URS

July 29, 2008

Mike Gross
U.S. Army Corps of Engineers, Portland District
333 SW First Avenue
PO Box 2946
Portland, Oregon 97208-2946

Subject: Reference Area Smallmouth Bass Collected October/November 2007 Analysis and Summary Report
Bradford Island Remedial Investigation
Bonneville Dam Forebay, Cascade Locks, Oregon
Contract No W9128F-04-D-0001, Task Order No. DT06, Modification No. 0001

Dear Mr. Gross:

Please find the analytical results for seven smallmouth bass provided to URS by the Corps. The fish were analyzed in general accordance with the *Quality Assurance Project Plan, River Operable Unit Remedial Investigation*, prepared by URS, dated September 2007. We understand that these bass were collected in the identified upstream reference area in the Columbia River during October and November 2007, and were stored in a freezer at secure location until they were provided to URS on February 11, 2008.

This summary report consists of the following:

- Sample location maps
- Tabulated data for each sample analyzed
- Quality control summary report

The original laboratory data deliverables both the .pdf and electronic versions are available upon request.

Additional smallmouth bass were obtained by the Corps from the reference area in May 2008. These smallmouth bass are currently being analyzed; the analytical data will be provided under separate cover.

This information will be utilized in the remedial investigation and risk assessment as provided in the *RI/FS Management Plan*.

Sincerely,
URS CORPORATION

Jeff Wallace, R.G.
Project Manager

Attachments:
Figure 1: Smallmouth Bass Sample Locations
Analytical Results Tables 1 through 4
Quality Control Summary Report for Analytical Chemistry

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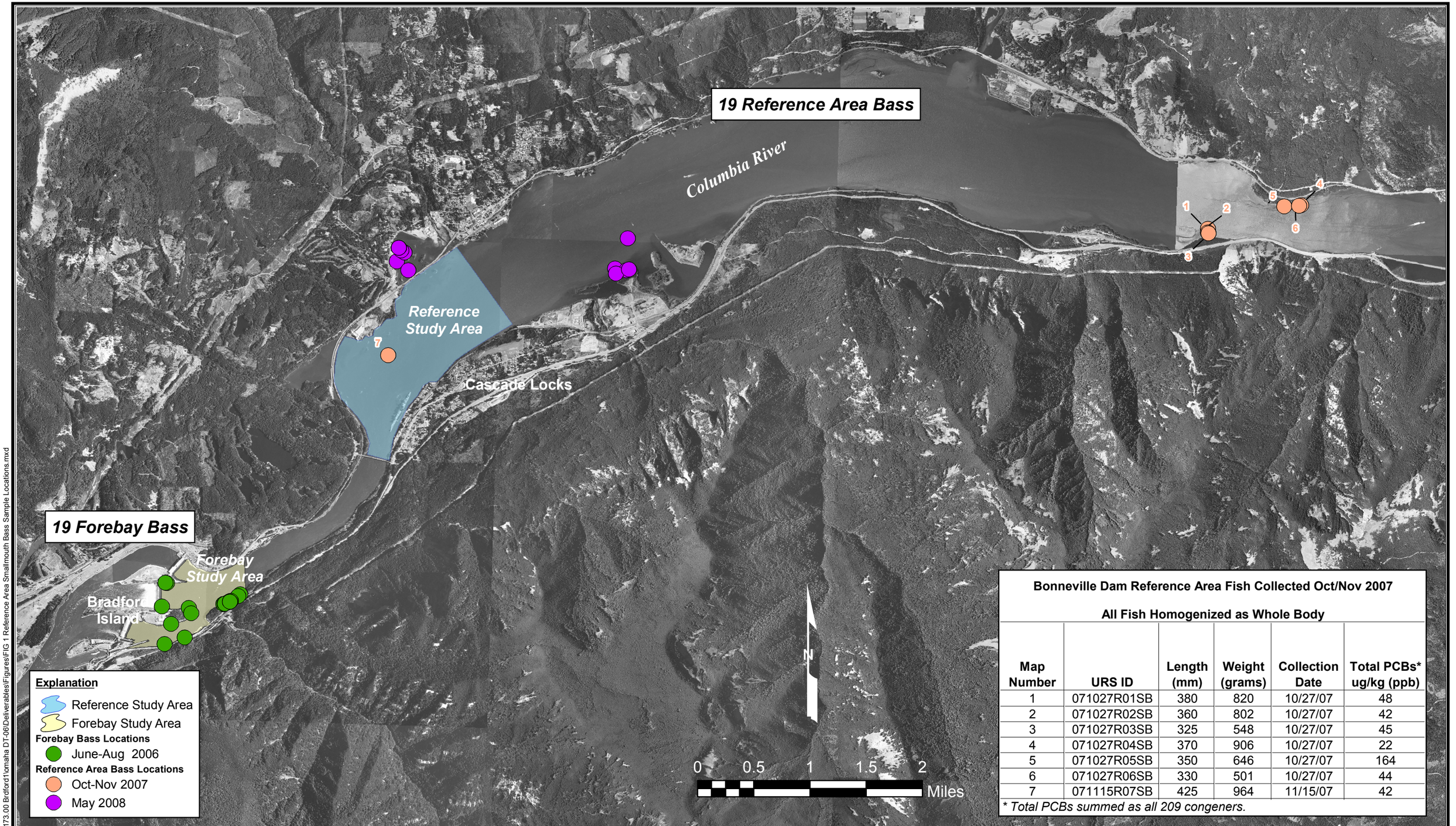

Bonneville Dam Reference Area Fish Collected Oct/Nov 2007

All Fish Homogenized as Whole Body

Map Number	URS ID	Length (mm)	Weight (grams)	Collection Date	Total PCBs* ug/kg (ppb)
1	071027R01SB	380	820	10/27/07	48
2	071027R02SB	360	802	10/27/07	42
3	071027R03SB	325	548	10/27/07	45
4	071027R04SB	370	906	10/27/07	22
5	071027R05SB	350	646	10/27/07	164
6	071027R06SB	330	501	10/27/07	44
7	071115R07SB	425	964	11/15/07	42

** Total PCBs summed as all 209 congeners.*

	JOB No. 25695254.00009	DESIGNED: CW	PROJ. ENGINEER: –	URS	BRADFORD ISLAND
	Imagery provided by USACE	DRAWN BY: SB	APPROVED BY: JTW	111 S.W. Columbia, Suite 1500 Portland, Oregon 97201 (tel) 503-222-7200 (fax) 503-222-4292	CASCADE LOCKS, OREGON
		CHECKED BY: –	DATE: JULY 2008		

SMALLMOUTH BASS SAMPLE LOCATIONS

DRAWING NUMBER: FIGURE 1

GIS FILE NUMBER: Fig 1.mxd

SHEET: REV.

O:\25692709 USACE\53-F0072173.00 Bradford1\omaha DT-06\Deliverables\Figures\FIG 1 Reference Area Smallmouth Bass Sample Locations.mxd

Table 1
Reference Area Smallmouth Bass PCB Analytical Results and Screening Criteria
Bradford Island - Remedial Investigation
Reference Area Smallmouth Bass Collected October/November 2007

Parameter								Polychlorinated Biphenyls (units = µg/kg or ppb)										12 Dioxin-like Polychlorinated Biphenyl Congeners (units = µg/kg or ppb)																			
Method								EPA 8082										EPA 1668A																			
URS ID	Axys ID	Collection Date	Moisture (%)	Total Lipids (%)	Length (mm)	Weight (grams)	Basis	Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260	Aroclor-1262	Aroclor-1268	Total PCBs[5] (as Aroclors)	PCB 77		PCB 81		PCB 105	PCB 114	PCB 118	PCB 123	PCB 126	PCB 156	PCB 157	PCB 167	PCB 169	PCB 189	Total PCBs[6] (all 209 congeners)
071027R01SB	L10965-1	10/27/2007	71.8	20.2	380	820	D	-	-	-	-	-	-	-	-	-	-	--		--		--	--	--	--	--	--	--	--	--	--	-
071027R02SB	L10965-2	10/27/2007	73.7	22.5	360	802	D	-	-	-	-	-	-	-	-	-	-	--		--		--	--	--	--	--	--	--	--	--	--	-
071027R03SB	L10965-3	10/27/2007	70.3	24.0	325	548	D	-	-	-	-	-	-	-	-	-	-	--		--		--	--	--	--	--	--	--	--	--	--	-
071027R04SB	L10965-4	10/27/2007	68.4	26.3	370	906	D	-	-	-	-	-	-	-	-	-	-	--		--		--	--	--	--	--	--	--	--	--	--	-
071027R05SB	L10965-5	10/27/2007	69.4	25.0	350	646	D	-	-	-	-	-	-	-	-	-	-	--		--		--	--	--	--	--	--	--	--	--	--	-
071027R06SB	L10965-6	10/27/2007	69.7	20.3	330	501	D	-	-	-	-	-	-	-	-	-	-	--		--		--	--	--	--	--	--	--	--	--	--	-
071115R07SB	L10965-7	11/15/2007	69.0	18.1	425	964	D	-	-	-	-	-	-	-	-	-	-	--		--		--	--	--	--	--	--	--	--	--	--	-
071027R01SB	L10965-1	10/27/2007	71.8	6.2	380	820	W	-	-	-	-	-	-	-	-	-	-	**0.047**		0.0068	U	**1.15**	**0.077**	**3.30**	**0.055**	0.0112	U	**0.468**	see note 4	**0.19**	0.0055	U	**0.017**	**J-EMPC**	**48**
071027R02SB	L10965-2	10/27/2007	73.7	7.0	360	802	W	-	-	-	-	-	-	-	-	-	-	**0.036**		0.006	U	**1.07**	**0.072**	**3.05**	**0.048**	**0.012**	**J-EMPC**	**0.402**		**0.17**	0.0089	U	**0.02**		**42**
071027R03SB	L10965-3	10/27/2007	70.3	7.2	325	548	W	-	-	-	-	-	-	-	-	-	-	**0.044**		0.005	U	**1.11**	**0.065**	**3.01**	**0.044**	**J-EMPC**	0.012	U	**0.378**		**0.16**	0.0054	U	**0.02**	**J-EMPC**	**45**
071027R04SB	L10965-4	10/27/2007	68.4	8.5	370	906	W	-	-	-	-	-	-	-	-	-	-	**0.025**		0.0055	U	**0.498**	**0.029**	**1.33**	**0.025**		**0.006**		**0.194**		**0.08**	0.0023	U	**0.013**		**22**
071027R05SB	L10965-5	10/27/2007	69.4	7.9	350	646	W	-	-	-	-	-	-	-	-	-	-	**0.195**		0.0205	U	**4.06**	**0.300**	**10.20**	**0.184**		0.030	U	**1.39**		**0.54**	0.0109	U	**0.068**		**164**
071027R06SB	L10965-6	10/27/2007	69.7	5.9	330	501	W	-	-	-	-	-	-	-	-	-	-	**0.038**		0.0094	U	**1.16**	**0.086**	**J-EMPC**	**3.14**	**0.047**	**J-EMPC**	0.016	U	**0.490**		**0.18**	0.0049	U	**0.02**	**J-EMPC**	**44**
071115R07SB	L10965-7	11/15/2007	69.0	5.4	425	964	W	-	-	-	-	-	-	-	-	-	-	**0.030**		0.0025	U	**1.01**	**0.068**	**J-EMPC**	**3.11**	**0.053**		0.011	U	**0.448**		**0.17**	0.0086	U	**0.023**	**J-EMPC**	**42**
ODEQ ATLs for Fish/Shellfish (2007)1 (µg/kg wet)						Birds (Individual)		NE	NE	NE	NE	NE	NE	NE	NE	NE	35	0.16		0.080		80.0	800	800	800	0.08	80.0	80.0	800.0	8.00	800	35			
						Mammals (Individual)		NE	NE	NE	NE	NE	NE	NE	NE	NE	880	5.80		2.00		20.0	20.0	20.0	20.0	0.01	20.0	20.0	20.0	0.020	20.0	880			
						Humans[3]		NE	NE	NE	NE	NE	NE	NE	NE	NE	0.57	0.076		0.025		0.25	0.25	0.25	0.25	0.000076	0.25	0.25	0.25	0.00025	0.25	0.57			
ODEQ CTLs for Fish/Shellfish (2007)2 (µg/kg wet)						Freshwater		NE	NE	NE	NE	NE	NE	NE	NE	NE	430	NE		NE		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	430			

