APPENDIX C
Input Values Being Developed for TRIM.FaTE Mercury Case Study

Input Parameter	Input Units	Value[a]	Reference
SOURCE DATA (for each source)			
Location of source	UTM coordinates (x,y)	[specific coordinates]	supplied by state agency
Height of emission source	m	specified by height of source compartment	supplied by state agency
Emission rate (for each chemical)	g/s	1.75E-03	supplied by state agency
BACKGROUND DATA (for each modeled chemical)			
Background concentration in each compartment	Soil: ng/m^3 Water: ng/l Air: ng/m^3	Soil: 100 [98% Hg(2), 2% MHg] Water: 1000 [90% Hg(2), 10% MHg] Air: 1 [100% Hg(0)]	based on ranges reported in U.S. EPA 1997
METEOROLOGICAL DATA			
Horizontal wind speed	m/s	varies over time	NCDC 1997
Horizontal wind direction	degrees	varies over time	NCDC 1997
Vertical wind speed	m/s	varies over time	NCDC 1997
Air temperature	°K	varies over time	NCDC 1997
Precipitation	m/day	varies over time	NCDC 1997
Mixing height	m	varies over time	NCDC 1997
Relative humidity	unitless	varies over time	NCDC 1997
SPATIAL DATA			
Height of each air VE[b]	m	Equal to mixing height	NCDC 1997
Surface soil depth (for each surface soil VE)	m	0.01	professional judgment
Root zone depth (for each root zone VE)	m	0.55	McKone et al. 1998
Vadose zone depth (for each vadose zone VE)	m	0.76	McKone et al. 1998

Input Parameter	Input Units	Value[a]	Reference
Ground water layer depth (for each aquifer layer VE)	m	3	professional judgment
Surface water depth (for each surface water VE)	m	ponds: 3.0 rivers: [being developed]	supplied by state agency
Sediment layer depth (for each sediment layer VE)	m	ponds: 0.05 rivers: [being developed]	based on default from U.S. EPA 1997
ABIOTIC ENVIRONMENTAL SETTING DATA			
Air (assumed same for all air compartments)			
Atmospheric dust load	kg[dust] / m^3[air]	6.15E-08	Bidleman 1988
Dust density	kg[dust] / m^3[dust]	1.40E+03	Bidleman 1988
Dry deposition velocity of air particulates	m / day	5.00E+02	McKone et al. 1998
Washout ratio	[mass chem/volume rain] /[mass chem/volume air]	2.00E+05	U.S. EPA 1997
Surface area per volume of particles	m^2[area] / m^3[particles]	5.71E-04	Bidleman 1988
Junge_C	m-Pa	1.72E-01	Pankow 1987
Density of air	g/cm^3	1.20E-03	U.S. EPA 1997
Fraction organic matter on particulates	unitless	2.00-01	Harner and Bidleman 1998
Diffusion coefficient of water in air	m^2/d	2.16E+00	Riederer 1995
Boundary layer thickness in air above soil	m	5.00E-03	McKone et al. 1998
Surface Soil (assumed same for all surface soil compartments)			
Water content	volume[water] / volume[compartment]	1.60E-01	McKone et al. 1998
Air content	volume[air] / volume[compartment]	4.38E-01	McKone et al. 1998
Soil material density	kg[soil] / m^3[soil]	2.60E+03	McKone et al. 1998
Organic carbon fraction	unitless	1.66E-02	McKone et al. 1998

Input Parameter	Input Units	Value[a]	Reference
Air soil boundary thickness	m	5.00E-03	Thibodeaux 1996
Default depth of runoff water	m	5.00E-03	approximated from a typical runoff rate and number of rain events
Fraction of area available for vertical diffusion	m^2[area available] / m^2[total]	1.00E+00	area assumed rural
Fraction of area available for erosion	m^2[area available] / m^2[total]	1.00E+00	area assumed rural
Fraction of area available for runoff	m^2[area available] / m^2[total]	1.00E+00	area assumed rural
Root Zone (assumed same for all root zone compartments)			
Water content	volume[water] / volume[compartment]	1.61E-01	McKone et al. 1998
Air content	volume[air] / volume[compartment]	3.60E-01	McKone et al. 1998
Soil material density	kg[soil] / m^3[soil]	2.60E+03	Siever 1986
Organic carbon fraction	unitless	1.66E-02	McKone et al. 1998
Vadose Zone (assumed same for all vadose zone compartments)			
Water content	volume[water] / volume[compartment]	1.60E-01	McKone et al. 1998
Air content	volume[air] / volume[compartment]	2.16E-01	McKone et al. 1998
Soil material density	kg[soil] / m^3[soil]	2.60E+03	McKone et al. 1998
Organic carbon fraction	unitless	1.28E-03	McKone et al. 1998
Ground Water (assumed same for all ground water compartments)			
Porosity	volume[total pore space] / volume[compartment]	2.00E-01	McKone et al. 1998
Solid material density in aquifer	kg[soil] / m^3[soil]	2.60E+03	McKone et al. 1998
Organic carbon fraction	unitless	1.00E-02	Schwarzenbach et al. 1993

Input Parameter	Input Units	Value[a]	Reference
Surface Water (depends on water body type - values provided have been developed for an initial simple water body scenario)			
Flush rate	flushes/year	4.31	supplied by state agency
Suspended sediment concentration	kg[sediment] / m^3[water column]	0.8E-03	Schwalen and Kiefer 1996
Evaporation of water	m^3[water] / m^2[area]-day	9.45E-05	van der Leeden et al. 1990
Current velocity	m/s	0	professional judgment
Organic carbon fraction in suspended sediments	unitless	0.02	McKone et al. 1998
Suspended sediment density	kg[sediment] / m^3[sediment]	2600	McKone et al. 1998
Boundary layer thickness above sediment	m	2.00E-02	McKone et al. 1998
Drag coefficient for water body	unitless	0.0011	Ambrose et al. 1995
Viscous sublayer thickness	m	4	Ambrose et al. 1995
pH	unitless	6.5	supplied by state agency
Chloride concentration	mg/L	56	supplied by state agency
Sediment (depends on associated water body type)			
Organic carbon fraction	unitless	2.00E-02	McKone et al. 1998
Solid material density in sediment	kg[sediment] / m^3[sediment]	2.60E+03	McKone et al. 1998
Porosity of the sediment zone	volume[total pore space] / volume[sediment compartment]	2.00E-01	McKone et al. 1998
Benthic solids concentration	kg[sediment] / m^3[sediment compartment]	2.08E+03	professional judgment

