APPENDIX G
BUCKET FILE ANALYSIS

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G.1 INTRODUCTION

This appendix describes the procedures used to calculate daily dredging volume and its associated total polychlorinated biphenyl (PCB) mass, total PCB concentration, Tri+ PCB mass, Tri+ PCB concentration and bulk density. These procedures rely on the electronic files (*.bkt text files) documenting the location of the dredge bucket at closure ("bucket files") that were generated by the bucket positioning software used by the dredging contractor. Volume was calculated directly from the *.bkt text files. All other parameters were calculated based using this volume and sediment data from the pre-dredging (Sediment Sampling and Analysis Program; SSAP) and residual coring programs, as discussed in Appendix H, Pass by Pass Mass Calculations.

G.2 CONVERT THE BUCKET FILE FROM A TEXT FILE TO A POLYGON SHAPEFILE

The bucket (*.bkt) files were received as a space delimited text file. They provide vertical and horizontal location information for every bucket closure by a given dredge on a given day. For the text file to be usable for analysis in GIS, it was converted to a shapefile. The steps taken to convert the *.bkt files to a shapefile are as follows:

1. In IDL, read in the space delimited *.bkt files. The bucket file is set up as follows:
    a. File name includes:
        i. Dredge ID: This is the ID of the dredge collecting the data (320, 345, or 385)
        ii. Date: Date of dredging in YYYYMMDD format
        iii. Time: Sometimes included, this is the start hour of time from 0000 to 2300 of dredging. Daily files and files split by am and pm will not have this information.
    b. File includes 7 columns as follows:
        i. X-coordinate of the bucket closure in NAD83 State Plane NY East (feet)
        ii. Y-coordinate of the bucket closure in NAD83 State Plane NY East (feet)
        iii. Elevation of the bucket closure in NAVD88 (feet)

iv. Bucket heading (degrees). Zero is north and rotation is clockwise.
v. Bucket width (feet) at full opening. Plane is x direction prior to rotation.
vi. Bucket length (feet) at full opening. Plane is y direction prior to rotation.
vii. Time of closure in seconds after midnight. This column was initially inaccurate and should not be used.

2. Data processing
    a. The following data is excluded from analysis:
        i. File is empty
        ii. X-coordinate or y-coordinate is missing.
        iii. Elevation is too low or too high to be a dredge value (<90 ft or >120 ft)
    b. The widths and lengths are manually added to the *.bkt files by the dredge operator. There is no consistency to the values, so the values are adjusted based on the following clamshell specifications for a 1,2, and 5-cy bucket respectively:
        i. Dredge 320 (1 CY)
            1. If width<length:
                a. width = 4.3406 ft (1323 mm)
                b. length = 9.2782 ft (2828 mm)
            2. if width>length
                a. width = 9.2782 ft (2828 mm)
                b. length = 4.3406 ft (1323 mm)
            3. elevation is lowered 0.1667 ft (2 in)
        ii. Dredge 345 (2 CY)
            1. If width<length:
                a. width = 5.0525 ft (1540 mm)
                b. length = 10.6890 ft (3258 mm)
            2. if width>length
                a. width = 10.6890 ft (3258 mm)
                b. length = 5.0525 ft (1540 mm)
            3. elevation is lowered 0.175 ft (2.1 in)
        iii. Dredge 385 (5 CY)

1. If width<length:
    a. width = 7.0886 ft (2160 mm)
    b. length = 14.6654 ft (4470 mm)
2. if width>length
    a. width = 14.6654 ft (4470 mm)
    b. length = 7.0886 ft (2160 mm)
3. elevation is lowered 0.15 ft (1.8 in)

c. Remove duplicate data. Since many of the files being read in have the same data as other files (i.e., a *.bkt file for an entire day will in theory have the same entries as that of the am or pm file and that of one of the hourly files), it is necessary to remove the duplicate data.
d. Sort the data from highest elevation to lowest elevation (necessary for processing in GIS).

3. Export the data as a polygon shapefile by day with the naming convention, BKT_day_YYMMDD.shp

G.3 PREPARE THE BUCKET SHAPEFILES TO CALCULATE DAILY VOLUME AND OTHER PARAMETERS

Once the text file was converted to a daily shapefile, it is in a usable format for analysis in GIS. A convex outline shapefile of each dredging area was created to account for gaps within and around the shapefile where bucket closures may not have been recorded (bucket positioning software only records buckets that close within 2 to 3 inches, but the program does not record unclosed buckets). The bucket file and the outline file were converted to 1-foot by 1-foot raster grid cells, which are capable of calculating elevation differences spatially. In the case of overlapping buckets, the grid cell with the lowest elevation took priority over overlapping grid cells. This is to account for the daily bucket closure with the lowest elevation being used for a volume calculation.

A Euclidean Allocation was then performed on the bucket shapefile. This fills any gaps within the shapefile with elevations of the grid cell it falls closest to. A 15-foot buffer is also included in the Euclidean Allocation, giving grid cells within 15 feet of the edge of the dredging area an elevation of the grid cell they fall closest to. The newly formed file was

then clipped to the convex outline to keep the area of dredging within the outline of the bucket files.

Now the dredging end depth elevation can be linked to the 2009 OSI pre-dredge bathymetry, which in the initial dredge pass is the dredge start elevation. The dredge pass is then "Mosaic'd" with the 2009 OSI pre-dredge bathymetry to create a new bathymetry file of the end depth. The Mosaic analysis inlays the dredging file into the 2009 OSI pre-dredge bathymetry and gives the lowest elevation in each grid cell priority.

In each successive dredge day, the previous day's dredge end elevation bathymetry becomes the dredge start elevation and the dredging file for that day was then "Mosaic'd" with the previous day's file to become the dredge end elevation.

The three files – the pre-dredge bathymetry, the daily dredge start elevation, and the daily dredge end elevation – were converted back to a polygon and layered together for use in calculating areas and depths of dredging and therefore volumes with the following procedure:

1. Bring the BKT_day_YYMMDD.shp into GIS
2. Create a daily outline polygon of the bucket shapefile to create a convex shapefile with no gaps with the naming convention, BKT_day_YYMMDD_outline.shp. This will account for gaps in data inside the convex outline of the shapefile.
    a. Dissolve BKT_day_YYMMDD.shp
    b. ET Clean Gaps
    c. Dissolve
    d. Multipart to Singlepart
    e. Features To Convex Polygons
    f. Dissolve
3. Convert BKT_day_YYMMDD.shp and BKT_day_YYMMDD_outline.shp to rasters with the naming conventions bkt_YYMMDD and bkt_YYMMDD_ol, respectively.
    a. Feature to Raster
        i. Rasters will be 1x1 ft grid cells with elevation as their value
        ii. Raster created should be within the same extent as the input file
        iii. Raster created should be snapped to the pre-dredge bathymetry file

iv. Value of bkt_YYMMDD will be the elevation; value of bkt_YYMMDD_ol will be zero.
v. For bkt_YYMMDD, the grid cell with the lowest elevation takes priority over overlapping grid cells.

