# Appendix D
# TABLES OF TRIM.FaTE INPUT PARAMETERS

This appendix contains the following sets of tables listing and describing the input parameters used in TRIM.FaTE:

- non-chemical-dependent parameters for abiotic compartment types;
- non-chemical-dependent parameters for biotic compartment types;
- chemical-dependent (i.e., value varies by chemical) parameters independent of compartment type;
- chemical-dependent parameters for abiotic compartment types;
- chemical-dependent parameters for biotic compartment types; and
- source, meteorological, and other input parameters.

For each parameter listed, the parameter name and symbol, exact TRIM.FaTE code name, input units, and a brief description are given; for chemical-specific parameters, the applicable chemicals (*e.g.* , all, organics, mercury) also are given. Values for parameters are not listed here, but the values used should be documented for individual model applications.

Within the framework of the TRIM.FaTE computer model, several different kinds of "properties" are defined and used. The input parameters described in this appendix fall into the following categories of TRIM.FaTE properties:

- compartment properties (includes by far the largest number of input parameters);
- volume element (VE) properties;
- link properties;
- chemical properties;
- source properties; and
- scenario properties.

In the following tables, the property type is identified for all input parameters that are not compartment properties.

This appendix is intended to document only input parameters that are TRIM.FaTE computer model properties, *i.e.,* those parameters for which a user needs to supply a value (or confirm that an existing TRIM.FaTE library value is appropriate) in order to apply TRIM.FaTE. There are many other parameters, described throughout this Technical Support Document (TSD), that are calculated from these inputs and used in various chains of equations in the model. These intermediate parameters are not listed in the following tables, but they are described in the other parts of this document.

In addition to the input parameters listed here, the transfer factor algorithms and other equations described in the body of this document also include some parameters for which the user may want to set different values (e.g., gill assimilation efficiency in fish, or "overall $K_{ow}$" ($D_{ow}$) in surface water). Although these parameters are considered part of the TRIM.FaTE algorithms/equations, rather than TRIM.FaTE properties, they and the algorithms/equations themselves are available to the user to modify as appropriate and scientifically defensible for the application at hand. These parameters are described along with the transfer factor algorithms and other equations in the other parts of this document, and are not listed in this appendix.

Finally, for a TRIM.FaTE application, “off-line” calculations generally are needed to develop some of the input parameters listed in these tables (e.g., meteorological data preprocessing, calculation of surface water flows, calculation of runoff fractions for overland flow). Inputs for such “off-line” calculations, which may vary considerably across model applications, are not listed in this appendix.

Note that the units listed in these tables are the units in which model input values need to be expressed. In a few cases, these computer model input units do not match the units used for the same parameter in equations and derivations in the other parts of this TSD. In such cases, there are internal units conversions in the computer model that account for the differences.

For most of the input parameters listed in the following tables, the symbol used in the other parts of this TSD is included. For a few input parameters (e.g., initial concentration of a chemical, boundary concentration of a chemical), no symbol is included because no symbol is used in the other parts of this TSD.

## Non-Chemical-Dependent -- Abiotic

**Air Compartment Type**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| Atmospheric dust particle load ($D_L$) | DustLoad | kg[dust particles]/$m^3$[air compartment] | Concentration of atmospheric dust particles in the air compartment |
| Density of air ($\rho_a$) | AirDensity_g_cm3 | $g/cm^3$ | Mass of air per unit volume of air |
| Density of dust particles ($\rho_p$) | DustDensity | kg[dust particles]/$m^3$[dust particles] | Mass of atmospheric particulate per unit volume of atmospheric particulate |
| Fraction organic matter on particulates ($f_{om}$) | FractionOrganicMatteronParticulates | unitless (wet wt) | Mass fraction of air particulates that is organic material |
| Height [VE Property][a] | top, bottom[a] | m | Height (i.e., vertical dimension) of the air volume element |
| Particulate washout ratio ($w_r$) | WashoutRatio | $m^3$[air]/$m^3$[rain] | Precipitation scavenging ratio for particles in air (ratio of concentration of particles in rain to concentration of particles in air); used in estimating wet deposition of particles |

[a] Height of air volume elements is set in TRIM.FaTE using two properties named "top" and "bottom."