Input Parameter	Input Units	Value[a]			Reference
ABIOTIC CHEMICAL-SPECIFIC DATA (for each chemical)					
General to All Media					
		Hg(0)	**Hg(2)**	**MHg**	
Molecular weight	g/mol	2.01E+02	2.01E+02	2.16E+02	U.S. EPA 1997
Octanol-water partition coefficient (K_{ow})	L[water] / L[octanol]	4.15E+00	3.33E+00	1.70E+00	Mason et al. 1996
Melting point	°K	2.34E+02	5.50E+02	4.43E+02	CARB 1994
Water solubility	mol / m^3	3.00E-04	3.30E+02	NA	CARB 1994
Henry's Law constant	Pa-m^3 / mol	7.10E-03	7.10E-10	4.70E-07	U.S. EPA 1997
Diffusion coefficient in pure air	m^2 / day	4.78E-01	4.78E-01	4.56E-01	U.S. EPA 1997
Diffusion coefficient in pure water	m^2 / day	5.54E-05	5.54E-05	5.28E-05	U.S. EPA 1997
Surface Soil					
Methylation rate constant for Hg(2) to MHg	1/day	1.00E-03			range reported in Porvari and Verta (1995) is 2E-4 to 1E-3 /day; value is average maximum potential methylation rate constant under anaerobic conditions
Demethylation rate constant for MHg to Hg(2)	1/day	0.06			range reported in Porvari and Verta (1995) is 3E-2 to 6E-2 /day; value is average maximum potential demethylation rate constant under anaerobic conditions
Reduction rate constant for Hg(2) to Hg(0)	1/day	1.25E-05			value used for untilled surface soil (2cm), 10% moisture content, in U.S. EPA 1997; general range is (0.0013/day)*moisture content to (0.0001/day)*moisture content for forested region (Lindberg 1996; Carpi and Lindberg 1997)
Oxidation rate constant for Hg(0) to Hg(2)	1/day	1.00E-08			small default nonzero value (0 assumed in U.S. EPA 1997)
Root Zone					
Methylation rate constant for Hg(2) to MHg	1/day	1.00E-03			range reported in Porvari and Verta (1995) is 2E-4 to 1E-3 /day; value is average maximum potential methylation rate constant under anaerobic conditions
Demethylation rate constant for MHg to Hg(2)	1/day	0.06			range reported in Porvari and Verta (1995) is 3E-2 to 6E-2 /day; value is average maximum potential demethylation rate constant under anaerobic conditions

Input Parameter	Input Units	Value[a]	Reference
Reduction rate constant for Hg(2) to Hg(0)	1/day	3.25E-06	value used for tilled surface soil (20cm), 10% moisture content, in U.S. EPA 1997 (Lindberg 1996; Carpi and Lindberg, 1997)
Oxidation rate constant for Hg(0) to Hg(2)	1/day	1.00E-08	small default nonzero value (0 assumed in U.S. EPA 1997)
Vadose Zone			
Methylation rate constant for Hg(2) to MHg	1/day	1.00E-03	range reported in Porvari and Verta (1995) is 2E-4 to 1E-3 /day; value is average maximum potential methylation rate constant under anaerobic conditions
Demethylation rate constant for MHg to Hg(2)	1/day	0.06	range reported in Porvari and Verta (1995) is 3E-2 to 6E-2 /day; value is average maximum potential demethylation rate constant under anaerobic conditions
Reduction rate constant for Hg(2) to Hg(0)	1/day	3.25E-06	value used for tilled surface soil (20cm), 10% moisture content, in U.S. EPA 1997 (Lindberg 1996; Carpi and Lindberg 1997)
Oxidation rate constant for Hg(0) to Hg(2)	1/day	1.00E-08	small default nonzero value (0 assumed in U.S. EPA 1997)
Ground Water			
Methylation rate constant for Hg(2) to MHg	1/day	1.00E-03	range reported in Porvari and Verta (1995) is 2E-4 to 1E-3 /day; value is average maximum potential methylation rate constant under anaerobic conditions
Demethylation rate constant for MHg to Hg(2)	1/day	0.06	range reported in Porvari and Verta (1995) is 3E-2 to 6E-2 /day; value is average maximum potential demethylation rate constant under anaerobic conditions
Reduction rate constant for Hg(2) to Hg(0)	1/day	3.25E-06	value used for tilled surface soil (20cm), 10% moisture content, in U.S. EPA 1997 (Lindberg 1996; Carpi and Lindberg, 1997)
Oxidation rate constant for Hg(0) to Hg(2)	1/day	1.00E-08	small default nonzero value (0 assumed in U.S. EPA 1997)
Surface Water			
Methylation rate constant for Hg(2) to MHg	1/day	1.00E-03	value used in U.S. EPA 1997; range is from 1E-4 to 3E-4/day (Gilmour and Henry 1991)
Demethylation rate constant for MHg to Hg(2)	1/day	0.0130	average of range of 1E-3 to 2.5E-2/day from Gilmour and Henry (1991)

Input Parameter	Input Units	Value[a]	Reference
Reduction rate constant for Hg(2) to Hg(0)	1/day	7.50E-03	value used in U.S. EPA 1997; reported values range from less than 5E-3/day for depths greated than 17m, up to 3.5/day (Xiao et al. 1995; Vandal et al. 1995; Mason et al. 1995a; Amyot et al. 1997)
Oxidation rate constant for Hg(0) to Hg(2)	1/day	1.00E-08	small default nonzero value (0 assumed in U.S. EPA 1997)
Sediment			
Methylation rate constant for Hg(2) to MHg	1/day	1.00E-04	value used in U.S. EPA 1997; range is from 1E-5 to 1E-1/day (Gilmour and Henry 1991)
Demethylation rate constant for MHg to Hg(2)	1/day	0.0501	average of range of 2E-4 to 1E-1/day from Gilmour and Henry (1991)
Reduction rate constant for Hg(2) to Hg(0)	1/day	1.00E-06	inferred value based on presence of Hg(0) in sediment porewater (U.S. EPA 1997; Vandal et al. 1995)
Oxidation rate constant for Hg(0) to Hg(2)	1/day	1.00E-08	small default nonzero value (0 assumed in U.S. EPA 1997)
ABIOTIC FLOW DATA			
Total erosion rate from soil	kg[soil] / m^2[area]-day	2.89E-04	van der Leeden et al. 1990
Erosion rates between soil and soil	kg[soil] / m^2[area]-day	parcel-specific	professional judgment
Erosion rates between soil and surface water	kg[soil] / m^2[area]-day	parcel-specific	professional judgment
Total runoff rate from soil	m^3[water] / m^2[area]-day	1.01E-03	van der Leeden et al. 1990
Runoff rates between soil and soil	m^3[water] / m^2[area]-day	parcel-specific	professional judgment
Runoff rates between soil and surface water	m^3[water] / m^2[area]-day	parcel-specific	professional judgment
Percolation rates between soil and soil	m^3[water] / m^2[area]-day	0.2 x rainfall rate	professional judgement
Surface water flow between surface water compartments	m^3[water] / m^2[area]-day	ponds: 0 rivers: NA	professional judgment
Recharge from ground water to surface water	m^3[water] / m^2[area]-day	being developed	professional judgment