4. Fill the gaps within the daily raster (BKT_day_YYMMDD) and create a new raster with the naming convention bkt_YYMMDD_ng:
    a. Times: bkt_YYMMDD * 100
    b. Integer conversion
    c. Euclidean Allocation
        i. 15-foot buffer (this creates a 15-foot buffer both around the raster and within the raster to fill gaps. The buffered areas receive the values of the grid cells with values they are closest to)
    d. Plus: Euclidean Allocation + bkt_YYMMDD_ol (clips the Euclidean Allocation to the outline of the daily bucket file)
5. Bring in a shapefile of all Certification Units (CUs) and create a raster of each CU
    a. Feature to Raster
        i. Rasters will be 1x1 ft grid cells with elevation as their value
        ii. Raster created should be within the same extent as the input file
        iii. Raster created should be snapped to the pre-dredge bathymetry file
        iv. Value of CU raster will be zero.
6. Bring in 2009 Pre-Dredge Bathymetry and convert the areas within bkt_YYMMDD_ol to a polygon
    a. Plus: 2009 Pre-Dredge + CU Raster (clips 2009 Pre-Dredge to specific CU)
    b. Plus: + bkt_YYMMDD_ol (further clips the raster created in step a to the bucket outline)
    c. Times: * 100
    d. Integer conversion
    e. Raster to Polygon
7. Copy the 2009 Pre-Dredge Bathymetry, save it as the Dredge Start (this is for the first round of each pass only, in successive rounds, the Dredge End replaces the Dredge Start), and convert the areas within bkt_YYMMDD_ol to a polygon
    a. Plus: Dredge Start + CU Raster (clips Dredge Start to specific CU)

b. Plus: + bkt_YYMMDD_ol (further clips the raster created in step a to the bucket outline)
c. Times: * 100
d. Integer conversion
e. Raster to Polygon

8. Create the Dredge End Bathymetry and convert the areas within bkt_YYMMDD_ol to a polygon
    a. Plus: bkt_YYMMDD_ng + CU Raster (clips Dredge End to specific CU)
    b. Float
    c. Divide: ÷100
    d. Mosaic To New Raster: w/ Dredge Start
        i. Minimum value in each grid cell takes priority
9. Convert Dredge End areas within bkt_YYMMDD_ol to a polygon
    a. Plus: Dredge End + CU Raster (clips Dredge End to specific CU)
    b. Plus: + bkt_YYMMDD_ol (further clips the raster created in step a to the bucket outline)
    c. Times: * 100
    d. Integer conversion
    e. Raster to Polygon
10. Union the Pre-dredge bathymetry with the Dredge Start bathymetry and the Dredge End bathymetry
    a. Union: 2009 Pre-dredge & Dredge Start
    b. Union: w/ Dredge End
11. Copy the Dredge End raster and save as the Dredge Start raster for the next round.
    a. Copy Raster

       After each successive pass (AID1, AID2, ARD1, ARD2, ARD3), set the post-pass bathymetry to the Dredge Start. Similar to the Pre-Dredge bathymetry, convert each post-pass bathymetry from a raster to a polygon and union with the other converted polygons. After one pass, you would do this once, after four passes, you would do this once for each pass and therefore four times, etc.
12. Union the polygon created in step 10 with the CU Thiessen polygons and Sheetpile area in CU-18.
    a. For the first round, this is the CU Thiessen polygons for the SSAP results

b. For all successive rounds, this is the CU Thiessen polygons with both the SSAP and the residual data results

13. Select the following
    a. CU-Label = "CU-"+#: areas within specific CU
    b. GRIDCODE <> 0: areas in the union that don't include any dredge data
    c. GRIDCODE_1 <> GRIDCODE_2: areas where dredge start <> dredge end
14. Add a field for area and calculate the area
    a. ET CalculateArea
        i. Square feet

The above analysis was run in a loop by CU, pass, and date. The results are shapefiles in the format such as: CU#_PASS_YYMMDD.shp (PASS = AID1. AID2, ARD1, ARD2, or ARD3). There is a shapefile for each CU and day.

G.4 FILLING THE GAPS (AID1)

After the first pass of dredging, it appeared there may be some gaps in the data. The following procedure was used to fill large (<500 sq feet) areas of potentially missing data:

1. Merge: all the CU#_PASS_YYMMDD.shp files from AID1
2. Dissolve
3. Union: w/ CU polygon
4. Remove areas where dredging occurred and CUs not dredged during AID1
5. Feature to Raster: Value field = 0
6. Minus: OSI 2009 pre-dredge bathymetry – post-AID1 OSI bathymetry
7. Find areas where dredging occurred (where 2009 pre-dredge – post-AID1 dredge > 0) and create a raster of only these areas.
8. Plus: raster of non-dredged bucket areas + raster of bathymetry dredged areas to find areas that have removal but do not have buckets.
9. Set all the cells in the raster to zero
10. Plus: + post-AID1 bathymetry raster
    a. Sets the post-dredge elevations to the dredge areas with no bucket files. Now this file is similar to the bucket dredging Dredge End raster.

Once the file is in raster format, it went through a similar process as that of the bucket files. It was converted to a feature and "union'd" with the 2009 OSI pre-dredge bathymetry, the Dredge Start (pre-dredge = dredge start), the CU Thiessen polygon and the sheetpile file. Then each dredged area was linked to a CU and day, based off dredging information in the dredging reports provided by the dredging contractor.

G.5 POST-PROCESS THE SSAP FILE

The SSAP file (Appendix H) was created based on the Thiessen polygons for the SSAP data for the first pass, and the SSAP as well as the residual data for the second pass. Depths are in 6-inch increments, starting at zero inches, which is the 2005 OSI bathymetry. The bucket analysis is based on the 2009 OSI bathymetry. Due to differences in the elevations between the 2005 and the 2009 bathymetries, the SSAP file provided needed to be adjusted to the difference elevations. The following steps were taken to post-process the SSAP data:

1. Determine the mean 2009 pre-dredge elevation for each SSAP core using the SSAP Thiessen polygon file and the 2009 OSI bathymetry file
2. Determine the mean 2005 pre-dredge elevation for each SSAP core using the SSAP Thiessen polygon file and the 2005 OSI bathymetry file
3. Find the difference between the elevation means: diff = 2005 – 2009
4. If diff ≤0, then no change to core's information is necessary
5. If diff > 0, this means we "lost" sediment depth between 2009 and 2005.
    a. Temporarily reset upper and lower depths to account for "lost" sediment
        i. If upper depth <> 0, then new upper depth = old upper depth – (diff MOD 6)
        ii. New lower depth = old lower depth – (diff MOD 6)
    b. Adjust mass in each interval so that it represents every 6 inches
        i. For each interval: mass = (upper section mass*(1 – ((diff MOD 6)/6))) + (lower section mass *(((diff MOD 6)/6)))
        ii. Intervals reset to 0-6, 6-12, etc.
    c. Adjust concentration in each interval so that it represents every 6 inches
        i. For each interval: conc = (upper section conc*(1 – ((diff MOD 6)/6))) + (lower section conc *(((diff MOD 6)/6)))
        ii. Intervals reset to 0- 6, 6-12, etc.

d. Adjust bulk density in each interval so that it represents every 6 inches
    i. For each interval: BD = (upper section BD*(1 – ((diff MOD 6)/6))) + (lower section BD *(((diff MOD 6)/6)))
    ii. Intervals reset to 0-6, 6-12, etc.

Post-processing was not necessary for the residual files (Appendix H) as the bathymetry in the residual files always begins at zero and correlates with the final bathymetry of the previous dredge pass.