# Non-Chemical-Dependent -- Abiotic

**Soil Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| **Surface Soil Compartment Type** | | | |
| Air content ($\epsilon_{Ss}$)[a] | VolumeFraction_vapor | volume[air]/volume[compartment] | Volumetric pore space occupied by air in surface soil compartment (fraction of total volume that is air) |
| Average vertical velocity of water (percolation) ($V_i$)[b] | AverageVerticalVelocity | m/day | Average speed of water movement in downward vertical direction through soil column |
| Boundary layer thickness above surface soil ($\delta_{Ss}$) | AirSoilBoundaryThickness | m | Boundary layer thickness above surface soil |
| Density of soil solids (dry weight) ($\rho$)[a] | rho | kg[soil]/$m^3$[soil] | Dry soil density (or dry weight of surface soil particles per unit volume of surface soil particles) |
| Depth [VE Property] ($d_{Ss}$)[c] | top, bottom[c] | m | Depth (i.e., vertical dimension) of the surface soil volume element |
| Erosion fraction ($f_{erosion}$(Ssi → Ssj)) [Link property] | FractionofTotalErosion | unitless | Fraction of total eroded soil mass moving from a given sending compartment to a given receiving compartment or sink |
| Fraction of area available for erosion ($f_{avail\_erosion}$) | Fractionofareaavailableforerosion | $m^2$[area available]/$m^2$[total] | Fraction of the total surface area for which erosion can occur |
| Fraction of area available for runoff ($f_{avail\_runoff}$) | FractionofAreaAvailableforRunoff | $m^2$[area available]/$m^2$[total] | Fraction of the total surface area for which runoff can occur |
| Fraction of area available for vertical diffusion ($f_A$) | Fractionofareaavailableforverticaldiffusion | $m^2$[area available]/$m^2$[total] | Fraction of the total surface area for which vertical diffusion can occur |
| Organic carbon fraction ($f_{oc}$) | OrganicCarbonContent | kg [organic carbon]/kg[soil wet wt] | Organic carbon mass fraction for surface soil |
| Runoff fraction ($f_{runoff}$(Ssi → Ssj)) [Link property] | FractionofTotalRunoff | unitless | Fraction of total runoff volume moving from a given sending compartment to a given receiving compartment or sink |
| Total erosion rate *(erosion)* [b] | TotalErosionRate_kg_m2_day | kg[soil solids]/$m^2$[surface soil]-day | Mass of eroded surface soil particles per unit surface area per day |
| Total runoff rate *(runoff)* [b] | TotalRunoffRate_m3_m2_day | $m^3$[water]/$m^2$[surface soil]-day | Volume of liquid runoff from surface soil per unit surface area per day |

## Non-Chemical-Dependent -- Abiotic

**Soil Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| Water content ($\theta_{Ss}$)[a] | VolumeFraction_Liquid | volume[water]/volume[compartment] | Volumetric pore space occupied by water in surface soil compartment (fraction of total volume that is water) |
| **Root Zone Soil Compartment Type** | | | |
| Air content ($\epsilon_{Sr}$)[a] | VolumeFraction_vapor | volume[air]/volume[compartment] | Volumetric pore space occupied by air in root zone soil compartment (fraction of total volume that is air) |
| Average vertical velocity of water (percolation) ($V_i$)[b] | AverageVerticalVelocity | m/day | Average speed of water movement in vertical direction through soil column (downward) |
| Density of soil solids (dry weight) ($\rho$)[a] | rho | kg[soil]/$m^3$[soil] | Dry soil density (or dry weight of root zone soil particles per unit volume of root zone soil particles) |
| Depth [VE Property] ($d_{Sr}$)[c] | top, bottom[c] | m | Depth (i.e., vertical dimension) of the root zone soil volume element |
| Organic carbon fraction ($f_{oc}$) | OrganicCarbonContent | kg [organic carbon]/kg [soil wet wt] | Organic carbon mass fraction for root zone soil |
| Water content ($\theta_{Sr}$)[a] | VolumeFraction_Liquid | volume[water]/volume[compartment] | Volumetric pore space occupied by water in root zone soil compartment (fraction of total volume that is water) |
| **Vadose Zone Soil Compartment Type** | | | |
| Air content ($\epsilon_{Sv}$)[a] | VolumeFraction_vapor | volume[air]/volume[compartment] | Volumetric pore space occupied by air in vadose zone soil compartment (fraction of total volume that is air) |
| Average vertical velocity of water (percolation) ($V_i$)[b] | AverageVerticalVelocity | m/day | Average speed of water movement in vertical direction through soil column (downward) |
| Density of soil solids (dry weight) ($\rho$)[a] | rho | kg[soil]/$m^3$[soil] | Dry soil density (or dry weight of vadose zone soil particles per unit volume of vadose zone soil particles) |
| Depth [VE Property] ($d_{Sv}$)[c] | top, bottom[c] | m | Depth (i.e., vertical dimension) of the vadose zone soil volume element |
| Organic carbon fraction ($f_{oc}$) | OrganicCarbonContent | kg [organic carbon]/kg [soil wet wt] | Organic carbon mass fraction for vadose zone soil |