Input Parameter	Input Units	Value[a]	Reference
Deposition of suspended sediment in the water column to the sediment bed	kg[sediment] / m^2[area]-day	1.3E+01	McKone et al. 1998
Resuspension of sediment from the sediment bed to the water column	kg[sediment] / m^2[area]-day	1.00E-04	McKone et al. 1998
Burial rate of sediment in the sediment bed	kg[sediment] / m^2[area]-day	calculated assuming net solid deposition to sediment is zero	professional judgment
BIOTIC ENVIRONMENTAL SETTING DATA (for each relevant compartment)			
ANIMALS - AQUATIC			
Water Column Carnivore - Bass			
Body weight (BW)	kg	2.00E+00	professional judgment
Fraction lipid weight	unitless	1.00E-01	value from Thomann 1989
Biomass per area	km/ m^2	5.97E-04	mean of data from 11 lakes in Kelso and Johnson (1991)
Population per area	# / m^2	calculated	biomass per area divided by body weight of individual
Ventilation rate	ml / min / kg	5.00E+02	low end of range, 500-6000, in Thomann 1989
Fraction of food diet comprised of fish omnivores	unitless	1.00E+00	value set based on definition of trophic levels
Fraction of food diet comprised of fish herbivores	unitless	0.00E+00	value set based on definition of trophic levels
Fraction of food diet comprised of fish carnivores	unitless	0.00E+00	value set based on definition of trophic levels
Fraction of food diet comprised of mayfly nymph	unitless	0.00E+00	value set based on definition of trophic levels
Water Column Herbivore - Bluegill			
Body weight (BW)	kg	2.50E-02	professional judgment
Fraction lipid weight	unitless	1.00E-01	value from Thomann 1989
Biomass per area	kg / m^2	1.65E-03	based on data from 11 lakes in Kelso and Johnson (1991)
Population per area	# / m^2	calculated	biomass per area divided by body weight of individual
Ventilation rate	ml / min / kg	5.00E+02	low end of range, 500-6000, in Thomann 1989
Fraction of food diet comprised of phytoplankton (algae)	unitless	1.00E+00	value set based on definition of trophic levels

Input Parameter	Input Units	Value[a]	Reference
Fraction of food diet comprised of macrophyte	unitless	0.00E+00	value set based on definition of trophic levels
Fraction of diet_mayfly	unitless	0.00E+00	value set based on definition of trophic levels
Water Column Omnivore - Channel Catfish			
Body weight (BW)	kg	5.00E-01	professional judgment
Fraction lipid weight	unitless	0.1	value from Thomann 1989
Biomass per area	kg/ m^2	1.67E-04	mean of data from 11 lakes in Kelso and Johnson (1991)
Population per area	# / m^2	calculated	biomass per area divided by body weight of individual
Ventilation rate	ml / min / kg	500	low end of range, 500-6000, in Thomann 1989
Fraction of food diet comprised of macrophyte	unitless	0.00E+00	value set based on definition of trophic levels
Fraction of food diet comprised of mayfly nymph	unitless	0.00E+00	value set based on definition of trophic levels
Fraction of food diet comprised of omnivore	unitless	0.00E+00	value set based on definition of trophic levels
Fraction of food diet comprised of fish herbivores	unitless	1.00E+00	value set based on definition of trophic levels
Benthic Omnivore			
Body weight (BW)	kg	0.500	professional judgment
Fraction lipid weight	unitless	0.1	value from Thomann 1989
Biomass per area	kg/m^2	1.39E-03	mean of data from 11 lakes in Kelso and Johnson (1991)
Population per area	# / m^2	calculated	biomass per area divided by body weight of individual
Ventilation rate	ml / min / kg	500	low end of range, 500-6000, in Thomann 1989
Fraction of diet comprised of benthic invertebrates	unitless	1.00E+00	value set based on definition of trophic levels
Benthic Carnivore			
Body weight (BW)	kg	2.0	professional judgment
Fraction lipid weight	unitless	0.1	value from Thomann 1989
Biomass per area	kg/m^2	7.14E-04	mean of data from 11 lakes in Kelso and Johnson (1991)
Population per area	# / m^2	calculated	biomass per area divided by body weight of individual
Ventilation rate	ml / min / kg	500	low end of range, 500-6000, in Thomann 1989
Fraction of diet comprised of benthic omnivores	unitless	1.00E+00	value set based on definition of trophic levels

Input Parameter	Input Units	Value[a]	Reference
PLANTS - AQUATIC			
Macrophyte			
Biomass per area	kg/m^2	0.1	Bonar et al. 1993
Density of macrophytes	kg/m^3	1000	professional judgment
Phytoplankton - Algae			
Diameter of algae	µm	2.5	Mason et al. 1995b
Average cell density (per vol cell, not water)	$g/\mu m^3$	1.00E-12	Mason et al. 1995b, Mason et al. 1996
Algae growth rate	1/day	0.7	Hudson et al. 1994 as cited in Mason et al. 1995b
Algae density in water column	g[algae]/L[water]	2.50E-03	derived from Millard et al. 1996
Algae carbon content (fraction)	unitless	4.65E-01	APHA 1995
Algae water content (fraction)	unitless	9.00E-01	APHA 1995
ANIMALS - TERRESTRIAL			
Soil Detritivore - Earthworm			
Density per soil area, deciduous forest	kg[worm] / m^2 [area]	4.50E-02	avg of oak and beech values in Satchell 1983
Density per soil area, coniferous forest	kg[worm] / m^2 [area]	2.20E-02	pine forest in Satchell 1983
Density per soil area, grass/herb	kg[worm] / m^2 [area]	5.00E-03	avg of 0.0032 and 0.0075, range on grassland in Tennessee, Lee 1985
Density	kg[worm] / L[volume]	1.00E+00	professional judgment
Water content of worm	mass fraction	8.40E-01	U.S. EPA 1993
Soil Detritivore - Soil Arthropod			
Body weight (BW)	kg	1.31E-04	grasshopper, Porter et al. 1996
Biomass per area	kg / m^2	3.01E-04	grasshopper, Porter et al. 1996
Terrestrial Ground-Invertebrate Feeder - Black-capped Chickadee			
Body weight (BW)	kg	1.08E-02	Dunning 1993
Population per area	# / m^2	3.50E-05	avg of 0.2 and 0.3 /ha in British Columbia, Smith 1993
Soil ingestion rate	kg[soil] / kg BW-day	0.00E+00	assumed, rarely observed on ground, Smith 1993
Water_a	unitless	5.90E-02	Calder and Braun 1983
Water_b	unitless	6.70E-01	Calder and Braun 1983