G.6 CALCULATE VOLUME, MASS, CONCENTRATION AND BULK DENSITY BY CU AND DAY

Volume can be determined directly from the polygon files, but mass, concentration, and bulk density need to be linked to the SSAP and residual files (Appendix H), which are calculated in 6-inch increments. The simplest way to determine these parameters is by automating the analysis in IDL to calculate the parameters on a daily and CU basis by performing the following steps:

1. Bring in the post-processed SSAP file and the residual file into IDL
2. Bring in the shapefiles CU#_PASS_YYMMDD.shp, which are already split by CU and day into IDL
3. Bring in the shapefile that filled gaps in AID1 into IDL
4. Data table information
    a. The SSAP and residual files contain data for TPCB Mass, TPCB Concentration, Tri+ Mass, Tri+ Concentration, and Bulk Density
    b. Each attribute has a unique identifier CU Core ID (CU which the core Thiessen polygon falls inside and the SSAP core Id or residual node, the parameter, and results based on 6-inch intervals from 0 to 150 inches
    c. SSAP data that is necessary for this analysis are:
        i. Mass/Conc/BD above AID1: removed during AID1
        ii. Mass/Conc/BD left AID1: left after AID1 and removed during AID2
        iii. Mass/Conc/BD left AID2: left after AID2 and removed during ARD1
        iv. Mass/Conc/BD left ARD1: left after ARD1 and removed during ARD2
        v. Mass/Conc/BD left ARD2: left after ARD2 and removed during ARD3

d. Residual data that is necessary for this analysis are:
    i. AID1 Mass/Conc/BD: left after AID1 and removed during AID2
    ii. AID2 Mass/Conc/BD: left after AID2 and removed during ARD1
    iii. ARD1 Mass/Conc/BD: left after ARD1 and removed during ARD2
    iv. ARD2 Mass/Conc/BD: left after ARD2 and removed during ARD3
    v. ARD3 Mass/Conc/BD: left after ARD3 (not needed in this analysis)

5. Shapefile information
    a. Both the CU#_PASS_YYMMDD.shp and the shapefile that filled gaps in AID1 have the same structure
    b. The fields necessary for this analysis are:
        i. Core ID (SSAP) or Node (residual)
        ii. CU Label
        iii. CU Area (m2)
        iv. Area (ft2) of dredging grid cell
        v. Sheetpile – whether the dredging falls inside or outside
        vi. Date
        vii. 2009 Pre-Dredge Elevation
        viii. Dredge Start Elevation
        ix. Dredge End Elevation
        x. Residual Dredge Start (after AID1, this is used with the residual samples)
6. Data Processing
    a. Create a unique identifier to link data between the shapefiles and the data tables of results
        i. CU_CoreID = CU Label + Core ID or Node ID
    b. Calculate the CU Thiessen polygon volume in 6-inch intervals and convert from m^2 to ft^2
    c. Calculate Dredge Start and Dredge End from the shapefiles
        i. 2009 Pre-dredge bathymetry is the zero depth for all SSAP samples
        ii. Each post-pass bathymetry is the zero depth for respective residual samples (i.e., post-AID1 bathymetry is the zero depth for the AID2 dredging)

d. Calculate the dredge volume removed at each 6-inch interval (0-6,6-12,12-18, etc.) for each CU_CoreID
    i. Volume = (start depth in each 6-inch interval – end depth in each 6-inch interval) * area of grid cell
    ii. Create an array of volumes for each CU_CoreID for each 6-inch interval
e. Fill the results from the SSAP data and the residual data into the 6-inch incremental dredging volume based on the CU_CoreID
    i. The results from the 0-6 interval will match up with the dredging volume removed from 0-6 inches, etc.
    ii. Create an array of results for each parameter based on each CU_CoreID for each 6-inch interval
f. Calculate total volume removed by day and CU
    i. Total the volume array in the shapefile by CU and day
g. Calculate the volume ratio of removal by day and CU
    i. Divide the volume area by the CU volumes for 6 inch intervals
h. Calculate total volume removed when bulk density has a value by day and CU
    i. Total the volume array in the shapefile by day and CU where bulk density has a value (this is to make sure when bulk density is calculated, it is not incorporating volumes where there is no bulk density).
i. Calculate Bulk Density by day and CU
    i. Multiply the bulk density array by the volume array
    ii. Sum the results by day and CU
    iii. Divide by the total volume array when bulk density has a value
j. Calculate Total & Tri+ PCB Mass
    i. Multiply the mass array by the volume array
    ii. Sum the results by day and CU
k. Calculate Total & Tri+ PCB Concentration
    i. Multiply the concentration array by the bulk density array and the volume array
    ii. Sum the results by day and CU

iii. Divide the by the total volume array when bulk density has a value multiplied by the bulk density

At this point all analyses have been performed to calculate bucket dredge removal results for volume, TPCB and Tri+ mass and concentration, and bulk density by day and CU.

G.7 MODIFICATION OF BUCKET MASS TO MATCH MASS IN THE SSAP AND RESIDUAL FILES

Overall, the total PCB mass and the Tri+ PCB mass by the bucket analysis had lower values than the masses based on the polygon analysis of the SSAP and residual files (Appendix H). To account for the differences, the respective bucket analysis masses were multiplied by a factor within each CU and pass so their results matched those in the SSAP and residual files (Appendix H).

G.8 BUCKET CLOSURES

The number of bucket closures per CU and day were calculated by taking all the bucket closure centroids and linking them to the CU they are within. Each bucket closure has an X-coordinate and a Y-coordinate, which is considered the centroid of the closure. This centroid can be joined to the shapefile which contains CU spatial information to determine which CU contains the bucket closure. The count of all daily bucket closures in a CU can be determined by the following steps:

1. Merge all BKT_day_YYMMDD.shp shapefiles
2. Remove buckets with elevations ≥119 feet (this is considered the water elevation so anything ≥119 will not be considered removal)
3. Convert the buckets to points at the centroid of the bucket bite
4. Spatially join the points to the CU they are within
5. Spatially join the points to the sheetpile polygon
6. In excel, create a pivot table with date, CU, sheetpile information, and a count

G.9 DIFFERENCE IN CALCULATION OF VOLUME BY CU, DAY, AND DREDGE

Volume by day, CU and dredge was requested after the volume by day and CU analysis had been performed. Due to time constraints, the analysis could not be run from the beginning while incorporating dredge information. To resolve the issue, the following analysis was performed:

1. Dissolve: BKT_day_YYMMDD.shp based on dredge ID and date
2. Buffer: 15 feet around the dissolved areas based on dredge ID and date
3. Spatially join the CU#_PASS_YYMMDD.shp to the buffered file with the dredge ID based on date
4. Spatially join the shapefile that filled gaps in AID1 to the buffered file with the dredge ID based on date
5. Now the files have dredge information linked to them and volume can be calculated in a similar manner as the volume for day and CU (although the volume does not need to be split into 6-inch intervals since mass, concentration and bulk density will not be calculated from this)

The results by day, CU and dredge are similar to but not identical the results by day and CU. This is occurs because the shapefile that filled gaps in AID1 does not originally have a dredge ID linked to it.

G.10 RESULT TABLE

The daily CU volume, total PCB mass, total PCB concentration, Tri+ PCB mass, Tri+ PCB concentration and bulk density, along with amended masses are provided in table G-1.