## Non-Chemical-Dependent -- Abiotic

**Soil Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| Water content ($\theta_{Sv}$)[a] | VolumeFraction_Liquid | volume[water]/volume[compartment] | Volumetric pore space occupied by water in vadose zone soil compartment (fraction of total volume that is water) |
| **Ground Water Compartment Type** | | | |
| Depth [VE Property][c] | top, bottom[c] | m | Depth (i.e., vertical dimension) of the ground water volume element |
| Organic carbon fraction ($f_{oc}$) | OrganicCarbonContent | kg [organic carbon]/kg [soil wet wt] | Organic carbon mass fraction for ground water |
| Porosity ($\Phi$) | Porosity | volume[total pore space]/volume[compartment] | Ratio of pore space volume to total ground water compartment volume |
| Recharge rate to surface water *(recharge)* [Link property] | RechargeRate | $m^3$[water]/$m^2$[area]-day | Volume of ground water moving into surface water per unit interfacial area per day |
| Solid material density in aquifer (ρ) | rho | kg[soil]/$m^3$[soil] | Dry particle density (or dry weight of solid material in ground water compartment per unit volume of solid material in ground water compartment) |

[a]Interdependent parameters - user is responsible for making sure input values are consistent (also interdependent with soil bulk density, which is not an input parameter in TRIM.FaTE but for which data are often available).

[b]Interdependent parameters with precipitation - user is responsible for making sure input values are consistent.

[c]Set using the volume element properties named "top" and "bottom."

## Non-Chemical-Dependent -- Abiotic

**Surface Water Compartment Type**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| Algae carbon content (fraction) ($AI_{TOC}$) | AlgaeCarbonContentDryWt | g[carbon]/g[algae dry wt] | Mass fraction of algae that is carbon (dry wt basis) |
| Algae density in water column (AC) | AlgaeDensityinWaterColumn_g_L | g[algae wet wt]/L[water] | Mass of algae per unit volume of surface water |
| Algae growth rate constant (μ) | AlgaeGrowthRate | 1/day | First-order rate constant for increase of algae mass |
| Algae radius (R) | AlgaeRadius | um | Average size of algae cell |
| Algae water content (fraction) ($fW_{Algae}$) | AlgaeWaterContent | unitless | Mass fraction of algae that is water |
| Average algae cell density (per vol cell, not water) ($\rho_{Algae}$) | AlgaeDensity_g_m3 | g[algae]/$m^3$[algae] | Weight of algae per unit volume of algae cells |
| Boundary layer thickness above sediment ($\delta_{Sed}$) | BoundaryLayerThicknessAboveSediment | m | Thickness of surface water above sediment within which molecular diffusion between media can be significant (defines boundary between the well mixed portion, where turbulent mixing is rapid and continuous, and the stable portion at the very edge of the interface) |
| Bulk water flow (flow) [Link property][a,b,c] | BulkWaterFlowRate_Volumetric | $m^3$[water]/day | Volume of water movement per unit time across a link (i.e., at a compartment-compartment interface) |
| Chloride concentration | ChlorideConcentration_mg_L | mg/L | Concentration of chloride ion in surface water compartment |
| Chlorophyll concentration (CC) | ChlorophyllConcentration_mg_L | mg[chlorophyll]/L[water] | Concentration of chlorophyll in surface water compartment |
| Current velocity (μ)[c,d] | CurrentVelocity | m/s | Average speed of moving water in flowing surface water compartments |
| Depth ($d_W$) [VE property][c,e] | top, bottom[e] | m | Depth (i.e., vertical dimension) of the surface water volume element |
| Dispersion coefficient for exchange between surface water compartments (DSPij) [Link property][a] | DiffusiveExchangeCoefficient | $m^2$/day | Coefficient used to calculate dispersive transport between two horizontally adjacent surface water compartments |