Notes:

- Aroclor analysis in progress, results will be reported at a later date.
-- congeners reported as wet weight only.
µg/kg = microgram per kilogram
ATL = Acceptable Tissue Levels
CTL = Critical Tissue Level
D = Dry Weight
EPA = U.S. Environmental Protection Agency
J = The reported value is an estimate.
NE = Not Established
Non-detect congener values reported at the SDL
ODEQ = Oregon Department of Environmental Quality
PCBs = Polychlorinated Biphenyls
SDL= sample specific detection limit.
U = The analyte was not detected above the reported sample quantification limit
UJ = The analyte was not detected. The reported sample quantification limit is an estimate
= reported concentration exceeded one or more screening criteria listed.
W = Wet Weight
1 = Table A-3a in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Oregon Department of Environmental Quality (ODEQ), Final January 31, 2007.
2 = Table A-4 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Oregon Department of Environmental Quality (ODEQ), Final January 31, 2007.
3 = Lowest values of either carcinogen or non-carcinogen criteria.
4 = PCB 156 and 157 are coeluting congeners and are represented with one concentration.
5 = PCB Aroclors summed using all non-detect values as zero.
6 = Total PCBs are calculated by summing all 209 congeners, excluding results flagged as U, UJ, or J-EMPC

Table 2
Reference Area Smallmouth Bass Metals Analytical Results and Screening Criteria
Bradford Island - Remedial Investigation
Reference Area Smallmouth Bass Collected October/November 2007

								Parameter	Metals (EPA SW-846) (units = µg/kg or ppb)													
								Method	6010B	6010B	6020	6010B	6020	6010B	6010B	6010B	6010B	6010B	7471A	6010B	6010B	6010B	6010B
Sample ID	Lab Sample ID	Sample Date	Moisture (%)	Total Lipids (%)	Length (mm)	Weight (grams)	Basis	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Thallium	Vanadium	Zinc
071027R01SB	K0801240-001	10/27/2007	69.3	20.2	380	820	D	**2,600**	50 U	**1,010**	**3,440**	17 U	**25 J**	1,600 U	83 U	**1,860**	43 U	**346 J**	**1,060**	**52**	**140 J**	**43,800**
071027R02SB	K0801240-002	10/27/2007	69.0	22.5	360	802	D	**5,000**	50 U	**1,310**	**2,700**	18 U	**18 J**	1,600 U	100 U	**1,110**	44 U	**700 J**	**1,290**	**65**	**130 J**	**44,800**
071027R03SB	K0801240-003	10/27/2007	69.9	24.0	325	548	D	**3,800**	60 U	**1,440**	**3,970**	18 U	**19 J**	1,700 U	92 U	**1,520**	46 U	**300 J**	**1,090**	**68**	**130 J**	**42,900**
071027R04SB	K0801240-004	10/27/2007	67.8	26.3	370	906	D	**1,000 J**	50 U	**490**	**1,340**	18 U	**15 J**	1,600 U	77 U	**1,050**	45 U	**405 J**	930 U	**37**	**150 J**	**41,700**
071027R05SB	K0801240-005	10/27/2007	68.3	25.0	350	646	D	**2,100**	50 U	**2,400**	**1,440**	17 U	**12 J**	1,600 U	80 U	**1,030**	43 U	**455 J**	960 U	**60**	**110 J**	**35,500**
071027R06SB	K0801240-006	10/27/2007	71.0	20.3	330	501	D	**7,300**	50 U	**950 J**	**2,580**	18 U	**21 J**	1,600 U	92 U	**1,450**	45 U	**189 J**	950 U	**57**	**120 J**	**50,300 J**
071115R07SB	K0801240-007	11/15/2007	70.0	18.1	425	964	D	**5,200**	60 U	**900**	**4,990**	19 U	**12 J**	1,700 U	120 U	**1,920**	48 U	**311 J**	**1,360**	**50**	**190**	**42,900**
071027R01SB	K0801240-001	10/27/2007	69.3	6.2	380	820	W	**802**	16 U	**311**	**1,060**	5.30 U	**8.0 J**	500 U	25.5 U	**571**	13 U	**106 J**	**324**	**15.9**	**40 J**	**13,400**
071027R02SB	K0801240-002	10/27/2007	69.0	7.0	360	802	W	**1,550**	16 U	**406**	**837**	5.40 U	**5.0 J**	500 U	30.9 U	**344**	14 U	**217 J**	**399**	**20.1**	**40 J**	**13,900**
071027R03SB	K0801240-003	10/27/2007	69.9	7.2	325	548	W	**1,130**	17 U	**434**	**1,200**	5.50 U	**6.0 J**	500 U	27.8 U	**457**	14 U	**90 J**	**328**	**20.5**	**40 J**	**12,900**
071027R04SB	K0801240-004	10/27/2007	67.8	8.5	370	906	W	**330 J**	18 U	**159**	**430**	5.80 U	**5.0 J**	500 U	24.8 U	**336**	15 U	**130 J**	298 U	**12**	**50 J**	**13,400**
071027R05SB	K0801240-005	10/27/2007	68.3	7.9	350	646	W	**663**	16 U	**761**	**456**	5.50 U	**4.0 J**	500 U	25.5 U	**327**	14 U	**144 J**	306 U	**18.9**	**30 J**	**11,200**
071027R06SB	K0801240-006	10/27/2007	71.0	5.9	330	501	W	**2,110**	16 U	**277 J**	**748**	5.30 U	**6.0 J**	500 U	26.7 U	**419**	13 U	**55 J**	277 U	**16.5**	**30 J**	**14,600 J**
071115R07SB	K0801240-007	11/15/2007	70.0	5.4	425	964	W	**1,550**	17 U	**270**	**1,500**	5.80 U	**4.0 J**	500 U	36.1 U	**575**	14 U	**93 J**	**408**	**14.9**	**60**	**12,900**
ODEQ Sediment Bioaccumulation SLVs (2007)3 (µg/kg dry)								**Birds (Individual)**	NE	NE	7,000	NE	NE	1,000	NE	NE	NE	17,000	70	NE	NE	NE	NE
								Mammals (Individual)	NE	NE	7,000	NE	NE	1,000	NE	NE	NE	17,000	70	NE	NE	NE	NE
								Fish (Freshwater)	NE	NE	7,000	NE	NE	1,000	NE	NE	NE	17,000	70	NE	NE	NE	NE
								Humans (Subsistence)	NE	NE	7,000	NE	NE	1,000	NE	NE	NE	17,000	70	NE	NE	NE	NE
ODEQ ATLs for Fish/Shellfish (2007)[1] (µg/kg wet)								**Birds (Individual)**	NE	NE	13,000	NE	NE	8,400	NE	NE	NE	9,300	74	NE	NE	NE	NE
								Mammals (Individual)	NE	NE	7,600	NE	NE	5,600	NE	NE	NE	34,000	120	NE	NE	NE	NE
								Humans[3] (subsistence/tribal)	NE	NE	0.76	NE	NE	490	NE	NE	NE	500	49	NE	NE	NE	NE
ODEQ CTLs for Fish/Shellfish (2007)[2] (µg/kg wet)								**Freshwater**	NE	NE	6,600	NE	NE	150	NE	NE	NE	120	88 (inorganic)	NE	NE	NE	NE

Notes:

µg/kg = microgram per kilogram
ATL = Acceptable Tissue Levels
CTL = Critical Tissue Level
D = Dry Weight
EPA = U.S. Environmental Protection Agency
J = The reported value is an estimate
MRL = method reporting limit
NE = Not Established
Non-detect values reported at the MRL

ODEQ = Oregon Department of Environmental Quality
PCBs = Polychlorinated Biphenyls
U = The analyte was not detected above the reported sample quantification limit
UJ = The analyte was not detected. The reported sample quantification limit is an estimate
= reported concentration exceeded one or more screening criteria listed.
W = Wet Weight
1 = Table A-3a in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Oregon Department of Environmental Quality (ODEQ), Final January 31, 2007.
2 = Table A-4 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Oregon Department of Environmental Quality (ODEQ), Final January 31, 2007.
3 = Lowest values of either carcinogen or non-carcinogen criteria.