TABLES

Table G-1a
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Number of Dredging Bucket Closures below 119-ft elevation																		
		CU-1	CU-2	CU-3	CU-4	CU-5	CU-6	CU-7	CU-8	CU-9	CU-10	CU-11	CU-12	CU-13	CU-14	CU-15	CU-16	CU-17	CU-18 (out SP)	CU-18 (in SP)
5/15/2009	Y									85										
5/16/2009	Y									127										
5/17/2009	N																			
5/18/2009	N																			
5/19/2009	N																			
5/20/2009	N																			
5/21/2009	Y									70	3									
5/22/2009	Y									128	2									
5/23/2009	Y									108										
5/24/2009	N																			
5/25/2009	N																			
5/26/2009	Y								1	199										
5/27/2009	Y									200										
5/28/2009	Y									229	2									
5/29/2009	N																			
5/30/2009	N																			
5/31/2009	N																			
6/1/2009	Y	269	57							149										
6/2/2009	Y	291	80							85										
6/3/2009	Y	282	107							122										
6/4/2009	Y	292	211							136										
6/5/2009	Y	322	178							278										
6/6/2009	Y	218	136							243										
6/7/2009	N																			
6/8/2009	Y	263	263			35				351										
6/9/2009	Y	223	417			198				292										
6/10/2009	Y	213	265	1		429				333										
6/11/2009	Y	118	201			542	14			204										
6/12/2009	Y	60	350			456	163													
6/13/2009	Y	141	323			304	66													
6/14/2009	N																			

Table G-1a
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Number of Dredging Bucket Closures below 119-ft elevation																		
		CU-1	CU-2	CU-3	CU-4	CU-5	CU-6	CU-7	CU-8	CU-9	CU-10	CU-11	CU-12	CU-13	CU-14	CU-15	CU-16	CU-17	CU-18 (out SP)	CU-18 (in SP)
6/15/2009	Y	126	436			406	200													
6/16/2009	Y	181	338			554	262													
6/17/2009	Y	249	344	2		280	79													
6/18/2009	Y	316	425			630	289													
6/19/2009	Y	156	439			132	50						8							
6/20/2009	Y	178	509			143							269							
6/21/2009	N																			
6/22/2009	Y	350	631			128							443	12						
6/23/2009	Y	421	466			90							393							
6/24/2009	Y	273	322			282							398							
6/25/2009	Y	274	301			509							167					67		
6/26/2009	Y	145	286			929	3						1					241		
6/27/2009	Y	292	203			1102	141				3							302		
6/28/2009	N																			
6/29/2009	Y	344	241			816	489											331		
6/30/2009	Y	271	83			780	240											302		
7/1/2009	Y	242	53			798	195											207		
7/2/2009	Y	321	132			887	483											352		
7/3/2009	N																			
7/4/2009	N																			
7/5/2009	N																			
7/6/2009	Y	284	184			766	672											374		
7/7/2009	Y	144	161	19		533	672	2										341		
7/8/2009	Y	164	181	423		320	698	24										330		
7/9/2009	Y	374	83	392		218	574	21										640		
7/10/2009	Y	412	143	343		246	667	129										579		
7/11/2009	Y	256	231	215		399	497	344										498		
7/12/2009	N																			
7/13/2009	Y	422	163	165		399	452	479										542		
7/14/2009	Y	346	63	339		282	624	250										588		
7/15/2009	Y	107	35	513	5	76	567	393										315		

Table G-1a
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Number of Dredging Bucket Closures below 119-ft elevation																	
		CU-1	CU-2	CU-3	CU-4	CU-5	CU-6	CU-7	CU-8	CU-9	CU-10	CU-11	CU-12	CU-13	CU-14	CU-15	CU-16	CU-17	CU-18 (out SP)	CU-18 (in SP)
7/16/2009	Y		235	236	89		393	886										329		
7/17/2009	Y		67	206	160		315	1017										343		
7/18/2009	Y		4	192	87		236	1197										287	108	
7/19/2009	N																			
7/20/2009	Y		1	449	109		71	1259	233									265		65
7/21/2009	Y	89		406			52	1054	619									173	95	232
7/22/2009	Y	189		392			176	889	436									152	38	
7/23/2009	Y	124		786			137	1150	504										107	149
7/24/2009	Y	107		442				917	463										153	165
7/25/2009	Y	96		307			206	733	520										187	99
7/26/2009	N																			
7/27/2009	Y	250		705	2		191	661	544										372	167
7/28/2009	Y	115		555				874	618										248	164
7/29/2009	Y	168		825			1	997	695										308	190
7/30/2009	Y	206		295				832	675										268	142
7/31/2009	Y			294				817	837										390	120
8/1/2009	Y			190				505	526	1									364	277
8/2/2009	N																			
8/3/2009	Y	105		581				136	234									46	316	235
8/4/2009	Y	178		852	11			408	668									277	328	83
8/5/2009	Y	216		755	2			134	483									252	233	397
8/6/2009	Y	197		419	5	245		86	351									245	187	216
8/7/2009	Y	110		160		481			277	2		1						68	203	203
8/8/2009	N																			
8/9/2009	N																			
8/10/2009	N																			
8/11/2009	Y	188				558														137
8/12/2009	Y	535				1210														65
8/13/2009	Y	260	195			1545			84											70
8/14/2009	Y	228	449			1169	51		556	3										
8/15/2009	Y	289	336			596	390		343											

Table G-1a
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Number of Dredging Bucket Closures below 119-ft elevation																		
		CU-1	CU-2	CU-3	CU-4	CU-5	CU-6	CU-7	CU-8	CU-9	CU-10	CU-11	CU-12	CU-13	CU-14	CU-15	CU-16	CU-17	CU-18 (out SP)	CU-18 (in SP)
8/16/2009	N																			
8/17/2009	Y	238	737	3		645	462		221									99		
8/18/2009	Y	357	484			363	630		269									316		
8/19/2009	Y	224	359			828	556	1	207									214		
8/20/2009	Y	98	423	2	197	779	659		124									117		
8/21/2009	Y	80	329		96	807	749	5	18									237		
8/22/2009	Y	163	319	6	212	860	718											304		
8/23/2009	N					2														
8/24/2009	Y	393	223	2	348	1066	824											348		
8/25/2009	Y	217	67	268	76	865	935	61										266		
8/26/2009	Y	164	235	331	153	639	1090	311										137	105	
8/27/2009	Y	344	151	264	279	373	1102	382											293	
8/28/2009	Y	79	136	225	197		1227	578											318	30
8/29/2009	Y	93	133	166	31		1278	498											72	
8/30/2009	N																			
8/31/2009	Y	121	100	227	128		1471	803											124	
9/1/2009	Y	237	71	213	16	2	1009	676	95										1	
9/2/2009	Y	322		177			893	656	60										175	
9/3/2009	Y	258	1	329	138	38	888	710											66	
9/4/2009	Y	256		206	25	277	295	648											185	
9/5/2009	N																			
9/6/2009	N																			
9/7/2009	N																			
9/8/2009	Y	186		389	224	495	97	1202										25	588	
9/9/2009	Y	357		486	290	904		912	12									199	425	90
9/10/2009	Y	143		141	314	483		603	657			11	2					4	377	34
9/11/2009	Y	156		99	183	405		434	927				6					81	187	2
9/12/2009	Y	429		98		382			932									242	14	
9/13/2009	N																			
9/14/2009	Y	626		513	1	224		114	894									275	14	
9/15/2009	Y	481	42	599				188	922	2									255	1