Input Parameter	Input Units	Value[a]	Reference
Inhalation_a	unitless	4.09E-01	Lasiewski and Calder 1971
Inhalation_b	unitless	8.00E-01	Lasiewski and Calder 1971
Food ingestion rate	kg[food] / kg BW-day	7.40E-01	calculated from Bell 1990, Dunning 1993
Fraction of food diet comprised on plants	unitless	3.00E-01	Sample et al. 1993, Smith 1993, Martin et al. 1951
Fraction of food diet comprised of benthic invertebrates	unitless	7.00E-01	Sample et al. 1993, Smith 1993, Martin et al. 1951
Fraction excretion to soil	unitless	1.00E+00	professional judgment
Fraction excretion to water	unitless	0.00E+00	professional judgment
Semiaquatic Piscivore - Kingfisher			
Body weight (BW)	kg	1.48E-01	Dunning 1993
Population per area	# / m^2	4.00E-07	Fry and Fry 1992
Soil ingestion rate	kg[soil] / kg BW-day	0.00E+00	professional judgment
Water_a	unitless	5.90E-02	Calder and Braun 1983
Water_b	unitless	6.70E-01	Calder and Braun 1983
Inhalation_a	unitless	4.09E-01	Lasiewski and Calder 1971
Inhalation_b	unitless	8.00E-01	Lasiewski and Calder 1971
Food ingestion rate	kg[food] / kg BW-day	7.40E-02	Alexander 1977
Fraction of food diet comprised of water column herbivore	unitless	0.16	assumed based on approximate trophic levels of several consumed fish species
Fraction of food diet comprised of water column omnivore	unitless	0.16	assumed based on approximate trophic levels of several consumed fish species
Fraction of food diet comprised of benthic omnivore	unitless	0.325	assumed based on approximate trophic levels of several consumed fish species
Fraction excretion to soil	unitless	5.00E-01	professional judgment
Fraction excretion to water	unitless	5.00E-01	professional judgment
Semiaquatic Predator/Scavenger - Bald eagle			
Body weight (BW)	kg	4.74E+00	Dunning 1993
Population per area	# / m^2	1.30E-08	supplied by state agency
Soil ingestion rate	kg[soil] / kg BW-day	0.00E+00	professional judgment

Input Parameter	Input Units	Value[a]	Reference
Water_a	unitless	5.90E-02	Calder and Braun 1983
Water_b	unitless	6.70E-01	Calder and Braun 1983
Inhalation_a	unitless	4.09E-01	Lasiewski and Calder 1971
Inhalation_b	unitless	8.00E-01	Lasiewski and Calder 1971
Food ingestion rate	kg[food] / kg BW-day	7.40E-02	U.S. EPA 1995
Fraction of food diet comprised of mouse	unitless	2.30E-01	professional judgment
Fraction of food diet comprised of chickadee	unitless	1.00E-01	professional judgment
Fraction of food diet comprised of water column herbivore	unitless	0.11	assumed based on approximate trophic levels of several consumed fish species
Fraction of food diet comprised of water column omnivore	unitless	0.11	assumed based on approximate trophic levels of several consumed fish species
Fraction of food diet comprised of water column carnivore	unitless	0.11	assumed based on approximate trophic levels of several consumed fish species
Fraction of food diet comprised of benthic omnivore	unitless	0.17	assumed based on approximate trophic levels of several consumed fish species
Fraction of food diet comprised of benthic carnivore	unitless	0.17	assumed based on approximate trophic levels of several consumed fish species
Fraction excretion to soil	unitless	5.00E-01	professional judgment
Fraction excretion to water	unitless	5.00E-01	professional judgment
Semiaqautic Piscivore - Common Loon			
Body weight (BW)	kg	4.13E+00	Dunning 1993
Population per area	# / m^2	4.90E-08	W. Jakubas, Maine Dept Inland Fisheries & Wildlife
Soil ingestion rate	kg[soil] / kg BW-day	0.00E+00	professional judgment
Water_a	unitless	5.90E-02	Calder and Braun 1983
Water_b	unitless	6.70E-01	Calder and Braun 1983
Inhalation_a	unitless	4.09E-01	Lasiewski and Calder 1971
Inhalation_b	unitless	8.00E-01	Lasiewski and Calder 1971
Food ingestion rate	kg[food] / kg BW-day	2.30E-01	Barr 1996

Input Parameter	Input Units	Value[a]	Reference
Fraction of diet comprised of water column herbivore	unitless	1.00E+00	assumed based on approximate size range of fish consumed
Fraction excretion to soil	unitless	5.00E-01	professional judgment
Fraction excretion to water	unitless	5.00E-01	professional judgment
Semiaquatic Omnivore - Mallard			
Body weight (BW)	kg	1.13E+00	Nelson and Martin 1953
Population per area	# / m^2	9.30E-06	average of 0.012 and 0.174/ha, North Dakota, U.S. EPA 1993
Soil ingestion rate	kg[soil] / kg BW-day	3.30E-03	Beyer et al. 1994
Water_a	unitless	5.90E-02	Calder and Braun 1983
Water_b	unitless	6.70E-01	Calder and Braun 1983
Inhalation_a	unitless	4.09E-01	Lasiewski and Calder 1971
Inhalation_b	unitless	8.00E-01	Lasiewski and Calder 1971
Food ingestion rate	kg[food] / kg BW-day	1.00E-01	Heinz et al. 1987
Fraction of food diet comprised of plant	unitless	6.65E-01	Martin et al. 1951
Fraction of food diet comprised of benthic invertebrate	unitless	3.35E-01	professional judgment
Fraction excretion to soil	unitless	5.00E-01	professional judgment
Fraction excretion to water	unitless	5.00E-01	professional judgment
Terrestrial Predator/Scavenger - Red-tailed Hawk			
Body weight (BW)	kg	1.13E+00	North America, Dunning 1993
Population per area	# / m^2	7.00E-07	average of range 0.0034 and 0.01 for Colorado, U.S. EPA 1993
Soil ingestion rate	kg[soil] / kg BW-day	0.00E+00	professional judgment
Water_a	unitless	5.90E-02	Calder and Braun 1983
Water_b	unitless	6.70E-01	Calder and Braun 1983
Inhalation_a	unitless	4.09E-01	Lasiewski and Calder 1971
Inhalation_b	unitless	8.00E-01	Lasiewski and Calder 1971
Food ingestion rate	kg[food] / kg BW-day	1.20E-01	Preston and Beane 1993
Fraction of food diet comprised of soil arthropod	unitless	4.00E-02	approximate from Sherrod 1978
Fraction of food diet comprised of chickadee	unitless	2.57E-01	approximate from Sherrod 1978