Table 3
Reference Area Smallmouth Bass SVOC Analytical Results and Screening Criteria
Bradford Island - Remedial Investigation
Reference Area Smallmouth Bass Collected October/November 2007

								Polynuclear Aromatic Hydrocarbons (PAHs) (units = µg/kg or ppb)													Semivolatile Organic Compounds (SVOCs) (units = µg/kg or ppb)					
Parameter																									
Method								EPA 8270C SIM																	
Sample ID	**Lab Sample ID**	**Sample Date**	**Moisture (%)**	**Total Lipids (%)**	**Length (mm)**	**Weight (grams)**	**Basis**	**Acenaphthene**	**Anthracene**	**Benz(a)anthracene**	**Benzo(a)pyrene**	**Benzo(b)fluoranthene**	**Benzo(g,h,i)perylene**	**Benzo(k)fluoranthene**	**Chrysene**	**Dibenz(a,h)anthracene**	**Fluoranthene**	**Fluorene**	**Indeno(1,2,3-cd)pyrene**	**Phenanthrene**	**Pyrene**	**Bis(2-ethylhexyl) phthalate**	**Butyl benzyl phthalate**	**Carbazole**	**Di-n-butyl phthalate**	**Di-n-octyl phthalate**	**p-Cresol (4-methylphenol)**
071027R01SB	K0801240-001	10/27/2007	69.3	20.2	380	820	D	**2.30 J**	**0.29 J**	1.7 UJ	1.7 UJ	1.7 UJ	1.7 UJ	1.7 UJ	1.7 UJ	1.7 UJ	1.7 UJ	**3.3 J**	1.7 UJ	**8.3 J**	1.7 UJ	600 U	120 U	120 U	**720**	120 U	120 U
071027R02SB	K0801240-002	10/27/2007	69.0	22.5	360	802	D	**2.5**	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	**6.2 J**	5.6 U	16.0 U	16 U	16.0 U	7,800 UJ	130 U	130 U	130 U	130 U	130 U
071027R03SB	K0801240-003	10/27/2007	69.9	24.0	325	548	D	**3.5 J**	**1.3 J**	6.5 U	6.5 U	6.5 U	6.5 U	6.5 U	6.5 U	6.5 U	**4.7 J**	**4.6 J**	6.5 U	**10**	**1.4 J**	7,900 UJ	130 U	130 U	**510**	130 U	130 U
071027R04SB	K0801240-004	10/27/2007	67.8	26.3	370	906	D	**1.70 J**	1.6 UJ	1.6 UJ	1.6 UJ	1.6 UJ	1.6 UJ	1.6 UJ	1.6 UJ	1.6 UJ	1.6 UJ	**4.8 J**	1.6 UJ	**9.5 J**	1.6 UJ	5400 U	110 U	110 U	**880**	110 U	110 U
071027R05SB	K0801240-005	10/27/2007	68.3	25.0	350	646	D	**2.60**	15.00 U	15.0 U	15.0 U	15.0 U	15.0 U	15.0 U	15.0 U	15.0 U	7.8 J	6.3 U	15.0 U	**14 J**	15 U	5500 U	130 U	130 U	**470**	130 U	130 U
071027R06SB	K0801240-006	10/27/2007	71.0	20.3	330	501	D	**2 J**	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	4.1 U	**3.1 J**	3.2 U	**7.6**	3.2 U	5,000 U	130 U	130 U	**780**	130 U	130 UJ
071115R07SB	K0801240-007	11/15/2007	70.0	18.1	425	964	D	3.5 J	**0.72 J**	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	2.3 J	**4.3 J**	4.6 U	**8**	**1.3 J**	5,700 U	120 U	120 U	**290**	120 U	120 U
071027R01SB	K0801240-001	10/27/2007	69.3	6.2	380	820	W	**0.70 J**	**0.09 J**	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.50 UJ	0.50 UJ	0.50 UJ	**1.0 J**	0.50 UJ	**2.50 J**	0.5 UJ	190 U	37 U	37 U	**220**	37 U	37 U
071027R02SB	K0801240-002	10/27/2007	69.0	7.0	360	802	W	**0.77**	4.8 U	4.8 U	4.8 U	4.8 U	4.8 U	4.8 U	4.8 U	4.8 U	1.9 J	1.8 U	4.8 U	**3.7 J**	4.8 U	2,500 UJ	40 U	40 U	40 U	40 U	40 U
071027R03SB	K0801240-003	10/27/2007	69.9	7.2	325	548	W	**1.00 J**	**0.38 J**	2 U	2 U	2.0 U	2 U	2 U	2 U	2 U	**1.4 J**	**1.4 J**	2.00 U	**3.00**	**0.42 J**	2,400 UJ	37 U	37 U	**150**	37 U	37 U
071027R04SB	K0801240-004	10/27/2007	67.8	8.5	370	906	W	**0.56 J**	0.500 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	**1.50 J**	0.5 UJ	**3.1 J**	0.5 UJ	1800 U	36 U	36 U	**280**	36 U	36 U
071027R05SB	K0801240-005	10/27/2007	68.3	7.9	350	646	W	**0.82**	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U	2.5 J	2 U	4.7 U	**4.60 J**	4.7 U	1800 U	39 U	39 U	**150**	39 U	39 U
071027R06SB	K0801240-006	10/27/2007	71.0	5.9	330	501	W	**0.57 J**	0.93 U	0.9 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	1.2 U	**0.89 J**	0.93 U	**2.2**	0.93 U	1,500 U	36 U	36 U	**230**	36 U	36 UJ
071115R07SB	K0801240-007	11/15/2007	70.0	5.4	425	964	W	**1.00 J**	**0.22 J**	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	0.69 J	**1.3 J**	1.4 U	**2.4**	0.38 J	1,700 U	36 U	36 U	**87**	36 U	36 U
ODEQ ATLs for Fish/Shellfish (2007)1 (µg/kg wet)							**Birds (Individual)**	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
							Mammals (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	9.5	NE	NE	NE	9.5	NE	NE	NE	NE	NE	NE
							Humans[3]	NE	NE	NE	NE	NE	NE	NE	NE	NE	20,000	NE	NE	NE	15,000	NE	NE	NE	NE	NE	NE
ODEQ CTLs for Fish/Shellfish (2007)2 (µg/kg wet)							**Freshwater**	NE	NE	NE	NE	NE	NE	NE	NE	NE	19,000	NE	NE	NE	1,000	NE	NE	NE	NE	NE	NE

Notes:

µg/kg = microgram per kilogram
ATL = Acceptable Tissue Levels
CTL = Critical Tissue Level
D = Dry Weight
EPA = U.S. Environmental Protection Agency
J = The reported value is an estimate.
MRL = method reporting limit
NE = Not Established
Non-detect values reported at the MRL

SVOCs and PAHs are analyzed separately for tissue matrices.
ODEQ = Oregon Department of Environmental Quality
PCBs = Polychlorinated Biphenyls
U = The analyte was not detected above the reported sample quantification limit.
UJ = The analyte was not detected. The reported sample quantification limit is an estimate.
= reported concentration exceeded one or more screening criteria listed.
W = Wet Weight
1 = Table A-3a in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Oregon Department of Environmental Quality (ODEQ), Final January 31, 2007.
2 = Table A-4 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Oregon Department of Environmental Quality (ODEQ), Final January 31, 2007.
3 = Lowest values of either carcinogen or non-carcinogen criteria.