## Non-Chemical-Dependent -- Abiotic

**Surface Water Compartment Type**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| Dimensionless viscous sublayer thickness ($\lambda_2$) | DimensionlessViscousSublayerThickness | unitless | Parameter used in calculating gas and liquid phase transfer coefficients, which are used in calculating volatilization transfers between surface water and air |
| Distance between midpoints ($L_{ij}$) [Link property][a] | DistanceBetweenMidpoints | m | Linear distance between the midpoints of two connected surface water compartments; used as characteristic mixing length for dispersion calculations |
| Drag coefficient for water body ($C_d$) | DragCoefficient | unitless | Coefficient used to calculate the shear velocity of wind, which is used in calculating volatilization transfers between surface water and air |
| Flush rate *(flushes/yr)* [f] | Flushes_per_year | 1/year | Number of times surface water compartment volume is completely turned over (flushed) in a year |
| Generic diffusive exchange coefficient with sediment ($DSP_{Sed}$) | GenericDiffusiveExchangeCoefficientWithSediment | $m^2$/day | Coefficient used to calculate diffusive exchange between adjacent surface water and sediment compartments |
| Organic carbon fraction in suspended sediments ($f_{oc}$) | OrganicCarbonContent | unitless | Organic carbon mass fraction for suspended sediment |
| pH | pH | unitless | Negative logarithm (base 10) of concentration of hydrogen ion in surface water compartment |
| Suspended sediment density ($\rho_{Sed}$) | rho | kg[sediment particles]/$m^3$[sediment particles] | Dry suspended sediment density (or dry weight of suspended sediment particles per unit volume of suspended sediment particles) |
| Suspended sediment deposition velocity ($v_{dep}$) | SedimentDepositionVelocity | m/day | Speed that suspended sediment moves downward through water column |
| Total suspended sediment concentration (TSS) | SuspendedSedimentconcentration | kg[suspended sediment particles]/$m^3$[surface water compartment] | Concentration of suspended sediment in water column |
| Water temperature (T) [VE property] | WaterTemperature_K | degrees K | Average water temperature of the surface water compartment |

[a]Applies to all surface water compartments connected to other surface water compartments.

[b]Interdependent parameters with precipitation - user is responsible for making sure input values are consistent.

[c]Interdependent parameters - user is responsible for making sure input values are consistent.

## Non-Chemical-Dependent -- Abiotic

**Surface Water Compartment Type**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|

[d]Applies to flowing water bodies only (i.e., rivers, streams).

[e]Set using the volume element properties named "top" and "bottom."

[f]Applies to all surface water compartments connected to a flush rate sink (i.e., all or part of discharge modeled to a sink).

## Non-Chemical-Dependent -- Abiotic

**Sediment Compartment Type**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| Depth ($d_{Sed}$) [VE Property][a] | top, bottom[a] | m | Depth (i.e., vertical dimension) of the sediment volume element |
| Organic carbon fraction ($f_{oc}$) | OrganicCarbonContent | kg[organic carbon]/kg[soil wet wt] | Organic carbon mass fraction for bottom sediment |
| Porosity of the sediment zone ($\Phi$)[b] | Porosity | $m^3$[pore water]/$m^3$[sediment compartment] | Ratio of pore space volume to total sediment compartment volume |
| Solid material density in sediment ($\rho_{Sed}$)[b] | rho | kg[sediment particles]/$m^3$[sediment particles] | Dry sediment density (or dry weight of bottom sediment per unit volume of bottom sediment) |

[a]Set using the volume element properties named "top" and "bottom."

[b]Interdependent parameters with benthic solids concentration (kg[sediment]/$m^3$[sediment compartment]; not a TRIM.FaTE input parameter) - user is responsible for making sure input values are consistent.