Input Parameter	Input Units	Value[a]	Reference
Fraction of food diet comprised of mouse	unitless	3.03E-01	approximate from Sherrod 1978
Fraction of food diet comprised of short tailed shrew	unitless	2.00E-01	approximate from Sherrod 1978
Fraction of food diet comprised of vole	unitless	2.00E-01	approximate from Sherrod 1978
Fraction excretion to soil	unitless	1.00E+00	professional judgment
Fraction excretion to water	unitless	0.00E+00	professional judgment
Terrestrial Insectivore - Tree Swallow			
Body weight (BW)	kg	2.01E-02	Dunning 1993
Population per area	# / m^2	7.00E-04	De Graaf et al. 1981
Soil ingestion rate	kg[soil] / kg BW-day	0.00E+00	professional judgment
Water_a	unitless	5.90E-02	Calder and Braun 1983
Water_b	unitless	6.70E-01	Calder and Braun 1983
Inhalation_a	unitless	4.09E-01	Lasiewski and Calder 1971
Inhalation_b	unitless	8.00E-01	Lasiewski and Calder 1971
Food ingestion rate	kg[food] / kg BW-day	1.98E-01	Preston and Beane 1993
Fraction of food diet comprised of benthic invertebrate	unitless	1.00E+00	professional judgment
Fraction excretion to soil	unitless	1.00E+00	professional judgment
Fraction excretion to water	unitless	0.00E+00	professional judgment
Terrestrial Herbivore - Meadow Vole			
Body weight (BW)	kg	4.41E-02	Reich 1981
Population per area	# / m^2	6.00E-03	average of 0.011/m^2, Klaas et al. 1998, and 0.0015/m^2, Getz 1961
Soil ingestion rate	kg[soil] / kg BW-day	2.30E-03	Beyer et al. 1994
Water_a	unitless	9.90E-02	Calder and Braun 1983
Water_b	unitless	9.00E-01	Calder and Braun 1983
Inhalation_a	unitless	5.46E-01	Stahl 1967
Inhalation_b	unitless	8.00E-01	Stahl 1967
Food ingestion rate	kg[food] / kg BW-day	9.70E-02	mean for Microtus spp., Dark et al. 1983

Input Parameter	Input Units	Value[a]	Reference
Fraction of food diet comprised of plant	unitless	1.00E+00	professional judgment
Fraction excretion to soil	unitless	1.00E+00	professional judgment
Fraction excretion to water	unitless	0.00E+00	professional judgment
Terrestrial Predator/Scavenger - Long-tailed Weasel			
Body weight (BW)	kg	1.47E-01	Mumford and Whitaker 1982
Population per area	# / m^2	6.50E-06	average of 6-7/ha, Svendsen 1982
Soil ingestion rate	kg[soil] / kg BW-day	0.00E+00	professional judgment
Water_a	unitless	9.90E-02	Calder and Braun 1983
Water_b	unitless	9.00E-01	Calder and Braun 1983
Inhalation_a	unitless	5.46E-01	Stahl 1967
Inhalation_b	unitless	8.00E-01	Stahl 1967
Food ingestion rate	kg[food] / kg BW-day	7.35E-02	calc from Brown and Lasiewski 1972, Golley 1961, U.S. EPA 1993
Fraction of food diet comprised of mouse	unitless	5.00E-01	professional judgment
Fraction of food diet comprised of vole	unitless	2.50E-01	professional judgment
Fraction of food diet comprised of shrew	unitless	2.50E-01	professional judgment
Fraction excretion to soil	unitless	1.00E+00	professional judgment
Fraction excretion to water	unitless	0.00E+00	professional judgment
Semiaquatic Omnivore - Mink			
Body weight (BW)	kg	8.32E-01	Mumford and Whitaker 1982
Population per area	# / m^2	5.75E-05	avg of 0.01 and 0.1/ha for general US, U.S. EPA 1993
Soil ingestion rate	kg[soil] / kg BW-day	0.00E+00	professional judgment
Water_a	unitless	9.90E-02	Calder and Braun 1983
Water_b	unitless	9.00E-01	Calder and Braun 1983
Inhalation_a	unitless	5.46E-01	Stahl 1967
Inhalation_b	unitless	8.00E-01	Stahl 1967
Food ingestion rate	kg[food] / kg BW-day	1.40E-01	mink in captivity, Bleavins and Aulerich 1981
Fraction of food diet comprised of mouse	unitless	2.30E-01	Hamilton 1940, Sealander 1943, Korschgen 1958, Burgess and Bider 1980

Input Parameter	Input Units	Value[a]	Reference
Fraction of food diet comprised of vole	unitless	2.30E-01	Hamilton 1940, Sealander 1943, Korschgen 1958, Burgess and Bider 1980
Fraction of diet comprised of water column herbivore	unitless	7.00E-02	assumed based on approximate trophic levels of several consumed fish species
Fraction of diet comprised of water column omnivore	unitless	7.00E-02	assumed based on approximate trophic levels of several consumed fish species
Fraction of diet comprised of benthic omnivore	unitless	1.50E-01	assumed based on approximate trophic levels of several consumed fish species
Fraction of food diet comprised of benthic invertebrate	unitless	1.70E-01	Hamilton 1940, Sealander 1943, Korschgen 1958, Burgess and Bider 1980
Fraction of food diet comprised of chickadee	unitless	8.00E-02	Hamilton 1940, Sealander 1943, Korschgen 1958, Burgess and Bider 1980
Fraction excretion to soil	unitless	5.00E-01	professional judgment
Fraction excretion to water	unitless	5.00E-01	professional judgment
Terrestrial Omnivore - White-footed Mouse			
Body weight	kg	2.12E-02	North America, Silva and Downing 1995
Population per area	# / m^2	3.15E-03	average of range 6-57/ha, Wolff 1985
Soil ingestion rate	kg[soil] / kg BW-day	2.00E-02	Beyer et al. 1994
Water_a	unitless	9.90E-02	Calder and Braun 1983
Water_b	unitless	9.00E-01	Calder and Braun 1983
Inhalation_a	unitless	5.46E-01	Stahl 1967
Inhalation_b	unitless	8.00E-01	Stahl 1967
Food ingestion rate	kg[food] / kg BW-day	1.51E-01	Green and Millar 1987
Fraction of food diet comprised of worm	unitless	5.00E-01	professional judgment
Fraction of food diet comprised of plant	unitless	5.00E-01	professional judgment
Fraction excretion to soil	unitless	5.00E-01	professional judgment
Fraction excretion to water	unitless	5.00E-01	professional judgment
Terrestrial Herbivore - White-tailed Deer			
Body weight (BW)	kg	7.48E+01	Silva and Downing 1995
Population per area	# / m^2	4.60E-05	12-80/ha, forest avg from Smith 1987, Torgerson and Porath 1984,Wishart 1984,Cook 1984