Table 4
Reference Area Smallmouth Bass Congener Analysis Results
Bradford Island - Remedial Investigation
Reference Area Smallmouth Bass Collected October/November 2007

IUPAC #	COELUTING CONGENERS[1]	071027R01 L10965-1		071027R02 L10965-2		071027R03 L10965-3		071027R04 L10965-4		071027R05 L10965-5		071027R06 L10965-6		071115R07 L10965-7	
1		50.7		257		2.64		4.88		1.42	J-EMPC	15.5	J-EMPC	1.63	U
2		149		612		4.99		9.99		2.43	J-EMPC	35.2		2.15	J-EMPC
3		7.52		330		6.57	J-EMPC	7.75		3.38	J-EMPC	23.2	J-EMPC	3.29	J-EMPC
4		6.49	U	5.78		7.12	U	6.84	U	25.4	J-EMPC	9.49	J-EMPC	4.96	U
5		4.36	U	6.32		4.9	U	5.03	U	3.65	U	5.69	U	3.2	U
6		6.85	J-EMPC	13.8		4.39	U	4.51	U	16.8		5.1	U	2.87	U
7		3.99	U	13.9		4.5	U	4.63	U	3.36	U	5.23	U	2.95	U
8		8.4		12.8	J-EMPC	6.67		7.82	J-EMPC	66.7		22.2		6.54	J-EMPC
9		3.93	U	10.7	J-EMPC	4.36	U	4.48	U	3.25	U	5.07	U	2.85	U
10		3.8	U	4.15		4.1	U	4.21	U	3.05	U	4.76	U	2.68	U
11		644		519		930		748		1070		438		339	
12	12 + 13	22.6	C J-EMPC	31.4	C	4.77	C U	4.9	C U	3.55	C U	5.54	C U	3.12	C U
13	12 + 13		C12		C12		C12		C12		C12		C12		C12
14		4.14	U	10.9		4.54	U	4.66	U	3.38	U	5.28	U	2.97	U
15		9.85		5.92	J-EMPC	5.64	U	6.03	U	17.8		6.46	U	3.54	U
16		8.46		9.14		11.3	J-EMPC	10.3	J-EMPC	113		40.5		10.8	J-EMPC
17		11.7	J-EMPC	11.5		15.3		10.9		297		80.3		18.4	
18	18 + 30	25.4	C	23.8	C	33	C	25.8	C	458	C	158	C	39.1	C
19		3.24	J-EMPC	2.31		3.33	J-EMPC	2.16	J-EMPC	65.4		8.89	J-EMPC	2.44	J-EMPC
20	20 + 28	146	C	145	C	180	C	120	C	1760	C	740	C	219	C
21	21 + 33	28.9	C	24.4	C	29.5	C	22.1	C J-EMPC	342	C	155	C	33.5	C
22		32.2		25.6		34		30.4		310		151		35.1	
23		1.14	U	1.3	U	1.95	U	1.48	U	2.71	U	1.15	U	0.838	U
24		0.697	U	1.02	J-EMPC	0.913	U	1.11	J-EMPC	6.17	J-EMPC	3	J-EMPC	0.776	U
25		5.67	J-EMPC	5.17		6.1	J-EMPC	2	J-EMPC	119		30.4		6.87	
26	26 + 29	15.9	C	14.8	C	18.3	C	12.5	C	305	C	92.4	C	23.4	C J-EMPC
27		2.19	J-EMPC	2.2		2.56	J-EMPC	1.75	J-EMPC	75.8		11		2.62	
28	20 + 28		C20		C20		C20		C20		C20		C20		C20
29	26 + 29		C26		C26		C26		C26		C26		C26		C26
30	18 + 30		C18		C18		C18		C18		C18		C18		C18
31		84.8		74.6		97.2		73.2		889		409		108	
32		4		3.47	J-EMPC	3.04		2.75	J-EMPC	236		27.6		5.3	
33	21 + 33		C21		C21		C21		C21		C21		C21		C21
34		1.14	U	1.3	U	1.92	U	1.45	U	10.5	J-EMPC	2.02	J-EMPC	0.823	U
35		1.16	U	1.32	U	2.12	U	1.61	U	2.94	U	1.26	U	0.911	U
36		1.12	U	1.28	U	1.87	U	1.42	U	2.6	U	1.11	U	0.804	U
37		17.1		13.6	J-EMPC	20.8	J-EMPC	16.9		127		49.4		15.4	
38		1.18	U	1.35	U	2.04	U	1.54	U	2.82	U	1.2	U	0.874	U
39		1.16	U	1.32	U	1.98	U	1.5	U	9.71	J-EMPC	5.27		1.38	J-EMPC
40	40 + 41 + 71	62.8	C	50.9	C	55.9	C	36.2	C	1360	C	240	C	64.4	C
41	40 + 41 + 71		C40		C40		C40		C40		C40		C40		C40
42		48.5		37.9		48.6		31.1		727		180		58.6	
43		8.55	J-EMPC	5.58	J-EMPC	9.93	J-EMPC	5.05		178		32.1	J-EMPC	12.6	J-EMPC
44	44 + 47 + 65	308	C	257	C	311	C	164	C	4190	C	771	C	377	C
45	45 + 51	16.8	C	14.8	C	15.4	C	10.7	C	358	C	59.4	C	17.9	C
46		3.54		3.38		3.45	J-EMPC	2.68	J-EMPC	60.4		12.9	J-EMPC	3.47	
47	44 + 47 + 65		C44		C44		C44		C44		C44		C44		C44
48		38.3		32.1		1.11	U	21.7		503		178		0.662	U
49	49 + 69	228	C	191	C	233	C	128	C	3400	C	621	C	301	C
50	50 + 53	15.2	C	8.76	C	15.5	C	7.97	C J-EMPC	295	C	45.4	C	12.8	C
51	45 + 51		C45		C45		C45		C45		C45		C45		C45
52		551		436		558		276		5400		978		575	
53	50 + 53		C50		C50		C50		C50		C50		C50		C50
54		0.706	U	0.516	J-EMPC	0.758	U	0.78	U	13.9		0.814	U	0.492	U
55		8.47	J-EMPC	5.47	U	12	J-EMPC	9.48		148	J-EMPC	20.2		6.11	J-EMPC
56		80.9		52.7		74.1		52.1		920		87.1		64.2	
57		6.38	U	5.39	U	4.45	U	5.1	U	26.7		8.61	U	2.29	U
58		7.01	U	5.92	U	4.65	U	5.34	U	19.4	U	9.01	U	2.39	U
59	59 + 62 + 75	27.5	C	23.9	C	30.4	C	15.3	C	392	C	83	C	34.6	C
60		135		129		146		73.8		1320		145		129	
61	61 + 70 + 74 + 76	959	C	821	C	936	C	480	C	5610	C	1220	C	785	C
62	59 + 62 + 75		C59		C59		C59		C59		C59		C59		C59
63		29.7		32.3		31.6		16.9		277		49.7		36.3	
64		148		121		159		90.7		2010		400		175	
65	44 + 47 + 65		C44		C44		C44		C44		C44		C44		C44
66		593		602		626		324		5480		700		572	
67		8.3	J-EMPC	6.77		9.76	J-EMPC	5.78		63.1		19.5		9.4	
68		10.9	J-EMPC	11.2		7.68	J-EMPC	5.18	J-EMPC	45.4		11.6	J-EMPC	7.59	
69	49 + 69		C49		C49		C49		C49		C49		C49		C49
70	61 + 70 + 74 + 76		C61		C61		C61		C61		C61		C61		C61
71	40 + 41 + 71		C40		C40		C40		C40		C40		C40		C40
72		10.8		10.6		11.9		4.66	U	77.7		13.5	J-EMPC	11	
73		0.654	U	3.74	J-EMPC	0.817	U	0.762	U	0.667	U	0.796	U	7.72	J-EMPC
74	61 + 70 + 74 + 76		C61		C61		C61		C61		C61		C61		C61
75	59 + 62 + 75		C59		C59		C59		C59		C59		C59		C59
76	61 + 70 + 74 + 76		C61		C61		C61		C61		C61		C61		C61
77		47		35.8		43.5		25.4		195		38.1		30.1	
78		6.83	U	5.77	U	4.69	U	5.38	U	19.5	U	9.08	U	2.41	U
79		13.7	J-EMPC	9.52	J-EMPC	10.3	J-EMPC	5.71	J-EMPC	28	J-EMPC	16.2		7.61	
80		5.79	U	4.89	U	3.91	U	4.49	U	16.3	U	7.57	U	2.01	U
81		6.81	U	5.74	U	5.04	U	5.47	U	20.5	U	9.44	U	2.53	U
82		97.5		54.4	J-EMPC	68.9		42.4		323		112		59.7	
83	83 + 99	1940	C	1680	C	1850	C	777	C	7520	C	1660	C	1760	C
84		196		108		161		77.6		621		147		126	
85	85 + 116 + 117	568	C	486	C	539	C	232	C	2500	C	502	C	513	C
86	86 + 87 + 97 + 108 + 119 + 125	1150	C	771	C	1010	C	471	C	3760	C	1100	C	829	C
87	86 + 87 + 97 + 108 + 119 + 125		C86		C86		C86		C86		C86		C86		C86
88	88 + 91	187	C	126	C	164	C	81.2	C	886	C	183	C	133	C
89		4.65	J-EMPC	3.78		3.51	J-EMPC	2.12	J-EMPC	50.1	J-EMPC	4.43	J-EMPC	1.71	U
90	90 + 101 + 113	2620	C	1900	C	2500	C	1010	C	8280	C	2160	C	1950	C
91	88 + 91		C88		C88		C88		C88		C88		C88		C88
92		505		410		513		200		1880		401		404	
93	93 + 95 + 98 + 100 + 102	951	C	632	C	824	C	393	C	3440	C	835	C	653	C
94		3.71	J-EMPC	1.55	J-EMPC	2.81	J-EMPC	1.92	U	20.3		4.04	J-EMPC	1.99	J-EMPC
95	93 + 95 + 98 + 100 + 102		C93		C93		C93		C93		C93		C93		C93
96		2.3	J-EMPC	2.4		3.81	J-EMPC	0.977	J-EMPC	48.9		6.41	J-EMPC	1.88	J-EMPC
97	86 + 87 + 97 + 108 + 119 + 125		C86		C86		C86		C86		C86		C86		C86
98	93 + 95 + 98 + 100 + 102		C93		C93		C93		C93		C93		C93		C93
99	83 + 99		C83		C83		C83		C83		C83		C83		C83
100	93 + 95 + 98 + 100 + 102		C93		C93		C93		C93		C93		C93		C93
101	90 + 101 + 113		C90		C90		C90		C90		C90		C90		C90
102	93 + 95 + 98 + 100 + 102		C93		C93		C93		C93		C93		C93		C93
103		16.5		11.7		17		8.46		85.6		15.8		11.6	J-EMPC
104		1.11	J-EMPC	0.535	U	0.697	U	0.454	U	2.87	J-EMPC	0.947	U	0.507	U
105		1150		1070		1110		498		4060		1160		1010	
106		10	U	8.59	U	9.75	U	4.24	U	23.6	U	12	U	8.48	U
107	107 + 124	92.9	C	75.2	C	79.4	C	38.4	C	214	C	95.8	C	56.8	C J-EMPC
108	86 + 87 + 97 + 108 + 119 + 125		C86		C86		C86		C86		C86		C86		C86
109		311		286		268		127		802		251		262	
110	110 + 115	2150	C	1480	C	1940	C	904	C	7350	C	1760	C	1500	C
111		4		6.03		5.32		1.75	J-EMPC	13		1.56	U	4.79	J-EMPC
112		1.52	U	0.97	U	1.82	U	1.29	U	4.44	U	1.51	U	1.21	U
113	90 + 101 + 113		C90		C90		C90		C90		C90		C90		C90
114		77		72.3		65.2		29.2		300		85.6	J-EMPC	68.4	J-EMPC
115	110 + 115		C110		C110		C110		C110		C110		C110		C110

