Bioaccumulation Model Check-In

CPG-EPA Conference Call

May 13, 2019

623733

Agenda

- Update on model calibration
  - Current calibration and calibration targets
  - Updated plots

- Discussion of alternate calibrations

Uncalibrated Model

	2378-TCDD			TetraCB			1234678-HpCDF		
Species	**RM 0-6**	**RM 6-14.7**	**RM 14.7-Dam**	**RM 0-6**	**RM 6-14.7**	**RM 14.7-Dam**	**RM 0-6**	**RM 6-14.7**	**RM 14.7-Dam**
DEP		47.3	9.6		5.8	4.3		7.4	2.0
FF									
DET									
C/O	14.1			2.5			4.8		
Small filter feeding fish		-1.4			-3.2			-5.8	
Small forage fish	-1.3	3.8	-10.3	-4.6	-2.7	-4.2	-2.8	-7.2	-8.7
Small American eel	-2.6	4.2	-1.3	-11.3	-4.3	-4.1	-28.1	-11.8	-22.4
Blue crab	-3.9	1.6	-42.9	-5.3	-2.0	-3.0	-32.5	-14.9	-28.7
Carp		-1.7	-9.5		-3.0	-1.7		-10.8	-6.2
Catfish	-23.6	-2.4	-201.2	-13.3	-2.7	-4.4	-39.8	-6.1	-10.5
White perch	-3.9	1.3	-20.3	-10.7	-4.7	-4.5	-3.9	-2.5	-2.0
Large American eel	-1.9	1.3		-10.0	-5.2		-21.3	-18.7	
Bass		-1.2	-6.5		-4.8	-10.7		-9.6	-28.7
Average (all)	**6.2**	**2.1**	**41.7**	**9.2**	**3.6**	**4.7**	**21.4**	**9.7**	**15.3**
Average (priority)		**2.5**			**4.5**			**11.8**	

Invertebrate BSAF calculated from the model:

	TCDD			TetraCB			HpCDF		
BSAF - DEP	1.1	1.7	2.4	0.9	1.0	1.3	0.12	0.14	0.11
BSAF - FF	0.2	0.3	1.8	0.3	0.3	0.6	0.05	0.07	0.19
BSAF - DET	1.4	0.3	4.3	1.1	0.3	0.9	0.17	0.21	1.11
BSAF - C/O	0.9	0.5	2.9	0.7	0.3	0.7	0.06	0.11	0.45

Current Calibration

	2378-TCDD			TetraCB			1234678-HpCDF		
Species	**RM 0-6**	**RM 6-14.7**	**RM 14.7-Dam**	**RM 0-6**	**RM 6-14.7**	**RM 14.7-Dam**	**RM 0-6**	**RM 6-14.7**	**RM 14.7-Dam**
DEP		21.7	8.6		5.4	6.5		16.2	4.6
FF									
DET									
C/O	11.5			5.7			8.0		
Small filter feeding fish		1.1			-1.4			1.0	
Small forage fish	1.1	3.4	-7.6	-1.6	-1.1	-1.6	2.3	-1.1	-1.4
Small American eel	-1.6	4.8	1.2	-2.9	1.2	1.0	-2.3	1.5	-1.5
Blue crab	-2.0	2.2	-22.7	-1.7	1.6	1.2	-2.9	-1.1	-2.1
Carp		-1.5	-6.7		-2.7	-1.6		-1.3	1.2
Catfish	-5.2	1.4	-47.1	-4.9	-1.2	-1.9	-2.8	2.4	1.2
White perch	-2.1	1.5	-11.1	-3.6	-1.8	-1.4	1.6	2.7	2.8
Large American eel	-1.1	1.6		-2.3	1.1		-1.7	-1.1	
Bass		-1.3	-5.1		-1.8	-3.7		1.4	-2.2
Average (all)	**2.2**	**2.1**	**14.5**	**2.8**	**1.5**	**1.8**	**2.3**	**1.5**	**1.8**
Average (priority)		**2.2**			**1.8**			**1.7**	

Invertebrate BSAFs calculated from the model:

	TCDD			TetraCB			HpCDF		
BSAF - DEP	0.9	0.8	2.1	1.5	0.9	2.0	0.2	0.3	0.2
BSAF - FF	0.2	0.3	1.4	0.6	0.4	1.0	0.1	0.1	0.3
BSAF - DET	1.1	0.2	3.3	1.8	0.5	1.3	0.3	0.3	1.5
BSAF - C/O	0.8	0.3	2.6	1.5	0.5	1.5	0.1	0.2	0.7

Calibrated Parameters

- Chemical-specific:
  - K_{OW} (set equal to CFT model values)
  - E_D (dietary chemical transfer efficiency)
  - Metabolic rate constants (K_M)
- Other parameters:
  - Water temperature
  - Dietary AEs for benthic invertebrates (NLOC, NLOM)
  - Weight of DEPs (RM 6 to 14.7)
  - Diet of DEPs in RM 6-14.7 and RM 14.7-Dam

Current Calibration – Dynamic Model

- Review updated plots:
  - Time-series plots
  - Updated plots by river mile
    - Empirical data
    - Steady state calibration
    - Dynamic model calibration

Calibration Status

- Lines of evidence supporting calibration:
  - Steady state model – performing well across species and chemicals
  - Benthic BSAFs
  - Dynamic model – also performing well across species and chemicals

- Considering calibration final pending:
  - Evidence from alternate calibrations indicates reason for modification.
  - Comments from EPA

Alternate Calibrations

- Will be used in report to evaluate model calibration.
- Run two ways:
  - With K_{OW} held constant (i.e., equal to CFT model values
  - Allowing K_{OW} to vary
- Discuss process and parameters to include