Input Parameter	Input Units	Value[a]	Reference
Soil ingestion rate	kg[soil] / kg BW-day	1.00E-03	Beyer et al. 1994
Water_a	L[water] / kg BW-day	9.90E-02	Calder and Braun 1983
Water_b	L[water] / kg BW-day	9.00E-01	Calder and Braun 1983
Inhalation_a	unitless	5.46E-01	Stahl 1967
Inhalation_b	unitless	8.00E-01	Stahl 1967
Food ingestion rate	kg[food] / kg BW-day	5.00E-02	Mautz et al. 1976
Fraction of food diet comprised of plant	unitless	1.00E+00	professional judgment
Fraction excretion to soil	unitless	1.00E+00	professional judgment
Fraction excretion to water	unitless	0.00E+00	professional judgment
Semiaquatic Omnivore - Raccoon			
Body weight (BW)	kg	6.35E+00	Lotze and Anderson 1979
Population per area	# / m^2	2.15E-05	average of range 0.023 to 0.2/ha, Lotze and Anderson 1979
Soil ingestion rate	kg[soil] / kg BW-day	9.40E-02	Beyer et al. 1994
Water_a	L[water] / kg BW-day	9.90E-02	Calder and Braun 1983
Water_b	L[water] / kg BW-day	9.00E-01	Calder and Braun 1983
Inhalation_a	unitless	5.46E-01	Stahl 1967
Inhalation_b	unitless	8.00E-01	Stahl 1967
Food ingestion rate	kg[food] / kg BW-day	5.20E-01	calc from Teubner and Barrett 1983, Tyson 1950, U.S. EPA 1993
Fraction of food diet comprised of benthic invertebrate	unitless	6.90E-01	representing molluscs, crustacea, Tyson 1950
Fraction of diet comprised of water column herbivore	unitless	3.00E-02	assumed based on approximate trophic levels of several consumed fish species
Fraction of diet comprised of water column omnivore	unitless	3.00E-02	assumed based on approximate trophic levels of several consumed fish species
Fraction of diet comprised of benthic omnivore	unitless	4.00E-02	assumed based on approximate trophic levels of several consumed fish species
Fraction of food diet comprised of worm	unitless	2.10E-01	coastal mudflats of SW Washington, Tyson 1950
Fraction excretion to soil	unitless	5.00E-01	professional judgment
Fraction excretion to water	unitless	5.00E-01	professional judgment

Input Parameter	Input Units	Value[a]	Reference
Terrestrial Ground-Invertebrate Feeder - Short-tailed Shrew			
Body weight (BW)	kg	2.20E-02	0.015-0.029 kg reported for Manitoba, Silva and Downing 1995
Population per area	# / m^2	6.10E-04	average value for Maine, A. Fuller, U. Maine
Soil ingestion rate	kg[soil] / kg BW-day	6.11E-02	Talmage and Walton 1993
Water_a	L[water] / kg BW-day	9.90E-02	Calder and Braun 1983
Water_b	L[water] / kg BW-day	9.00E-01	Calder and Braun 1983
Inhalation_a	unitless	5.46E-01	Stahl 1967
Inhalation_b	unitless	8.00E-01	Stahl 1967
Food ingestion rate	kg[food] / kg BW-day	4.70E-01	Barrett and Stueck 1976
Fraction of food diet comprised of worm	unitless	5.85E-01	Whitaker and Ferraro 1963, slugs represented by earthworms, Ithaca, NY
Fraction of food diet comprised of soil arthropod	unitless	4.15E-01	Whitaker and Ferraro 1963
Fraction excretion to soil	unitless	1.00E+00	professional judgment
Fraction excretion to water	unitless	0.00E+00	professional judgment
PLANTS - TERRESTRIAL			
Deciduous Forest Leaf			
Water content	unitless	8.00E-01	Paterson et al. 1991
Lipid content	kg/kg wet weight	2.24E-03	European beech, Riederer 1995
Correction exponent, octanol to lipid	unitless	7.60E-01	from roots, Trapp 1995
Volume of wet leaf weight per unit area	m^3 / m^2	calculated	calculated
Density of wet leaf	kg / m^3	8.20E+02	Paterson et al. 1991
Mass of leaf per unit area	kg[fresh leaf] / m^2[area]	6.00E-01	calc from LAI[c], leaf thickness (Simonich and Hites 1994), density of wet foliage
Dry mass of leaf per unit area	kg[dry leaf] / m^2[area]	calculated	calculated
Leaf wetting factor	m	3.00E-04	1E-04 to 6E-04 for different crops and elements, Muller and Prohl 1993
1-sided leaf area index[c]	m^2[leaf] / m^2[area]	3.40E+00	Harvard Forest, dom. red oak and red maple, http://cdiac.esd.ornl.gov/

Input Parameter	Input Units	Value[a]	Reference
Vegetation attenuation factor (to calc interception fraction)	unitless	2.90E+00	grass/hay, Baes et al. 1984
Particle washoff rate constant	1 / day	5.76E+01	conifer leaves, McCune and Lauver 1986
Length of leaf	m	1.00E-01	professional judgment
Coniferous Forest Leaf			
Water content	unitless	8.00E-01	Paterson et al. 1991
Lipid content	kg/kg wet weight	2.24E-03	European beech, Riederer 1995
Correction exponent, octanol to lipid	unitless	7.60E-01	from roots, Trapp 1995
Volume of wet leaf weight per unit area	m^3 / m^2	calculated	calculated
Density of wet leaf	kg / m^3	8.20E+02	Paterson et al. 1991
Mass of leaf per unit area	kg[fresh leaf] / m^2[area]	2.00E+00	calc from LAI[c], leaf thickness (Simonich and Hites 1994), density of wet foliage
Dry mass of leaf per unit area	kg[dry leaf] / m^2[area]	calculated	calculated
Leaf wetting factor	m	3.00E-04	1E-04 to 6E-04 for different crops and elements, Muller and Prohl 1993
1-sided leaf area index[c]	m^2[leaf] / m^2[area]	5.00E+00	rep. value for conifers, Ned Nikolov, Oak Ridge National Lab
Vegetation attenuation factor (to calc interception fraction)	unitless	2.90E+00	grass/hay, Baes et al. 1984
Particle washoff rate constant	1 / day	5.76E+01	conifer leaves, McCune and Lauver 1986
Length of leaf	m	1.00E-02	professional judgment
Herb/Grassland Leaf			
Water content	unitless	8.00E-01	Paterson et al. 1991
Lipid content	kg/kg wet weight	2.24E-03	European beech, Riederer 1995
Correction exponent, octanol to lipid	unitless	7.60E-01	from roots, Trapp 1995
Volume of wet leaf weight per unit area	m^3 / m^2	calculated	calculated
Density of wet leaf	kg / m^3	8.20E+02	Paterson et al. 1991
Mass of leaf per unit area	kg[fresh leaf] / m^2[area]	1.00E+00	calc from LAI[c] and Maddelena 1998
Dry mass of leaf per unit area	kg[dry leaf] / m^2[area]	calculated	professional judgment