Table G-1a
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Number of Dredging Bucket Closures below 119-ft elevation																	
		CU-1	CU-2	CU-3	CU-4	CU-5	CU-6	CU-7	CU-8	CU-9	CU-10	CU-11	CU-12	CU-13	CU-14	CU-15	CU-16	CU-17	CU-18 (out SP)	CU-18 (in SP)
9/16/2009	Y	160	728	495					1001									1	189	
9/17/2009	Y	179	562	344					516										157	28
9/18/2009	Y	247	399	53	295		286		346											
9/19/2009	Y	124	646	2	242		563		262											
9/20/2009	N																			
9/21/2009	Y		322	1	337		277	12	158											
9/22/2009	Y		436		394		251		235											
9/23/2009	Y		177	1	350		297	1	159				1							
9/24/2009	Y		254	1	376		171	403	53										1	108
9/25/2009	Y			57	601			763	45										77	151
9/26/2009	Y		11	410	262			665	108				9							
9/27/2009	Y							867												
9/28/2009	Y			679				744	263											
9/29/2009	Y	212	6	210				486	198											
9/30/2009	Y	483		330				701	88											
10/1/2009	Y	516		41				304	48											
10/2/2009	Y	457	49	200				421	44											
10/3/2009	Y	254	1	377				520	40										62	
10/4/2009	N																			
10/5/2009	Y	404		322				429	110										310	10
10/6/2009	Y	205	199	266				427	214										160	72
10/7/2009	Y	78	268	230	74			435	200										5	193
10/8/2009	Y	159	13	19	297			470	279										6	63
10/9/2009	Y	67			408			344	254											43
10/10/2009	Y	206			412			205	344										2	177
10/11/2009	Y	216			262				537											
10/12/2009	Y	206			244				491											
10/13/2009	Y	136			358				209	1										
10/14/2009	Y	457			414				63										37	25
10/15/2009	Y	16			635							2							292	14
10/16/2009	Y				561															

Table G-1a
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Number of Dredging Bucket Closures below 119-ft elevation																	
		CU-1	CU-2	CU-3	CU-4	CU-5	CU-6	CU-7	CU-8	CU-9	CU-10	CU-11	CU-12	CU-13	CU-14	CU-15	CU-16	CU-17	CU-18 (out SP)	CU-18 (in SP)
10/17/2009	Y				510			117												
10/18/2009	Y				508			415				1							203	30
10/19/2009	Y	281			317				140										108	98
10/20/2009	Y	361			299				227			1							256	46
10/21/2009	Y	407							226										332	24
10/22/2009	Y	404							222										395	
10/23/2009	Y	597							66											
10/24/2009	Y	509																	198	
10/25/2009	Y	496			285															
10/26/2009	Y	443			368															
10/27/2009	Y	79																		

Notes:

1. Bucket counts based on "*.bkt" files outputted by the Dredgepack positioning software on each dredge. Bucket bites where the bucket achieved partial closure due to debris or other obstructions were not recorded by the dredgepack system and were not included in the bucket count. Bucket counts only includes bucket closures with a centroid inside of a CU.
2. Bucket elevations were lowered by approximately 2" from values in the *.bkt file as the adjusted elevations were more representative of the true dredge extent while *.bkt elevations denote the bucket closure elevation.
3. Bucket based volume information was estimated by comparing the adjusted bucket elevation based on the *.bkt file for each bucket bite, the estimated bucket footprint based on the size of the bucket and the different 2009 before dredge bathymetry xyz files for each dredging pass. In areas where no bucket closure information was available, bucket volumes were estimated by comparing the 2009 before and after dredging bathymetry xyz files for those areas only during the first inventory dredge pass.
4. Total PCB mass and concentration as well as bulk density were based on data collected during the Sediment Sampling and Analysis Program (SSAP) and residual sampling of each dredge pass.
5. Tri+ PCB mass and concentration were estimated as a function of Aroclors established in QAPP.
6. SP = Sheet Piling
7. TPCB Mass is amended by a multiplier to be consistent with the OSI bathymetry-based mass.
8. Due to the difference in bathymetry between 2005 and 2009, approximately 800 kg of mass was excluded from the analysis as well as other areas where bucket files did not reach the bathymetry depth. Therefore, the bucket results were amended by a factor on a CU and pass basis to reach result totals of those calculated using the SSAP and residual data by pass and CU.

Table G-1b
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Volume Removed based on Bucket Files (CY)																		
		CU01	CU02	CU03	CU04	CU05	CU06	CU07	CU08	CU09	CU10	CU11	CU12	CU13	CU14	CU15	CU16	CU17	CU18 (out SP)	CU18 (in SP)
5/15/2009	Y									222										
5/16/2009	Y									180										
5/17/2009	N																			
5/18/2009	N																			
5/19/2009	N																			
5/20/2009	N																			
5/21/2009	Y									53										
5/22/2009	Y									98										
5/23/2009	Y									74	12									
5/24/2009	N																			
5/25/2009	N																			
5/26/2009	Y								1.00	209										
5/27/2009	Y									177										
5/28/2009	Y									245										
5/29/2009	N																			
5/30/2009	N																			
5/31/2009	N																			
6/1/2009	Y	536	21							83										
6/2/2009	Y	673	93							34										
6/3/2009	Y	552	145							101										
6/4/2009	Y	662	396							119										
6/5/2009	Y	793	522							290										
6/6/2009	Y	469	325							240										
6/7/2009	N																			
6/8/2009	Y	534	532			23	0.26			278										
6/9/2009	Y	511	680			72				103										
6/10/2009	Y	362	328	17		251	0.23			149										
6/11/2009	Y	201	207			197	1.6			111										
6/12/2009	Y	146	310			298	38													
6/13/2009	Y	277	535			207	46													
6/14/2009	N																			

Table G-1b
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Volume Removed based on Bucket Files (CY)																		
		CU01	CU02	CU03	CU04	CU05	CU06	CU07	CU08	CU09	CU10	CU11	CU12	CU13	CU14	CU15	CU16	CU17	CU18 (out SP)	CU18 (in SP)
6/15/2009	Y	170	679			242	54													
6/16/2009	Y	448	684			359	184													
6/17/2009	Y	509	873	3.0		175	33													
6/18/2009	Y	727	714			475	74													
6/19/2009	Y	357	855	10		85	33						3.2							
6/20/2009	Y	320	649			99							278	0.13						
6/21/2009	N																			
6/22/2009	Y	708	626			143							461	1.2						
6/23/2009	Y	807	585	11		64							427							
6/24/2009	Y	437	210			206							459							
6/25/2009	Y	617	258			416							171					77		
6/26/2009	Y	290	368			584	2.4											314		
6/27/2009	Y	388	263			603	135											399		
6/28/2009	N																			
6/29/2009	Y	539	138			461	330											318		
6/30/2009	Y	353	19			441	182											283		
7/1/2009	Y	325	67			330	125											188		
7/2/2009	Y	391	267			303	344											325		
7/3/2009	N																			
7/4/2009	N																			
7/5/2009	N																			
7/6/2009	Y	173	506	1.3		224	441											307		
7/7/2009	Y	127	176	122		189	423	0.94										323		
7/8/2009	Y	166	149	1280		123	558	28										354		
7/9/2009	Y	344	59	1195		64	389	17										1085		
7/10/2009	Y	302	415	1473		109	398	125										999		
7/11/2009	Y	80	276	605		105	254	315										576		
7/12/2009	N																			
7/13/2009	Y	192	465	537		103	242	367										815		
7/14/2009	Y	268	20	1431		210	466	181										889		
7/15/2009	Y	31	5.5	2086	33	44	312	384										458		