Table 4
Reference Area Smallmouth Bass Congener Analysis Results
Bradford Island - Remedial Investigation
Reference Area Smallmouth Bass Collected October/November 2007

IUPAC #	COELUTING CONGENERS[1]	071027R01 L10965-1		071027R02 L10965-2		071027R03 L10965-3		071027R04 L10965-4		071027R05 L10965-5		071027R06 L10965-6		071115R07 L10965-7	
116	85 + 116 + 117		C85		C85		C85		C85		C85		C85		C85
117	85 + 116 + 117		C85		C85		C85		C85		C85		C85		C85
118		3300		3050		3010		1330		10200		3140		3110	
119	86 + 87 + 97 + 108 + 119 + 125		C86		C86		C86		C86		C86		C86		C86
120		21.1		21.7	J-EMPC	21.4		10.3	J-EMPC	54.7		15.4		22.7	
121		3.26		2.66		3.01	J-EMPC	1.35	J-EMPC	11.3		2.91		2.35	
122		21.4	J-EMPC	9.49	U	14.8		4.86	U	27	U	22.8	J-EMPC	9.72	U
123		55.4		47.7		43.5	J-EMPC	24.8		184		47	J-EMPC	53.1	
124	107 + 124		C107		C107		C107		C107		C107		C107		C107
125	86 + 87 + 97 + 108 + 119 + 125		C86		C86		C86		C86		C86		C86		C86
126		11.2	U	11.6	J-EMPC	12.2	U	5.61		30.1	U	15.7	U	10.7	U
127		10.2	U	8.75	U	10.1	U	4.41	U	24.5	U	12.5	U	8.83	U
128	128 + 166	842	C	724	C	747	C	350	C	2030	C	713	C	704	C
129	129 + 138 + 160 + 163	5820	C	5250	C	5640	C	2430	C	14300	C	4680	C	5240	C
130		332		276		321		154		632		282		239	
131		28.2		13.5		21		10.6	J-EMPC	32.6	J-EMPC	29.4		12.2	J-EMPC
132		646		381		529		282		1170		550		381	
133		118		108		118		52.4		323		97.8		111	
134	134 + 143	141	C	79.6	C	120	C	60.7	C	260	C	137	C	80.5	C
135	135 + 151 + 154	1210	C	993	C	1200	C	512	C	3100	C	913	C	904	C
136		187		134		181		75.4		610		147		131	
137		174		147		125		68.9		573		178		166	
138	129 + 138 + 160 + 163		C129		C129		C129		C129		C129		C129		C129
139	139 + 140	87.5	C	79.3	C	89.5	C	37.4	C	253	C	73.6	C	75.5	C
140	139 + 140		C139		C139		C139		C139		C139		C139		C139
141		324		255		275		153		1490		337		269	
142		7.73	U	13	U	7.25	U	3.01	U	14.3	U	6.52	U	11.4	U
143	134 + 143		C134		C134		C134		C134		C134		C134		C134
144		110		81.5		109	J-EMPC	48.4		243		99.9		70.9	
145		0.6	U	0.555	U	0.667	U	0.491	U	0.771	U	0.733	U	0.571	U
146		1020		939		978		429		2540		767		901	
147	147 + 149	2400	C	1450	C	1920	C	1060	C	3250	C	1980	C	1400	C
148		11.6	J-EMPC	10	J-EMPC	11.2		4.22		36.6		7.79		7.82	J-EMPC
149	147 + 149		C147		C147		C147		C147		C147		C147		C147
150		6.01		3.99	J-EMPC	7.15	J-EMPC	3.76	J-EMPC	11.7	J-EMPC	5.88	J-EMPC	3.81	
151	135 + 151 + 154		C135		C135		C135		C135		C135		C135		C135
152		1.45	J-EMPC	1.78	J-EMPC	1.01	J-EMPC	0.956		14.4		0.675	U	1.14	
153	153 + 168	5530	C	5250	C	5040	C	2510	C	15500	C	4230	C	5710	C
154	135 + 151 + 154		C135		C135		C135		C135		C135		C135		C135
155		6.7		5.11		6.87		3.1	J-EMPC	16		3.02		5	
156	156 + 157	468	C	402	C	378	C	194	C	1390	C	490	C	448	C
157	156 + 157		C156		C156		C156		C156		C156		C156		C156
158		439		393		435		188		1220		396		391	
159		11.5		8.69	U	9.01		6.33		24		10.4		8.5	
160	129 + 138 + 160 + 163		C129		C129		C129		C129		C129		C129		C129
161		5.38	U	9.04	U	5.18	U	2.15	U	10.2	U	4.66	U	8.16	U
162		22.7		23.6	J-EMPC	17.3	J-EMPC	8.3	J-EMPC	52.4		19.2	J-EMPC	18.3	
163	129 + 138 + 160 + 163		C129		C129		C129		C129		C129		C129		C129
164		180		139		167		81.4		541		173		122	
165		6.32	J-EMPC	10.2	U	5.85	U	2.75	J-EMPC	13.6		5.26	U	9.22	U
166	128 + 166		C128		C128		C128		C128		C128		C128		C128
167		193		169		157		84.3		536		181		168	
168	153 + 168		C153		C153		C153		C153		C153		C153		C153
169		5.51	U	8.9	U	5.36	U	2.27	U	10.9	U	4.89	U	8.57	U
170		438		457		406		260		1950		398		498	
171	171 + 173	238	C	242	C	249	C	122	C	766	C	208	C	241	C
172		84.6		94.6		79.8		57.7		376		83.6		93.3	
173	171 + 173		C171		C171		C171		C171		C171		C171		C171
174		270		195		229		164		642		254		185	
175		31.4		29.3		32.7		17.1	J-EMPC	71.8		28.3	J-EMPC	26.3	
176		66.4		42		62.2		36		91		58.1		44.3	
177		535		429		557		291		903		441		382	
178		292		303		351		166		786		237		288	
179		321		232		342		153		810		230		229	
180	180 + 193	1220	C	1310	C	1120	C	806	C	5270	C	1040	C	1500	C
181		10.6	J-EMPC	10.3		8.97	J-EMPC	4.54		32.5		10.9		8.36	J-EMPC
182		7.69	J-EMPC	5.65	J-EMPC	8.57		5.13		24.4	J-EMPC	4.26		6.39	J-EMPC
183	183 + 185	559	C	573	C	567	C	297	C	1740	C	458	C	549	C
184		7.16		7.07		6.44		2.86	J-EMPC	19.4		3.98	J-EMPC	5.95	J-EMPC
185	183 + 185		C183		C183		C183		C183		C183		C183		C183
186		1.24	U	0.703	U	0.589	U	0.54	U	0.775	U	0.854	U	0.553	U
187		1840		1810		2040		1000		3850		1450		1690	
188		5.67		4.91	J-EMPC	5.62		2.31	J-EMPC	11.9		3.35	J-EMPC	4.31	J-EMPC
189		16.5	J-EMPC	17.4		16.8	J-EMPC	13.3		67.7		19.5	J-EMPC	23.2	J-EMPC
190		179		192		185		103		570		144		201	
191		22.3		26.4		21.2		16.7		81.1		24		25.9	
192		1.29	U	0.732	U	0.626	U	0.574	U	0.824	U	0.908	U	0.588	U
193	180 + 193		C180		C180		C180		C180		C180		C180		C180
194		167		150		126		122		618		138		208	
195		112		105		95.2		65.2		334		77		122	
196		88.2		101		69.2		58.1		284		85.8	J-EMPC	106	
197	197 + 200	34.6	C	28.2	C	28.5	C	20.5	C	71.2	C	27	C	32.3	C
198	198 + 199	279	C	258	C	222	C	192	C	702	C	210	C	261	C
199	198 + 199		C198		C198		C198		C198		C198		C198		C198
200	197 + 200		C197		C197		C197		C197		C197		C197		C197
201		51.2		46.2		46.9		27.9		109		40.2	J-EMPC	41.6	
202		173		166		175		100		428		125		205	
203		237		237		210		169	J-EMPC	596		191		284	
204		1.64	U	0.578	U	0.64	U	0.872	J-EMPC	0.676	U	0.683	U	0.578	U
205		15.4		14.6	J-EMPC	14.5	J-EMPC	10.6	J-EMPC	37.9		11.7		16	
206		103		95.6		72.8		66.6		240		76.4		136	
207		19.6		16.8		13.3	J-EMPC	11.7	J-EMPC	38.8		12.8		24	
208		43.9		36.1		31.5	J-EMPC	27.7		87.1		29.7		44.4	
209		52.4		44		36.9		33.9		90.2		41.1	J-EMPC	72.3	
	Total PCBs[2] (pg/g)	47,713		41,765		44,625		22,068		163,517		44,253		41,536	
	Total PCBs[2] (ug/kg or ppb)	**47.7**		**41.8**		**44.6**		**22.1**		**163.5**		**44.3**		**41.5**	

Notes:

All results are in units of pg/g (picograms/gram)