Input Parameter	Input Units	Value[a]	Reference
Leaf wetting factor	m	3.00E-04	1E-04 to 6E-04 for different crops and elements, Muller and Prohl 1993
1-sided leaf area index[c]	m^2[leaf] / m^2[area]	5.00E+00	range for old field about 4 to 6, R. J. Luxmoore, Oak Ridge National Lab.
Vegetation attenuation factor (to calc interception fraction)	unitless	2.90E+00	grass/hay, Baes et al. 1984
Particle washoff rate constant	1 / day	5.76E+01	conifer leaves, McCune and Lauver 1986
Length of leaf	m	5.00E-02	professional judgment
Root – Nonwoody Only			
Wet density of root	kg / m^3	8.30E+02	soybean, Paterson et al. 1991
Water content of root	unitless	0.8	professional judgment
Lipid content of root	kg/kg wet weight	1.10E-02	calculated
Correction exponent for the differences between octanol and lipids	unitless	0.76	Trapp 1995
Total volume of dry roots in domain per unit area	m^3 / m^2	calculated	calculated
Areal density grass/herb	kg / m^2	1.40E+00	temperate grassland , Jackson et al. 1996
Stem – Nonwoody Only			
Density	g/cm^3	9.00E-01	professional judgment
Water content of stem	unitless	8.00E-01	Paterson et al. 1991
Lipid content	kg/kg wet weight	2.24E-03	leaves of European beech, Riederer 1995
Volume of wet stem per unit area	m^3/m^2	10% of volume of foliage	professional judgment
Density of phloem fluid	kg/m^3	1.00E+03	professional judgment
Density of xylem fluid	kg/cm^3	9.00E+02	professional judgment
Volume of wet weight in domain per unit area	m^3/m^2	0.4 times volume of foliage per unit area	professional judgment
Flow rate of transpired water per leaf area	m^3[water]/m^2 [leaf]	4.80E-03	Crank et al. 1981
Fraction of transpiration flow rate that is phloem rate	unitless	0.05	Paterson et al. 1991
Correction exponent between foliage lipids and octanol	unitless	7.60E-01	Trapp 1995

Input Parameter	Input Units	Value[a]			Reference
TEMPORAL ENVIRONMENTAL SETTING DATA					
Site-specific					
Day of first frost	unitless	Sept 30			Hampden, ME, value for northeastern US
Day of last frost	unitless	May 12			Hampden, ME, value for northeastern US
Deciduous Forest and Grassland					
Litterfall begin date	unitless	Day 273 (Sept 30)			assumed equivalent to date of first frost (W. W. Hargrove, U. of Tenn., pers. comm., 2/99)
Litterfall end date	unitless	Day 302 (Oct 29)			professional judgment
Uptake by leaf, end date	unitless	Day 273 (Sept 30)			assumed equivalent to date of first frost (W. W. Hargrove, U. of Tenn., pers. comm., 2/99)
Uptake by root (herb/grass), end date	unitless	Day 273 (Sept 30)			assumed equivalent to date of first frost (W. W. Hargrove, U. of Tenn., pers. comm., 2/99)
LAI[c] = 0, date	unitless	Day 273 (Sept 30)			assumed equivalent to date of first frost (W. W. Hargrove, U. of Tenn., pers. comm., 2/99)
Uptake by leaf, begin date	unitless	Day 132 (May 12)			assumed equivalent to date of last frost (W. W. Hargrove, U. of Tenn., pers. comm., 2/99)
LAI[c] = default value, date	unitless	Day 132 (May 12)			assumed equivalent to date of last frost (W. W. Hargrove, U. of Tenn., pers. comm., 2/99)
Litterfall rate constant	1/ day	1.50E-01			assumes 99% of leaves have fallen during 30 days of litterfall
Coniferous Forest					
Uptake by leaf, end date	unitless	Day 303 (Oct 30)			assumed to be one month after date of first frost
Uptake by leaf, end date	unitless	Day 102 (Apr 12)			assumed to be one month before date of last frost
Litterfall rate constant	1/ day	being developed			2-10 yr turnover, WM Post, Oak Ridge Natl
BIOTIC CHEMICAL-SPECIFIC DATA					
ANIMALS - AQUATIC					
Water-column Carnivore - Bass					
		Hg(0)	**Hg(2)**	**MHg**	
Carnivore-omnivore partition coefficient	kg/kg	NA	8.81E-02	3.50E+00	1 trophic level transfer, Hg(2) - Watras and Bloom 1992, MHg - Lindqvst et al. 1991
Alpha for carnivore	unitless	NA	9.50E-01	9.50E-01	professional judgment
t_{alpha}	day	NA	4.38E+04	4.38E+04	derived from Lindqvist et al. 1991
Assimilation efficiency	percent	NA	9	90	Hg(2): Trudel and Rasmussen 1997; MHg: Odin et al. 1995

Input Parameter	Input Units	Value[a]			Reference
Water-column Herbivore - Bluegill					
		Hg(0)	**Hg(2)**	**MHg**	
Herbivore-algae partition coefficient	kg/kg	NA	1.41E-01	1.20E+01	zooplankton intermediate trophic level, Hg(2) - Watras and Bloom 1992; MHg - Lindqvst et al. 1991
Alpha for herbivore	unitless	NA	9.50E-01	9.50E-01	professional judgment
t_{alpha}	day	NA	5.48E+02	5.48E+02	derived from Lindqvist et al. 1991
Assimilation efficiency	percent	NA	9	90	Hg(2): Trudel and Rasmussen 1997; MHg: Odin et al. 1995
Water-column Omnivore - Channel Catfish					
		Hg(0)	**Hg(2)**	**MHg**	
Omnivore-herbivore partition coefficient	kg/kg	NA	8.81E-02	3.50E+00	zooplankton to planktiverous fish, Hg(2) - Watras and Bloom 1992; MHg - Lindqvst et al. 1991
Alpha for omnivore	unitless	NA	9.50E-01	9.50E-01	professional judgment
t_{alpha}	days	NA	1.46E+03	1.46E+03	derived from Lindqvist et al. 1991
Assimilation efficiency	percent	NA	9	90	Hg(2): Trudel and Rasmussen 1997; MHg: Odin et al. 1995
Benthic Invertebrate (represented by Mayfly)					
		Hg(0)	**Hg(2)**	**MHg**	
Benthic invertebrate-sediment partition coefficient	kg/kg	NA	8.24E-02	5.04E+00	Hg(0) - assumed based on Hg(2) value; Hg(2) and MHg - Saouter et al. 1991
Alpha for omnivore	unitless	NA	9.50E-01	9.50E-01	professional judgment
t_{alpha}	days	NA	1.40E+01	1.40E+01	experiment duration from Saouter 1991
Benthic Carnivore (represented by Largemouth Bass)					
Carnivore-omnivore partition coefficient	kg/kg	NA	8.81E-02	3.50E+00	zooplankton to planktiverous fish, Hg(2) - Watras and Bloom 1992; MHg - Lindqvst et al. 1991
Alpha for omnivore	unitless	NA	9.50E-01	9.50E-01	professional judgment
t_{alpha}	day	NA	4.38E+04	4.38E+04	derived from Lindqvist et al. 1991
Assimilation efficiency	percent	NA	9	90	Hg(2): Trudel and Rasmussen 1997; MHg: Odin et al. 1995
Benthic Omnivore (represented by Channel Catfish)					
		Hg(0)	**Hg(2)**	**MHg**	
Omnivore-invertebrate partition coefficient	kg]/kg	NA	8.81E-02	3.50E+00	zooplankton to planktiverous fish, Hg(2) - Watras and Bloom 1992; MHg - Lindqvst et al. 1991
Alpha for omnivore	unitless	NA	9.50E-01	9.50E-01	professional judgment
t_{alpha}	day	NA	1.46E+03	1.46E+03	derived from Lindqvist et al. 1991
Assimilation efficiency	percent	NA	8	80	Hg(2): Trudel and Rasmussen 1997; MHg: Odin et al. 1995