Table G-1b
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Volume Removed based on Bucket Files (CY)																		
		CU01	CU02	CU03	CU04	CU05	CU06	CU07	CU08	CU09	CU10	CU11	CU12	CU13	CU14	CU15	CU16	CU17	CU18 (out SP)	CU18 (in SP)
7/16/2009	Y		72	1127	248		264	651										462	4.8	
7/17/2009	Y		27	661	501		142	821										370	0.57	0.19
7/18/2009	Y			366	356		226	863										404	121	
7/19/2009	N																			
7/20/2009	Y		0.16	266	294		61	1065	327									487		93
7/21/2009	Y	122	0.39	821			55	823	681									144	171	380
7/22/2009	Y	148		1207			196	738	452									85	116	
7/23/2009	Y	115		1475	6.9		158	994	664										119	197
7/24/2009	Y	68		1184			174	788	518										201	186
7/25/2009	Y	80		946			119	652	542										244	145
7/26/2009	N																			
7/27/2009	Y	172		1335	16		107	807	676										621	195
7/28/2009	Y	99	0.11	850				807	785										312	225
7/29/2009	Y	133	0.15	1318			1.2	698	867										488	249
7/30/2009	Y	157		920				618	667	0.24									313	152
7/31/2009	Y			823			1.0	387	1036										579	113
8/1/2009	Y		0.19	647				321	505	9.3									679	307
8/2/2009	N																			
8/3/2009	Y	119	1.4	713				104	235									70	429	273
8/4/2009	Y	173		1353	3.1		0.32	175	719									485	496	109
8/5/2009	Y	227		1453	15			40	593									440	394	425
8/6/2009	Y	157	2.0	497	18	249		57	499									474	502	208
8/7/2009	Y	23		418		502			349									80	602	191
8/8/2009	N																			
8/9/2009	N																			
8/10/2009	N																			
8/11/2009	Y	56				489														53
8/12/2009	Y	215				1196														26
8/13/2009	Y	64	206	7.1		1503			95											48
8/14/2009	Y	69	985	3.0		1083	37		617	4.9										
8/15/2009	Y	76	739			472	285		308											

Table G-1b
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Volume Removed based on Bucket Files (CY)																		
		CU01	CU02	CU03	CU04	CU05	CU06	CU07	CU08	CU09	CU10	CU11	CU12	CU13	CU14	CU15	CU16	CU17	CU18 (out SP)	CU18 (in SP)
8/16/2009	N																			
8/17/2009	Y	369	1824	18		363	278		194	2.8								225		
8/18/2009	Y	460	1002			299	265		145									593		
8/19/2009	Y	217	858			816	190		155									405		
8/20/2009	Y	152	944	8.5	425	632	400		46									122		
8/21/2009	Y	274	218		274	518	502	19	6.4									380		
8/22/2009	Y	225	394	12	625	373	694	3.5										326	0.63	12
8/23/2009	N																			
8/24/2009	Y	697	184	5.1	897	790	235											332		
8/25/2009	Y	409	93	572	194	483	477	105										304		
8/26/2009	Y	379	286	698	293	263	522	404										87	180	
8/27/2009	Y	615	221	459	534	113	541	448											465	
8/28/2009	Y	77	66	579	503		633	658											580	62
8/29/2009	Y	183	102	364	91		548	523											86	
8/30/2009	N																			
8/31/2009	Y	217	52	607	422	0.16	647	700											216	
9/1/2009	Y	296	72	454	68	1.8	387	509	73											
9/2/2009	Y	576		265		0.05	262	595	40										306	
9/3/2009	Y	455	3.1	546	554	23	245	694											103	
9/4/2009	Y	519		316	157	295	39	631											256	
9/5/2009	N																			
9/6/2009	N																			
9/7/2009	N																			
9/8/2009	Y	455	6.2	801	907	432	15	1246										48	1007	
9/9/2009	Y	702	1.4	949	1137	616	0.56	1099	16									386	860	118
9/10/2009	Y	316		244	1102	379		853	594			16	5.3						627	52
9/11/2009	Y	244		318	682	297		424	917			1.8	18					150	392	0.39
9/12/2009	Y	724				248			1102									221	1.5	
9/13/2009	N																			
9/14/2009	Y	718		1205		93		36	1082									473	21	0.00
9/15/2009	Y	466	77	1199				65	1020	18									567	

Table G-1b
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Volume Removed based on Bucket Files (CY)																		
		CU01	CU02	CU03	CU04	CU05	CU06	CU07	CU08	CU09	CU10	CU11	CU12	CU13	CU14	CU15	CU16	CU17	CU18 (out SP)	CU18 (in SP)
9/16/2009	Y	84	1158	1007	6.6			0.00	869									0.76	496	
9/17/2009	Y	214	1026	663					530	0.50									383	76
9/18/2009	Y	330	869	63	752		82		385											
9/19/2009	Y	78	1316	12	578		83		336											
9/20/2009	N																			
9/21/2009	Y		540	0.00	815		69	2.2	185			2.3								
9/22/2009	Y		952		992		250		213											
9/23/2009	Y		483		524		239	4.8	97				0.62							
9/24/2009	Y		342		1123		187	374	41										5.7	91
9/25/2009	Y			151	1965			653	96										107	154
9/26/2009	Y		24	904	505			549	174											
9/27/2009	Y				132			582												
9/28/2009	Y			1278				617	600											
9/29/2009	Y	608	21	455				305	351											
9/30/2009	Y	1478		588				546	103											
10/1/2009	Y	1550		76				163	245											
10/2/2009	Y	1889	85	244				281	213											
10/3/2009	Y	1257	3.4	516				314	44										140	
10/4/2009	N																			
10/5/2009	Y	956		921				415	217										595	36
10/6/2009	Y	686	469	397				428	197										487	193
10/7/2009	Y	241	765	531	162			341	221										3.2	594
10/8/2009	Y	1072	20	38	619			440	270										2.3	147
10/9/2009	Y	608			668			338	238										0.48	71
10/10/2009	Y	809			932			91	246										2.1	483
10/11/2009	Y	515			654				297											
10/12/2009	Y	560			771				319											
10/13/2009	Y	530			1454				80											
10/14/2009	Y	835			1572				43										83	69
10/15/2009	Y	0.21			1743							12							323	30
10/16/2009	Y				1299															

Table G-1b

Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	Volume Removed based on Bucket Files (CY)																		
		CU01	CU02	CU03	CU04	CU05	CU06	CU07	CU08	CU09	CU10	CU11	CU12	CU13	CU14	CU15	CU16	CU17	CU18 (out SP)	CU18 (in SP)
10/17/2009	Y				1005			124												
10/18/2009	Y				811			310				6.4	11						367	49
10/19/2009	Y	671			909				174										197	251
10/20/2009	Y	785			680				184			12	5.1						392	109
10/21/2009	Y	766							357										528	74
10/22/2009	Y	734							477										515	
10/23/2009	Y	1041							133											
10/24/2009	Y	1104																	319	
10/25/2009	Y	750			837															
10/26/2009	Y	721			912															
10/27/2009	Y	181																		