# Non-Chemical-Dependent -- Biotic

**Terrestrial Plant Compartment Types**[a]

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| **Leaf Compartment Type** | | | |
| Allow exchange[b] | AllowExchange | 1=yes, 0=no | 1 if exchange can occur with another compartment, 0 if not (can be made seasonal by setting allow exchange start and stop dates) |
| Average leaf area index (LAI)[c] | AverageLeafAreaIndex_No_Time_Dependence | $m^2$[total leaf area]/$m^2$[underlying soil area] | Average area of leaf per unit surface area (no time dependence) |
| Calculate wet dep interception fraction | CalculateWetDepInterceptionFraction_1_Means_Yes_Else_No | 1=yes, 0=no | Switch used to allow use of input value or model calculations |
| Correction exponent, octanol to lipid (b) | CorrectionExponent | unitless | Correction exponent for the differences between octanol and lipids |
| Degree stomatal opening ($\alpha_s$) | DegreeStomatalOpening | unitless | Mean degree of opening of stomatal pores, between 0 and 1 |
| Density of wet leaf ($\rho_{Leaf}$)[c] | WetDensity | kg[leaf wet wt]/$m^3$[leaf] | Density of wet plant leaf |
| Leaf wetting factor (S) | LeafWettingFactor | m | Vegetation-dependent leaf-wetting factor (retention coefficient) |
| Length of leaf (l) | LengthofLeaf | m | Length of flat leaf |
| Lipid content ($fL_{Leaf}$) | LipidContent | kg[lipid]/kg[leaf wet wt] | Mass fraction of leaf that is lipid (wet wt basis) |
| Litter fall rate ($K_L$)[b] | LitterFallRate | 1/day | First-order rate constant for fall of plant leaves to soil (can be made seasonal by setting litter fall start and stop dates) |
| Stomatal area, normalized for effective diffusion path length ($S_N$) | StomatalAreaNormalizedEffectiveDiffusionPathLength | 1/m | Portion of total leaf surface area comprised of stomatal pores divided by the effective path length for a diffusing molecule through a pore; value is relatively similar across plant species |
| Vegetation attenuation factor ($\alpha_{VAF}$) | AttenuationFactor | $m^2$/kg | Effective attenuation by plant leaves of dry depositing particles per unit dry weight of the plant species; used to calculate interception fraction |
| Water content ($fW_{Leaf}$) | WaterContent | unitless (kg[water]/kg[leaf wet wt]) | Mass fraction of leaf that is water (wet wt basis) |

## Non-Chemical-Dependent -- Biotic

**Terrestrial Plant Compartment Types**[a]

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| Wet dep interception fraction ($I_{wet}$) | WetDepInterceptionFraction_Input_Used_Only_If_OptionSet | unitless | Fraction of wet deposition intercepted by leaves (input used only if option set) |
| Wet mass of leaf per unit area ($\rho area_{Leaf}$)[c] | WetMassperArea | kg[fresh leaf]/$m^2$[area] | Freshweight mass of leaf per unit surface area |
| **Particle-on-Leaf Compartment Type** | | | |
| Allow exchange[b] | AllowExchange | 1=yes, 0=no | 1 if exchange can occur with another compartment, 0 if not (can be made seasonal by setting allow exchange start and stop dates) |
| Volume particle per area leaf | VolumeParticlePerAreaLeaf | m3 [leaf particles]/m2 [leaf] | Volume of leaf particles per unit area of leaf; used to calculate compartment volume |
| **Root Compartment Type - Nonwoody Plants Only**[d] | | | |
| Allow exchange[b] | AllowExchange | 1=yes, 0=no | 1 if exchange can occur with another compartment, 0 if not (can be made seasonal by setting allow exchange start and stop dates) |
| Correction exponent, octanol to lipid (b) | CorrectionExponent | unitless | Correction exponent for the differences between octanol and lipids |
| Lipid content of root ($fL_{Root}$) | LipidContent | kg[lipid]/kg [root wet wt] | Mass fraction of root that is lipid (wet wt basis) |
| Water content of root ($fW_{Root}$) | WaterContent | kg[water]/kg[root wet wt]) | Mass fraction of root that is water (wet wt basis) |
| Wet density of root ($\rho_{Root}$) | WetDensity | kg[leaf wet wt]/$m^3$[root] | Density of wet plant root |
| Wet mass per area ($\rho area_{Root}$) | WetMassperArea | kg[root wet wt]/$m^2$[soil] | Freshweight mass of root per unit surface area |