C = concentration represents coeluting congeners
U = The analyte was not detected above the reported sample quantification limit.
J = The reported value is an estimate.
J-EMPC = The analyte was not positively identified; the associated numerical value is the Estimated Maximum Potential Concentration.
Non-detect values reported at the analytical reporting limit
PCBs = Polychlorinated Biphenyls
RL = method reporting limit
1= When two or more congeners can not be resolved in the chromatogram they are considered to be 'coeluting' and are reported as a single concentration.
This concentration is reported once for all the coeluting congeners, to eliminate possible errors during congener summation.
2=Total PCBs are calculated by summing all 209 congeners, excluding results flagged as U, UJ, or J-EMPC

BRADFORD ISLAND REMEDIAL INVESTIGATION PROJECT

QUALITY CONTROL SUMMARY REPORT FOR ANALYTICAL CHEMISTRY

REFERENCE AREA SMALLMOUTH BASS COLLECTED FALL 2008

JULY 2008

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TABLES

Table 1 Reference Area Smallmouth Bass Collected Fall 2007
Table 2 Smallmouth Bass Non-congenor Qualifier Summary

1.0 Executive Summary

The overall assessment of the sample results shows the quality of the data is acceptable for supporting project objectives. The contracted laboratories provided all requested analyses, and delivered data reports were complete. Some data were qualified as estimated 'J' or 'J-EMPC' and some as non-detect, 'U'. All data qualifiers resulting from this review have been added to both the project database and the data tables within the main body of this deliverable. The end user should be aware of the potential low bias of the mercury results due to hold time (as discussed in Section 4.1). Additionally, the 27 standards used to quantify PCB congeners were added post extraction and were not exposed to the potential losses encountered during extraction, all fish tissue sample results have the potential to be biased slightly low (see Section 4.5 and 4.8).

2.0 Project Description

URS retrieved seven archived smallmouth bass fish samples from the United States Army Corp of Engineers (USACE) storage facility near Bonneville Dam on February 11, 2008. The fish were collected from October to November 2007 in support of the Bradford Island Bonneville Lock and Dam Project, River Operable Unit Remedial Investigation. Fish were captured under the supervision of the USACE and archived frozen by USACE for future analysis as described below.

3.0 Sampling and Analytical Procedures

Samples were analyzed according to the Quality Assurance Project Plan (QAPP) *River Operable Unit Remedial Investigation* (URS 2007). Table 1 summarizes the sample IDs, capture dates, fish length and weight, and requested analyses for each sample. Whole-body fish samples were homogenized using an industrial blender, then stored frozen by Columbia Analytical Services (CAS), located in Kelso Washington. An aliquot of the homogenized tissue was sent to Axys Analytical Services Ltd located in Sidney, British Columbia (Axys) to perform the PCB congener analysis by EPA Method 1668A, *Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by High Resolution Gas Chromatography/High Resolution Mass Spectrometry*. The Axys analytical data report includes a listing of Axys Method 1668A modifications.

The following table lists the parameters analyzed for one or more of the samples. Table 1 summarizes the specific requested analyses for each medium by URS and laboratory identification numbers. (Note: SVOCs and PAHs were analyzed separately for tissue matrices and are discussed separately in this report).

Method	Analytical Parameter
EPA 1668A	Polychlorinated Biphenyls (PCBs) - Congeners

Method	Analytical Parameter
EPA 8270C-SIM	Semivolatile Organic Compounds (SVOCs)
EPA 8270C-SIM	Polynuclear Aromatic Hydrocarbons (PAHs)
EPA 6000/7000 series	Metals
Puget Sound Estuary Program (PSEP 1996)	Percent Lipids
Freeze Dry	Percent Solids

4.0 Data Validation

Analyses were performed in general accordance with the above reference methods and variations from method requirements were well-documented. The analytical results for all samples were subjected to a quality assurance/quality control (QA/QC) review. This QA/QC review includes evaluation of representativeness (sample collection/handling), accuracy (spike and/or standard recoveries), analytical precision (duplicate relative percent difference), comparability (use of standard methods) and completeness (percent of usable data). Specifically, the following items were reviewed when appropriate: compliance with the QAPP, chain of custody (COC), laboratory case narrative, proper sample preservation and handling procedures, holding times, initial and continuing calibrations, quantitation limits, field/method/trip blank analyses, matrix/matrix spike duplicate recoveries, laboratory duplicate results, field duplicate results, blank spike recoveries (laboratory control samples), data completeness and format, data qualifiers assigned by the laboratory, and analyte identification. The following items were reviewed on 15% or greater of the data: primary and secondary column verification (method 8270C and 6000/7000 series), instrument calibration and a verification of the reported electronic data with the hard copy deliverable.

The data review process for this investigation followed the Bradford Island Bonneville Lock and Dam Project, River Operable Unit Remedial Investigation Quality Assurance Project Plan (QAPP) (USACE 2007). Additionally, because the QAPP-referenced *Department of Defense Quality Systems Manual* does not discuss PCB congeners, the data review process utilized guidance from EPA's *Contract Laboratory Program National Functional Guidelines (EPA NFGs) for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review (September 2005)* and *EPA Region 10 Standard Operating Procedure (SOP) for the Validation of Method 1668 Toxic, Dioxin-like, PCB data (USEPA 1995)* as appropriate for method performed. In the case of disagreement between the documents listed as guidance or the analytical method, method criteria were utilized for data review. The SVOC and Metals results were reviewed in accordance with the criteria contained in the DoD QSM (DoD 2006) and the above listed methods and EPA's *NFGs for Organic Data Review, and the NFGs for Inorganic Data Review* (USEPA 2004), in that order of precedence. Project-specific QC criteria are listed in the above mentioned QAPP.

A summary of qualifiers assigned to results in this investigation is included in Tables 2. Samples are listed by their URS sample identification assigned in the field as well as the laboratory identification. Qualifiers that may be assigned to the results of this investigation include the following:

- U - The analyte was analyzed for but was not detected above the reported sample quantitation limit (for SVOCs and metals) or above the noise-based sample-specific detection limit for PCB congeners.

- J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

- J-EMPC – The analyte was not positively identified; the associated numerical value is the **E**stimated **M**aximum **P**otential **C**oncentration of the analyte in the sample - used only for PCB congener results.

- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

- DNR - Do Not Report

Final sample results and qualifiers are presented in the analytical tables provided in the sampling report.

4.1 Chain-of-Custody, Sample Preservation and Holding Time

Fish Tissue (non-congeners)

The chain-of-custody (COC) forms indicate that samples were maintained under chain of custody and forms were signed upon release and receipt. All coolers were submitted at temperatures within the EPA-recommended temperature of 6°C or below. Data were not qualified based on cooler temperatures.

All samples were analyzed within the technical and contracted holding time with the following exceptions:

- All samples were analyzed from 88 to 113 days past the 28 day holding time for inorganic mercury in solid matrixes. The mercury data were not rejected based on hold time due to the fact that it is believed that a large percentage of the mercury in these samples is in the form of methyl mercury due to the higher tropic level of the sample.

The short hold time for inorganic mercury is due to the loss of analyte from evaporation; however, methyl mercury is more resistant to loss via evaporation. Methyl mercury was not specifically analyzed in these samples nor are there specific hold times for methyl mercury listed in QSM DoD. All mercury results are qualified as estimated and flagged 'J'. The end user should be aware of the potential low bias of the mercury results due to hold time.

Fish Tissue (congeners)

The chain-of-custody (COC) forms from CAS to Axys indicate that samples were maintained under chain of custody and forms were signed upon release and receipt. The Axys receipt date of March 5, 2007, printed on the COC form appears to be in error, as it is before the sample collection date of October and November 2007. The CAS relinquish date on the COC form is listed as March 4, 2008, the Axys Sample Receiving Record included as page 12 in data package DPWG25561 lists March 5, 2008 as the sample receipt date, and the sample shipping information included as page 11 in data package DPWG25561 lists March 4, 2008 as the sample shipment date. For these reasons, it is concluded the March 5, 2007 Axys receipt date printed on the COC form should be March 5, 2008.

Sample temperature during transport from CAS to Axys was not indicated on the COC form or on the Axys Sample Receiving Record. However, the sample shipping information included as page 11 in data package DPWG25561 lists dry ice in the description field of the Federal Express paperwork. The samples were stored at -20°C by Axys prior to extraction and analysis. The condition of the samples upon receipt by Axys was appropriate, custody seals were intact, and all samples listed on the COC form were present. Data were not qualified based COC and sample shipment procedures.

All samples were analyzed within the technical and contracted holding times.

4.2 Instrument Calibration

The laboratory performed initial multipoint calibrations for target and surrogate compounds as required by the analytical methods. Initial calibrations (ICAL) and continuing calibrations (CCAL) were performed at the proper frequency and at the appropriate concentrations required by the methods.

Fish Tissue (non-congeners)

Instrument calibrations were acceptable for non-congener sample analyses performed with the following exceptions:

- The ICAL for di-n-butyl phthalate, di-n-octyl phthalate and terphenyl-d4 exceeded the DoD QSM RSD limit of ≤15% with 16.4%, 15.9%, 15.5%, respectively. The alternative criteria presented in both the DoD QSM (p.139) and EPA guidance were met. Additionally, CCALs for these analytes were within the control limits. No qualification was given to the data based on ICAL values.

Fish Tissue (congeners)

ICALs and continuing calibration verifications (CCVs) were reviewed for PCB congener analyses. The laboratory performed initial multipoint calibrations for all target and standard compounds as required by the Method 1668A. ICALs, CCVs and OPR (ongoing precision recovery) standards were analyzed at the proper frequency and at appropriate concentrations required by EPA Method 1668A. Calibration compounds analyzed associated with the fish tissue samples met the acceptance criteria as listed in the method.