Notes:

1. Bucket counts based on "*.bkt" files outputted by the Dredgepack positioning software on each dredge. Bucket bites where the bucket achieved partial closure due to debris or other obstructions were not recorded by the dredgepack system and were not included in the bucket count. Bucket counts only includes bucket closures with a centroid inside of a CU.
2. Bucket elevations were lowered by approximately 2 inches from values in the *.bkt file as the adjusted elevations were more representative of the true dredge extent while *.bkt elevations denote the bucket closure elevation.
3. Bucket based volume information was estimated by comparing the adjusted bucket elevation based on the *.bkt file for each bucket bite, the estimated bucket footprint based on the size of the bucket and the different 2009 before dredge bathymetry xyz files for each dredging pass. In areas where no bucket closure information was available, bucket volumes were estimated by comparing the 2009 before and after dredging bathymetry xyz files for those areas only during the first inventory dredge pass.
4. Total PCB mass and concentration as well as bulk density were based on data collected during the Sediment Sampling and Analysis Program (SSAP) and residual sampling of each dredge pass.
5. Tri+ PCB mass and concentration were estimated as a function of Aroclors established in QAPP.
6. SP = Sheetpiling
7. TPCB Mass is amended by a multiplier to be consistent with the OSI bathymetry-based mass.
8. Due to the difference in bathymetry between 2005 and 2009, approximately 800 kg of mass was excluded from the analysis as well as other areas where bucket files did not reach the bathymetry depth. Therefore, the bucket results were amended by a factor on a CU and pass basis to reach result totals of those calculated using the SSAP and residual data by pass and CU.

Table G-1c
Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	PCB Mass Removal based on Bucket Files (kg)																		
		CU-1	CU-2	CU-3	CU-4	CU-5	CU-6	CU-7	CU-8	CU-9	CU-10	CU-11	CU-12	CU-13	CU-14	CU-15	CU-16	CU-17	CU-18 (out SP)	CU-18 (in SP)
5/15/2009	Y																			
5/16/2009	Y																			
5/17/2009	N																			
5/18/2009	N																			
5/19/2009	N																			
5/20/2009	N																			
5/21/2009	Y									0.64										
5/22/2009	Y									0.41										
5/23/2009	Y																			
5/24/2009	N																			
5/25/2009	N																			
5/26/2009	Y								0.07	5.6										
5/27/2009	Y									1.7										
5/28/2009	Y																			
5/29/2009	N																			
5/30/2009	N																			
5/31/2009	N																			
6/1/2009	Y	12	2.8																	
6/2/2009	Y	18	0.42																	
6/3/2009	Y	7.4	2.5																	
6/4/2009	Y	2.3	6.9																	
6/5/2009	Y	3.8	9.9																	
6/6/2009	Y	3.9	3.2																	
6/7/2009	N																			
6/8/2009	Y	6.0	4.8			0.04	0.00													
6/9/2009	Y	2.0	45			0.34														
6/10/2009	Y	0.78	4.5	0.41		1.3	0.00													
6/11/2009	Y	0.88	2.0			1.0	0.00													
6/12/2009	Y	1.4	6.5			2.0	0.42													
6/13/2009	Y	1.5	6.9			2.3	0.06													
6/14/2009	N																			

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Summary of Daily Bucket Analysis by CU

Date	Dredging Day Based on Bucket Files	PCB Mass Removal based on Bucket Files (kg)																		
		CU-1	CU-2	CU-3	CU-4	CU-5	CU-6	CU-7	CU-8	CU-9	CU-10	CU-11	CU-12	CU-13	CU-14	CU-15	CU-16	CU-17	CU-18 (out SP)	CU-18 (in SP)
6/15/2009	Y	0.79	63			1.3	1.4													
6/16/2009	Y	2.7	68			6.4	12													
6/17/2009	Y	4.7	72	0.14		9.9	0.48													
6/18/2009	Y	4.0	71			67	0.91													
6/19/2009	Y	2.4	41	0.04		1.3	0.51													
6/20/2009	Y	1.6	32			1.3														
6/21/2009	N																			
6/22/2009	Y	18	83			3.0														
6/23/2009	Y	5.8	29	0.04		0.61														
6/24/2009	Y	2.9	21			1.2														
6/25/2009	Y	3.3	54			4.8												1.5		
6/26/2009	Y	2.0	3.9			30	0.01											3.7		
6/27/2009	Y	3.5	7.7			34	0.39											3.7		
6/28/2009	N																			
6/29/2009	Y	1.7	2.5			38	8.4											4.8		
6/30/2009	Y	1.5	1.9			3.3	9.2											2.3		
7/1/2009	Y	1.1	2.0			2.3	1.7											4.6		
7/2/2009	Y	1.6	11			1.7	8.9											12		
7/3/2009	N																			
7/4/2009	N																			
7/5/2009	N																			
7/6/2009	Y	0.64	63	0.15		0.96	16											9.4		
7/7/2009	Y	0.05	70	116		0.99	16	0.06										14		
7/8/2009	Y	0.93	47	129		0.82	20	1.4										20		
7/9/2009	Y	3.1	0.75	29		3.0	8.9	0.22										138		
7/10/2009	Y	1.9	4.6	118		0.36	9.2	7.8										186		
7/11/2009	Y	0.15	13	48		0.21	27	35										55		
7/12/2009	N																			
7/13/2009	Y	0.89	52	26		0.75	5.4	10										107		
7/14/2009	Y	14	0.30	277		27	12	5.7										128		
7/15/2009	Y	0.10	0.11	202	4.9	0.19	5.7	34										42		

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		CU-1	CU-2	CU-3	CU-4	CU-5	CU-6	CU-7	CU-8	CU-9	CU-10	CU-11	CU-12	CU-13	CU-14	CU-15	CU-16	CU-17	CU-18 (out SP)	CU-18 (in SP)
7/16/2009	Y		0.19	213	2.0		12	47										66	0.76	
7/17/2009	Y		1.2	48	8.6		2.0	16										65	0.14	0.05
7/18/2009	Y			10	9.7		5.9	8.3										60	2.1	
7/19/2009	N																			
7/20/2009	Y		0.05	33	22		5.0	26	3.2									92		18
7/21/2009	Y	0.98	0.00	17			1.5	14	30									21	9.7	9.4
7/22/2009	Y	1.2		24			8.3	16	19									13	11	
7/23/2009	Y	0.95		66	0.50		4.2	21	13										8.9	0.93
7/24/2009	Y	0.81		51			5.2	25	10										19	10
7/25/2009	Y	0.91		50			6.0	20	4.6										34	21
7/26/2009	N																			
7/27/2009	Y	1.5		92	0.13		2.0	56	11										76	9.8
7/28/2009	Y	0.81	0.00	45				45	45										8.1	31
7/29/2009	Y	0.91		119			0.07	22	18										43	6.0
7/30/2009	Y	0.60		168				16	19	0.00									8.2	20
7/31/2009	Y			79			0.01	9.4	37										35	20
8/1/2009	Y		0.00	62				5.1	27	0.33									32	33
8/2/2009	N																			
8/3/2009	Y	1.2	0.00	41				0.34	23									2.6	3.2	10
8/4/2009	Y	1.1		29	0.00		0.00	0.95	54									72	57	6.0
8/5/2009	Y	2.3		24	0.07			0.36	43									29	3.8	78
8/6/2009	Y	0.96	0.00	21	2.8	4.6		0.16	34									36	13	11
8/7/2009	Y	0.07		7.5		16			35									4.7	75	22
8/8/2009	N																			
8/9/2009	N																			
8/10/2009	N																			
8/11/2009	Y	0.69				12														3.0
8/12/2009	Y	2.9				31														1.4
8/13/2009	Y	0.57	24	0.00		13			3.5											2.4
8/14/2009	Y	0.30	61	0.00		9.6	0.36		25	0.09										
8/15/2009	Y	0.95	33			6.9	5.8		11											