Input Parameter	Input Units	Value[a]			Reference
PLANTS - AQUATIC					
Macrophyte					
		Hg(0)	**Hg(2)**	**MHg**	
Macrophyte-water partition coefficient	L/g	NA	8.83E-01	4.40E+00	Elodea densa, Ribeyre and Boudou 1994
Alpha for macrophyte	unitless	NA	9.50E-01	9.50E-01	professional judgment
t_{alpha}	days	NA	1.80E+01	1.80E+01	experiment duration from Ribeyre and Boudou 1994
Phytoplankton - Algae					
		Hg(0)	**Hg(2)**	**MHg**	
D_{ow}	unitless	NA	depends on pH and Cl conc	depends on pH and Cl conc	look-up table of pH and Cl concentrations derived from graph in Mason et al. 1996
Uptake rate	μm^{-2}-d^{-1}-L	NA	4.00E-11	7.07E-11	assumes radius = 2.5mm, Mason et al. 1995b, Mason et al. 1996
ANIMALS - TERRESTRIAL					
Soil Detritivore - Earthworm					
		Hg(0)	**Hg(2)**	**MHg**	
Earthworm-soil partitition coefficient, dry	mg/kg per mg/kg	NA	3.60E-01	3.60E-01	Bull et al. 1977
t_{alpha} for worm ↔ soil	day	2.10E+01	2.10E+01	2.10E+01	assumed same as earthworms, Janssen et al. 1997
Alpha for worm ↔ soil	unitless	9.50E-01	9.50E-01	9.50E-01	specified
Soil Detritivore - Soil Arthropod					
		Hg(0)	**Hg(2)**	**MHg**	
Arthropod-soil partition coefficient	kg/kg wet weight	NA	4.60E-01	2.90E+00	Hg(2) - median from Talmage and Walton 1993; MHg - median from Nuorteva and Nuorteva 1982
t_{alpha} for arthropod ↔ soil	day	2.10E+01	2.10E+01	2.10E+01	assumed same as earthworms, Janssen et al. 1997
Alpha for arthropod ↔ soil	unitless	9.50E-01	9.50E-01	9.50E-01	professional judgment
Terrestrial Ground-Invertebrate Feeder - Black-capped Chickadee					
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00			professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02			calculated from rats in Takeda and Ukita 1970

Input Parameter	Input Units	Value[a]	Reference
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Semiaquatic Piscivore - Kingfisher			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment

Input Parameter	Input Units	Value[a]	Reference
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Semiaquatic Predator/Scavenger - Bald Eagle			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)

Input Parameter	Input Units	Value[a]	Reference
Semiaquatic Piscivore - Common Loon			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Semiaquatic Omnivore - Mallard			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment

Input Parameter	Input Units	Value[a]	Reference
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Terrestrial Predator/Scavenger - Red-tailed Hawk			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965

Input Parameter	Input Units	Value[a]	Reference
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Terrestrial Insectivore - Tree Swallow			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Terrestrial Herbivore - Meadow Vole			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970

Input Parameter	Input Units	Value[a]	Reference
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Terrestrial Herbivore - Long-tailed Vole			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment

Input Parameter	Input Units	Value[a]	Reference
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Terrestrial Predator/Scavenger - Long-tailed Weasel			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)

Input Parameter	Input Units	Value[a]	Reference
Semiaquatic Omnivore - Mink			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation of Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation of Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation of MHg	unitless	0.75	assume same as value of Hg(0)
Terrestrial Omnivore - White-footed Mouse			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment

Input Parameter	Input Units	Value[a]	Reference
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Terrestrial Herbivore - Mule Deer/Black-tailed Deer			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965

Input Parameter	Input Units	Value[a]	Reference
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Terrestrial Herbivore - White-tailed Deer			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Semiaquatic Omnivore - Raccoon			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970

Input Parameter	Input Units	Value[a]	Reference
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00	professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75	human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4	value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75	assume same as value of Hg(0)
Terrestrial Ground-Invertebrate Feeder - Short-tailed Shrew			
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+00	professional judgment
First-order transformation rate constant for MHg→Hg(2)	1/day	9.00E-02	calculated from rats in Takeda and Ukita 1970
First-order transformation rate constant for Hg(0)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00	professional judgment
First-order transformation rate constant for Hg(2)→Hg(0)	1/day	0.00E+00	professional judgment

Input Parameter	Input Units	Value[a]			Reference
First-order transformation rate constant for MHg→Hg(0)	1/day	0.00E+00			professional judgment
Assimilation efficiency for inhalation for Hg(0)	unitless	0.75			human, ATSDR 1997, Teisinger and Fiserova-Bergova 1965
Assimilation efficiency for inhalation for Hg(2)	unitless	0.4			value for dog, U.S. EPA 1997
Assimilation efficiency for inhalation for MHg	unitless	0.75			assume same as value of Hg(0)
PLANTS - TERRESTRIAL					
Leaf					
First-order transformation rate constant for Hg(0)→Hg(2)	1/day	1.00E+06			value used for rate constants that are judged to be close to instantaneous
First-order transformation rate constant for Hg(2)→MHg	1/day	0.00E+00			assumed from Gay 1975, Bache et al. 1973, Lindberg pers comm
First-order transformation rate constant for MHg →Hg(2)	1/day	3.00E-02			calc from Bache et al. 1973
Washout ratio Hg(2) vapor	unitless	1.60E+06			U.S. EPA 1997 based on Petersen et al. 1995
Washout ratio Hg(0) vapor	unitless	1.20E+03			U.S. EPA 1997 based on Petersen et al. 1995
Washout ratio Hg particulate	unitless	5.00E+05			U.S. EPA 1997 based on Petersen et al. 1995
Root					
		Hg(0)	**Hg(2)**	**MHg**	
Alpha for root ↔ root-zone soil	unitless	9.50E-01	9.50E-01	9.50E-01	professional judgment
t_{alpha}	day	NA	2.10E+01	2.10E+01	professional judgment
Dry root/root-zone-soil partition coefficient	mg/kg per mg/kg	NA	9.00E-01	6.00E+00	Hg(2) - geom mean Leonard et al. 1998, John 1972, Hogg et al. 1978; MHg - assumed, based on Hogg et al. 1978
Stem					
Transpiration stream concentration factor	kg/m^3 per kg/m^3	0	0.2	0.5	calculation from Norway spruce, Scots pine, Bishop et al. 1998

Input Parameter	Input Units	Value[a]	Reference
Leaf Surface			
Transfer factor from leaf to leaf surface (Hg)	1/day	2.00E-03	calculated (1% of transfer factor from leaf surface to leaf)
Transfer factor from leaf surface to leaf (Hg particulate)	1/day	2.00E-01	professional judgment

[a] NA = not applicable, parameter does not apply to this species of mercury
[b] VE = volume element
[c] LAI = leaf area index

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