4.3 Review of Blanks

Method blanks were used to check for laboratory contamination and instrument bias. The laboratories analyzed at least one method blank for each analysis and for each batch, per QAPP requirements. Qualification of samples due to method or field blank contamination followed guidelines set forth in the EPA NFGs.

Fish Tissue (non-congeners)

For non-congener organic analyses, sample results less than five times (5x) and inorganic sample results (or common laboratory organic contaminates such as phthalates) less than ten times (x10) the method blank or field blank concentration and between the method detection limit (MDL) and the method reporting limits (MRL) were flagged as non-detect 'U' at the MRL. When sample results were less than 5x the blank concentration but above the MRL, the reported result was qualified as non-detect 'U'. Target compounds detected in the method blank but reported as not detected in the associated samples were not qualified. Target compounds reported with concentrations greater than 5x the blank concentration were not qualified. For solid matrices reported in both wet and dry weight concentrations, the above guidelines were applied using wet weight results and any flags applied were also applied to the dry weight results. Field blanks were not collected as part of this sampling event. All analytical tests indicate non-detects for all method blanks with the following exceptions:

- Lead and nickel were detected above the MDL and below the MRLs in the method blank associated with sample delivery group K0801240, additionally, cobalt was detected in the calibration blanks bracketing the samples. Sample results were above 10x the blank concentrations with the exception of cobalt in samples K0801240-001 through K0801240-007 and lead in samples K0801240-001 through K0801240-007 and nickel in samples K0801240-004, K0801240-005 and K0801240-006. These samples were qualified and flagged 'U' as described above and reported in Table 2.
- Di-n-butyl phthalate was detected in the SVOC method blank associated with delivery group K0801240 at a concentration above the MRL. The following samples had results below 10x the method blank concentration and were detected above the MRL and were flagged 'U' at the reported sample concentration, K0801240-001, -003 through -007.

Fish Tissue (congeners)

PCB congener sample results that were reported as detected at a concentration less than five times (5x) the associated blank concentration were flagged 'U' or non-detect at the reported concentration. Target compounds reported with concentrations greater than 5x the blank concentration were not qualified. Target compounds detected in the method blank but reported as not detected in the associated samples were not qualified. Method blank results reported as EMPCs were not considered appropriate for use in qualifying associated sample results. Method 1668A stipulates using a method blank as similar to the matrix as possible. The method blank was prepared using corn oil to approximate the lipid content of the samples.

The method blank associated with fish tissue samples had only low levels of few PCBs. No sample results were qualified based on method blank concentrations.

4.4 Surrogate Recovery Review (non-congener analyses only)

Each sample analyzed for organic compounds other than PCBs was spiked with surrogates (system monitoring compounds). Surrogate recoveries are a measure of accuracy for the overall extraction and analysis of each individual sample. Surrogate recoveries were acceptable for all analyses with the following exceptions:

- PAH surrogate recoveries for fluorene-d10 and fluoranthene-d10 were below the lower DoD QSM control limit of 60% for samples K0801240-001 and -004. The associated MS/MSD and LCS/LCSD were within control limits for fluorene and fluoranthene suggesting analytical batch was in control. All PAHs in samples K0801240-001 and K0801240-004 were estimated and flagged 'J/UJ' to indicate potential low bias.

4.5 Labeled Internal Standard Recovery Review (congener analysis only)

Samples analyzed for PCB congeners were spiked with labeled internal (quantification) standards. These standards are used to quantitate target congeners and the calculations of target compound concentrations are designed to compensate for low extraction and/or cleanup efficiencies. In addition, their recovery is measured against injection standards added after extraction and cleanup to typically evaluate extraction and/or cleanup efficiency which could affect sensitivity and could also affect accuracy for target compounds not quantitated against a chemically identical, isotopically labeled standard. The percent recovery of the labeled standards was compared with the limits set forth in EPA Method 1668A and those set by Axys detailed in Table 1 of the Axys narrative. Cleanup standards 28L, 111L, and 178L typically are added prior to cleanup and quantitated using injection standards added just prior to analysis to evaluate cleanup efficiency.

Because Axys anticipated high level congener concentrations in these tissue samples based on previous fish tissue samples collected [Bonneville Dam Forebay, 2006/2007], the three standards typically used as cleanup standards (28L, 111L, and 178L) were introduced prior to extraction and used as "extraction standards." The internal standards (27 labeled congeners used to quantitate target congeners) were introduced after extraction and prior to cleanup and should therefore be considered "cleanup standards" for these samples. This approach was taken as a

result of the anticipated high congener levels and resulting volumetric amount of standard necessary to be introduced prior to extraction, and the relative cost of the three labeled congener standard solution to that of the 27 labeled congener standard solution. Section 4.8 presents additional details on the target congener quantification effects of this approach by Axys. The internal standards were within the 25-150% control limits set by EPA Method 1668A, and cleanup standards were within the 30-135% control limits set by EPA Method 1668A.

Isotopic dilution calculations are designed to compensate for recovery or loss. Therefore, PCB congeners quantified against chemically identical ^{13}C-labeled standards were not considered for qualification based upon internal standard recoveries. However, congeners with concentrations calculated based upon internal standards that are not chemically identical have the accuracy of the results potentially affected by low extraction and/or cleanup efficiency since the efficiency for the standard may not match the target compound exactly. These congeners were considered for qualification if recoveries were outside specified limits. Internal standard recoveries were within Method 1668A specified control limits for the samples reported in this data package, and data qualification was not necessary.

As described later in Section 4.8, Axys analyzed each sample extract twice due to the levels observed in the first analyses. The standards used to monitor the efficiency of the extraction were reported from the original analyses and the remainder of the data was reported from the repeat analyses.

4.6 Laboratory Control Samples and Matrix Spike/Matrix Spike Duplicate Review

Laboratory control samples (LCS) are used to monitor the laboratory's day-to-day performance of routine analytical methods, independent of matrix effects and to assess accuracy for the target compounds. Matrix spike/matrix spike duplicate (MS/MSD) samples are analyzed to assess the ability of the laboratory to recover the target compounds from the sample matrix. Per method requirements, at least one LCS and one MS/MSD were analyzed for each analysis and for each batch.

Fish Tissue (non-congeners)

LCS/LCSD and MS/MSD recoveries were acceptable for all non-congener analytical tests with the following exceptions:

- MS recoveries for sample K0801240-006 were over the DoD QSM control limit of 120% for arsenic and zinc with 121% and 131%, respectively. The MSD performed on the same sample had arsenic and zinc recoveries of 122% and 135%, respectively. The LCS and SRM recoveries for arsenic and zinc were in control indicating batch was in control. Arsenic and zinc were flag 'J' in sample K0801240 due to potential high bias due to sample matrix.
- SVOC MS/MSD recoveries for sample K0801240-006 were outside control limits for di-n-butyl phthalate and bis(2-ethylhexyl) phthalate. Accurate quantification of these analytes was prevented due to unknown matrix interferences in the chromatograms even

after additional gel-permeation chromatography (GPC) cleanup was performed. Recovery in the associated LCS/LCSD was acceptable suggesting analytical batch was in control; data were not flagged based on MS/MSD recoveries of these analytes. Recoveries for di-n-octyl phthalate within the same MS/MSD pair were above the upper control limit of 130% with recoveries of 206% and 220%, respectively. Sample results in the associated sample delivery group were all non-detect for di-n-octyl phthalate. Results were not qualified based on the potential bias high for di-n-octyl phthalate. Additionally, recoveries for 4-methylphenol in the same MSD were below the lower control limit of 40% with 18%. The 4-methylphenol recovery in the associated MS was 40%. The resulting RPD for the MS/MSD pair for 4-methylphenol was above the control limit. Therefore, results for 4-methylphenol in the parent sample (K0801240-006) were flagged 'UJ' due to potentially low bias.

- The MSD recovery for sample K0801240-001 was below the DoD QSM control limit of 45% for pyrene with 43%, additionally, the RPD for the MS/MSD pair was above the 30% control limit with 54%. The associated MS, LCS and calibration standards indicate analytical batch was in control. The sample result for pyrene was estimated and flagged 'UJ' for sample K0801240-001 due to MSD and RPD results.

Fish Tissue (congeners)

MS/MSD samples are not required by Method 1668A for PCB congener analysis. For Method 1668A, Ongoing Precision and Recovery (OPR) samples were used in place of LCS to monitor laboratory performance. The OPR was prepared using corn oil to approximate the lipid content of the samples. OPR recoveries were acceptable for congener analyses.

4.7 Duplicate Review (non-congener analyses only)

Field duplicates were not collected as part of this sampling event. Laboratory precision was evaluated through duplicate analyses (i.e. LCS/LCSD and MS/MSD). No samples were qualified exclusively on duplicate precision exceedances.

4.8 Compound Quantification

Fish Tissue (congeners)

An accurately weighed, approximately 2 gram subsample of the tissue was spiked with extraction standards (28L, 111L, and 178L, Section 4.5) then extracted and the resulting extract was split by weight into two uneven portions; 95% of the extract was reserved as backup. The remaining five percent of the extract was spiked with quantification standards, cleaned up, and used for initial analyses on April 24, 2008. This approach was taken by Axys due to high level congener concentrations expected in these samples based on previous fish tissue samples collected (as stated above). Due to the low levels of target analytes observed in these initial analyses, repeat analyses were conducted using the reserved portion of the extract on May 15, 2008. Repeat analyses are indicated by the "RX" suffix added to the laboratory sample ID.

A combination of the two analyses was reported by Axys. As described in Section 4.5 above, labeled standards 28L, 111L, and 178L were used to monitor extraction efficiency. Following routine sample preparation and cleanup procedures, Axys staff inadvertently introduced more cleanup standard solution (28L, 111L, and 178L) to the 95% portion of the extract prior to its cleanup (forgetting that the cleanup and internal standards were reversed for these samples as discussed in Section 4.5). For this reason, the standards used to monitor the efficiency of the extraction were reported from the initial analyses (five percent extract aliquot) and the remainder of the data were reported from the repeat analyses (95% extract aliquot).