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8/16/2009	N																			
8/17/2009	Y	3.3	300	0.04		4.4	8.8		1.8	0.06								12		
8/18/2009	Y	2.6	87			3.5	1.8		6.1									81		
8/19/2009	Y	2.6	25			7.4	2.0		7.6									53		
8/20/2009	Y	1.1	16		3.5	3.7	2.6		2.8									0.95		
8/21/2009	Y	2.3	2.1		8.0	2.1	14	1.4	0.51									7.3		
8/22/2009	Y	1.5	18	0.01	53	3.4	2.7	0.00										9.7	0.07	0.91
8/23/2009	N																			
8/24/2009	Y	4.4	3.7	0.27	53	6.1	1.0											9.4		
8/25/2009	Y	0.84	4.2	22	5.0	2.1	1.9	13										15		
8/26/2009	Y	3.5	1.5	16	17	1.7	1.4	30										0.72	4.4	
8/27/2009	Y	2.8	0.84	4.3	4.9	0.27	2.4	33											15	
8/28/2009	Y	0.50	2.9	86	3.6		25	42											30	1.1
8/29/2009	Y	0.63	1.6	79	8.4		3.6	53											4.6	
8/30/2009	N																			
8/31/2009	Y	0.72	0.80	59	23		2.3	22											9.7	
9/1/2009	Y	0.85	0.58	6.2	2.4	0.00	2.4	54	3.1											
9/2/2009	Y	1.6		2.2			0.41	29	1.7										18	
9/3/2009	Y	1.8	0.00	7.0	41	0.00	4.2	12											0.55	
9/4/2009	Y	3.5		8.1	6.3	0.90	0.05	17											24	
9/5/2009	N																			
9/6/2009	N																			
9/7/2009	N																			
9/8/2009	Y	2.4	0.05	42	68	12	0.35	43										2.8	116	
9/9/2009	Y	3.6	0.09	147	268	5.1	0.00	37	0.07									18	133	13
9/10/2009	Y	1.7		33	105	11		36	13			0.25	0.23						54	8.1
9/11/2009	Y	1.1		54	30	3.8		21	34			0.04	0.44					1.1	49	0.05
9/12/2009	Y	2.2				3.1			8.7									1.2	0.46	
9/13/2009	N																			
9/14/2009	Y	2.5		195		1.5		0.31	13									5.0	3.6	0.00
9/15/2009	Y	1.1	1.3	192				1.5	15	0.35									71	

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9/16/2009	Y	0.27	18	26	0.01			0.00	10									0.00	65	
9/17/2009	Y	1.1	14	57					22										49	12
9/18/2009	Y	1.1	24	0.71	43		0.45		7.9											
9/19/2009	Y	0.26	25	0.14	55		0.60		3.4											
9/20/2009	N																			
9/21/2009	Y		29		94		0.35	0.00	0.86			0.00								
9/22/2009	Y		21		147		0.65		6.8											
9/23/2009	Y		9.5		5.1		1.3	0.05	0.49				0.01							
9/24/2009	Y		7.8		72		3.7	1.4	1.5										1.1	6.3
9/25/2009	Y			0.05	122			3.2	0.55										3.8	14
9/26/2009	Y		0.17	9.7	11			5.7	2.6											
9/27/2009	Y				2.1			9.1												
9/28/2009	Y			19				10	2.1											
9/29/2009	Y	4.5	0.24	13				2.8	4.1											
9/30/2009	Y	6.6		45				9.2	0.09											
10/1/2009	Y	9.3		1.7				2.3	48											
10/2/2009	Y	7.2	1.5	5.7				4.2	14											
10/3/2009	Y	3.7	0.00	6.5				2.7	2.1										1.0	
10/4/2009	N																			
10/5/2009	Y	2.1		14				33	52										32	6.7
10/6/2009	Y	1.4	7.9	2.6				51	1.1										7.7	3.8
10/7/2009	Y	0.07	6.6	2.8	0.36			22	3.3										0.08	9.3
10/8/2009	Y	3.6	0.13	0.02	6.9			72	2.3										0.12	11
10/9/2009	Y	0.55			31			25	22										0.00	1.5
10/10/2009	Y	2.8			92			2.7	3.7										0.03	10
10/11/2009	Y	1.5			52				1.9											
10/12/2009	Y	1.2			87				1.4											
10/13/2009	Y	1.4			71				0.35											
10/14/2009	Y	2.5			93				0.26										1.7	2.0
10/15/2009	Y				83							0.01							19	2.1
10/16/2009	Y				139															

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		CU-1	CU-2	CU-3	CU-4	CU-5	CU-6	CU-7	CU-8	CU-9	CU-10	CU-11	CU-12	CU-13	CU-14	CU-15	CU-16	CU-17	CU-18 (out SP)	CU-18 (in SP)
10/17/2009	Y				16			20												
10/18/2009	Y				63			17				0.00	0.23						1.4	3.0
10/19/2009	Y	6.4			14				18										1.0	1.3
10/20/2009	Y	10			25				1.9			0.01	0.04						10	3.4
10/21/2009	Y	14							2.2										13	5.5
10/22/2009	Y	9.0							2.4										6.9	
10/23/2009	Y	7.3							2.6											
10/24/2009	Y	15																	2.1	
10/25/2009	Y	19			37															
10/26/2009	Y	14			20															
10/27/2009	Y	11																		

Notes:

1. Bucket counts based on "*.bkt" files outputted by the Dredgepack positioning software on each dredge. Bucket bites where the bucket achieved partial closure due to debris or other obstructions were not recorded by the dredgepack system and were not included in the bucket count. Bucket counts only includes bucket closures
2. Bucket elevations were lowered by approximately 2" from values in the *.bkt file as the adjusted elevations were more representative of the true dredge extent
3. Bucket based volume information was estimated by comparing the adjusted bucket elevation based on the *.bkt file for each bucket bite, the estimated bucket footprint based on the size of the bucket and the different 2009 before dredge bathymetry xyz files for each dredging pass. In areas where no bucket closure
4. Total PCB mass and concentration as well as bulk density were based on data collected during the Sediment Sampling and Analysis Program (SSAP) and residual
5. Tri+ PCB mass and concentration were estimated as a function of Aroclors established in QAPP.
6. SP = Sheet Piling
7. TPCB Mass is amended by a multiplier to be consistent with the OSI bathymetry-based mass.
8. Due to the difference in bathymetry between 2005 and 2009, approximately 800 kg of mass was excluded from the analysis as well as other areas where bucket files