustments are made, the current direction is corrected from degrees magnetic to degrees True and the depth cells are adjusted for the height off bottom of the transducer head. The ADPs do not have pressure sensors so the data is processed using in-house programs to test for boundary interference (e.g., water surface bins) by looking for spikes in the amplitude and signal-to-noise ratio for each of the three beams. The number of good data bins for each profile is also tracked to ensure that the pattern matches the tidal signal from nearby moorings with pressure sensors. As a final QA/QC check, vector time series are plotted for specific depth bins. The final data file is a text space delimited and used to calculate record statistics are calculated and plots are created.

RD Instruments ADCP Current Meter

The RDI acoustic Doppler current profiler (ADCP) current meters logged internally according to the deployment parameters listed in Table B-1 depending on the frequency of the meter (e.g., 300, 150, and 75 kHz). The binary files downloaded from the instruments are the raw files on the data CD. RDI's program BBLIST was used to convert the binary files to ASCII format. Although the meters had pressure sensors, the near-surface bins often contained questionable data because of the depth of the profiles. In order to recover as much usable data as possible,

in-house programs were used to test for boundary interference using echo intensities and correlation coefficients for each of the four beams and percent good on beam 4. Values for the echo intensities and correlations were determined from the manufacturers technical manual and the meter frequency. The percent good was originally set at a limit of 85%. At the direction of King County personnel, the limit was reduced to 25%. As a final QA/QC check, vector time series are plotted for specific depth bins. The final data file is text space delimited and used to calculate record statistics are calculated and plots are created.