Because the labeled quantification standards were introduced to the extract (post extraction and pre cleanup as described in Section 4.5), these standards were not exposed to the potential loss one might expect during the extraction process. Rather the "extraction standards" 28L, 111L, and 178L were used as a measure of aggregate loss encountered during extract and cleanup. Because the quantification standards used to quantify congener results were not exposed to the potential losses encountered during extraction, all fish tissue sample results have the potential to be biased slightly low. The presence and magnitude of this bias are indicated by the recoveries of the 28L, 111L, and 178L standards. As all labeled standards were recovered within method limits, no data qualification was considered necessary.

Congener results were reported by Axys as picograms per gram (pg/g) on a wet weight basis. The removal of an aliquot for the lipid determination has been accounted for in the quantification procedures such that the final results are in terms of the whole subsample extracted.

Homologue totals were obtained by summing the concentration of all detected congeners at each level of chlorination. Toxic Equivalents (TEQs) were calculated using World Health Organization 2005 Toxicity Equivalence Factors. Chromatographic peaks that met all other qualitative identification criteria but did not meet the method ion abundance ratio criteria were not included in the homologue totals or TEQ calculations.

The internal standard method is used to calculate concentrations of PCB congeners that do not have chemically identical labeled standards. The internal standard method is dependent upon consistent detector response over the calibration range and over time. If detector response varies between the retention time of the standard and that of the target compound, concentrations can be biased high or low based on the variations in detector sensitivity. During congener analysis, PFK (perfluorokerosene) is used as a lock mass reference standard to measure changes in detector sensitivity. Each lock mass must not vary more than 20% throughout its respective retention time window as required by Method 1668A. Variations of more than 20% indicate the presence of co-eluting interferences or decreased sensitivity. No PCB congener results were qualified due to lock mass variations.

4.9 Target Compound Identification

Fish Tissue (non-congeners)

- Two metal standard reference materials (SRM) were analyzed. One (N.R.C.C Dolt-3) exceeded the upper CAS control limit for lead (i.e. 0.460 mg/kg versus control limit of 0.437 mg/kg) in sample delivery group K0801240. The LCS, MS/MSD, calibration standard and second SRM were all within the recovery control limits set by either the DoD QSM or CAS. Lead sample results were not flagged due to the SRM recovery.

Fish Tissue (congeners)

Ion abundance ratios are used to identify PCB congeners. Results that met all other qualitative identification criteria but were more than 15% different from the theoretical ion abundance criterion set by EPA Method 1668A are flagged in the laboratory report with a 'K' flag. Those results flagged 'K' with ion abundance ratios outside the identified quantitation criteria are considered estimated maximum possible concentrations (EMPC) and were re-flagged 'J-EMPC' during this review. If the analyte result was previously qualified 'U' by method blank detection, the result retained the 'U' qualifier and it was not qualified further because an ion ratio was out of limits (there is no ion ratio criterion for non-detects). These EMPC flags are not tabulated in this report but appear within the data tables in the main body of this deliverable. In addition, these flags are entered into the database.

Ion ratios outside the control limits are generally a consequence of co-eluting interferences to either one or both quantitation peaks. In these cases, Axys chose to use the quantitation peak areas as recorded; no adjustments were made to force the peaks to match the theoretical ion abundance ratios before reporting EMPC results. EMPC results should be considered by the data users as part of evaluating the data for end-use objectives.

Additionally, the flag 'C' was used in Table 3 to indicate co-eluting PCB isomers for this analysis. The concentrations of the co-eluting isomers were reported as a group, eliminating the need for any data qualification.

5.0 Completeness

The laboratory reported all requested analyses, and the deliverable data reports were complete. Some data were qualified as estimated 'J' or 'J-EMPC' and some as non-detect 'U'. A summary of qualifiers can be found in Tables 2. A completeness summary follows; congener completeness was calculated using 209 congener results.

The electronic and pdf versions of the deliverables were cross-checked for accuracy at frequency of 20% for the congener data and 20% for non-congener data. No discrepancies were found between the deliverables.

- *Technical Completeness* = (number of useable results/total reported results) x100
  All samples results are considered useable.
  Congener = *(1,463 compliant / 1,463 total results) = 100*%
  Non-congener = *(259 compliant / 259 total results)*= 100%
- *Contract Completeness* = (number of contract compliant results/total reported results) x100
  Congener = *(1,463 compliant / 1,463 total results)* = 100%

Non-congener = *(259 compliant / 259 total results)*= 100%

- *Analytical Completeness* = (number of unqualified results/total reported results) x100

  Congener = *(1,317 compliant / 1,463 total results) = 90*%
  Non-congener = *(230 compliant / 259 total results)* = 88%
  Some congener data were qualified as estimated 'J-EMPC'.

- *Field Sampling Completeness* =(number samples collected/total reported results) x100
  All proposed field samples were successfully collected.
  Congener = *(1,463 compliant / 1,463 total results)* = 100%
  Non-congener = *(259 compliant / 259 total results)*= 100%

6.0 References

URS 2007. Quality Assurance Project Plan, *Water Quality Monitoring for the In-Water Removal Action*, Bradford Island, Bonneville Lock and Dam Project, Cascade Locks, Oregon. July 2007.

DOD 2006. Department of Defense Environmental Data Quality Workgroup. Department of Defense (DOD) Quality Systems Manual (QSM) for Environmental Laboratories. Final Version 3. January 2006. Retrieved from [http://www.navylabs.navy.mil/Archive/DoDV3.pdf] on 3/3/06

USEPA 1995. U.S. Environmental Protection Agency (USEPA) Region 10 SOP for the Validation of Method 1668 Toxic, Dioxin-like, PCB Data. December 1995.

USEPA 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. October 1999.

USEPA 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. October 2004.

USEPA 2005. USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review. September 2005.

Table 1. Reference Area Smallmouth Bass Collected Fall 2007

Quality Control Summary Report for Analytical Chemistry
Reference Area Smallmouth Bass Collected October/November 2007

URS ID	Length (mm)	Weight (grams)	Collection Date	CAS ID	Axys ID (congeners)	Analytes				
						PCB (congeners) (Axys Analtyical)	SVOCs	Metals	%Lipids	%Solids
071027R01SB	380	820	10/27/07	K0801240-001	L10965-1	X	X	X	X	X
071027R02SB	360	802	10/27/07	K0801240-002	L10965-2	X	X	X	X	X
071027R03SB	325	548	10/27/07	K0801240-003	L10965-3	X	X	X	X	X
071027R04SB	370	906	10/27/07	K0801240-004	L10965-4	X	X	X	X	X
071027R05SB	350	646	10/27/07	K0801240-005	L10965-5	X	X	X	X	X
071027R06SB	330	501	10/27/07	K0801240-006	L10965-6	X	X	X	X	X
071115R07SB	425	964	11/15/07	K0801240-007	L10965-7	X	X	X	X	X

Notes:

CAS – Columbia Analytical Services
ID – Identification
mm – millimeter
PCB – Polychlorinated biphenyl
SVOCs – Semivolatile Organic Compounds

Table 2. Smallmouth Bass Non-congener Qualifer Summary
Quality Control Summary Report for Analytical Chemistry
Reference Area Smallmouth Bass Collected October/November 2007

CAS ID	URS ID	Analyte	Qualifer	Rational
K0801240-001	071027R01SB	mercury	J	hold time
K0801240-002	071027R02SB			
K0801240-003	071027R03SB			
K0801240-004	071027R04SB			
K0801240-005	071027R05SB			
K0801240-006	071027R06SB			
K0801240-007	071115R07SB			
K0801240-001	071027R01SB	lead	13U	MB detections
K0801240-002	071027R02SB		14U	
K0801240-003	071027R03SB		14U	
K0801240-004	071027R04SB		15U	
K0801240-005	071027R05SB		14U	
K0801240-006	071027R06SB		13U	
K0801240-007	071115R07SB		14U	
K0801240-004	071027R04SB	nickel	298U	
K0801240-005	071027R05SB		306U	
K0801240-006	071027R06SB		277U	
K0801240-001	071027R01SB	di-n-butyl phthlate	220U	
K0801240-003	071027R03SB		150U	
K0801240-004	071027R04SB		280U	
K0801240-005	071027R05SB		150U	
K0801240-006	071027R06SB		230U	
K0801240-007	071115R07SB		87U	
K0801240-001	071027R01SB	cobalt	25.5U	calibration blank detections
K0801240-002	071027R02SB		30.9U	
K0801240-003	071027R03SB		27.8U	
K0801240-004	071027R04SB		24.8U	
K0801240-005	071027R05SB		25.5U	
K0801240-006	071027R06SB		26.7U	
K0801240-007	071115R07SB		36.1U	
K0801240-001	071027R01SB	acenapthene fluorene phenanthrene anthracene fluoranthene pyrene benzo(a)anthracene chrysene benzo(b)fluoranthene benzo(k)fluoranthene benzo(a)pyrene indeno(1,2,3-cd)pyrene dibenzo(a,h)anthracene benzo(g,h,i)perylene	J/UJ	PAH surrogate recovery (*fluorene-d10 and fluoranthene-d10*)
K0801240-004	071027R04SB			
K0801240-006	071027R06SB	arsenic zinc	J	MS/MSD recoveries
K0801240-006	071027R06SB	4-methylphenol	UJ	MSD recovery and RPD
K0801240-001	071027R01SB	pyrene	UJ	MSD recovery and RPD

Notes:
Not included are J flags indicating detections above the MDL and below the MRL.
Concentrations are reported in weight wet (µg/kg).