## Non-Chemical-Dependent -- Biotic

**Terrestrial Plant Compartment Types**[a]

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| **Stem Compartment Type - Nonwoody Plants Only**[d] | | | |
| Allow exchange[b] | AllowExchange | 1=yes, 0=no | 1 if exchange can occur with another compartment, 0 if not (can be made seasonal by setting allow exchange start and stop dates) |
| Correction exponent, octanol to lipid (b) | CorrectionExponent | unitless | Correction exponent for the differences between octanol and lipids |
| Density of phloem fluid ($\rho_{Ph}$) | PhloemDensity | kg[phloem]/$m^3$[phloem] | Density of phloem fluid |
| Density of xylem fluid ($\rho_{Xy}$) | XylemDensity | kg[xylem]/$m^3$[xylem] | Density of xylem fluid |
| Flow rate of transpired water per leaf area | FlowRateofTranspiredWaterperAreaofLeafSurface | $m^3$[water]/$m^2$ [leaf]-day | Empirical factor used to estimate total flow of transpired water based on leaf surface area |
| Fraction of transpiration flow rate that is phloem rate | FractionPhloemRatewithTranspirationFlowRate | unitless | Fraction of total transpiration flow rate that is the phloem rate |
| Lipid content of stem ($fL_{Stem}$) | LipidContent | kg[lipid]/kg [stem wet wt] | Mass fraction of stem that is lipid (wet wt basis) |
| Water content of stem ($fW_{Stem}$) | WaterContent | kg[water]/kg[stem wet wt] | Mass fraction of stem that is water (wet wt basis) |
| Wet density of stem ($\rho_{Stem}$) | WetDensity | kg[stem wet wt]/$m^3$[root] | Density of wet plant stem |
| Wet mass per area ($parea_{Stem}$) | WetMassperArea | kg[stem wet wt]/$m^2$[soil] | Freshweight mass of stem per unit surface area |

[a]TRIM.FaTE currently includes four kinds of terrestrial plants: deciduous forest, coniferous forest, grasses/herbs, and agricultural.
[b]If modeled as seasonal processes, on/off dates are interdependent - user is responsible for making sure input values are consistent.
[c]Interdependent parameters - user is responsible for making sure input values are consistent.
[d]Roots and stems are not modeled for deciduous and coniferous forest in the current version of TRIM.FaTE.

## Non-Chemical-Dependent -- Biotic

**Aquatic Plants Compartment Type**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| **Macrophyte Compartment Type** | | | |
| Biomass per water area | BiomassPerArea_kg_m2 | $kg/m^2$ | Mass of macrophytes per unit surface water area (wet wt basis) |
| Density of macrophytes ($\rho_{Mp}$) | Density | kg/L | Mass of macrophytes per unit volume of macrophytes (wet wt basis) |

# Non-Chemical-Dependent -- Biotic

**Terrestrial Animal Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| **Soil Detritivore Compartment Type - Earthworm** | | | |
| Density | Density_Freshweight | kg[worm]/L[worm] | Density of worm (wet wt basis); used to calculate compartment volume |
| Density per soil area ($\rho area_{Worm}$) | ArealDensity_Freshweight | kg[worm wet wt]/$m^2$[soil] | Mass of worm per unit surface area of soil |
| Water content of worm ($fW_{worm}$) | Water_content | unitless | Mass fraction of worm that is water |
| **Soil Detritivore Compartment Type - Soil Arthropod** | | | |
| Biomass per soil area ($\rho area_{Arth}$) | BiomassPerArea_kg_m2 | kg[arthropod wet wt]/$m^2$[soil] | Mass of soil arthropods per unit surface area of soil |
| Body weight (BW) | BW | kg | Mass of individual animal |
| **All Other Terrestrial Animal Compartment Types**[a] | | | |
| Body weight (BW) | BW | kg | Mass of individual |
| Food ingestion rate ($IN_D$) | FoodIngestionRate | kg[diet wet wt]/kg BW-day | Total amount of food eaten per day, scaled to body weight |
| Fraction diet - american robin ($P^{American\ robin}$) | FractionDietAmericanRobin | unitless | Fraction of food diet comprised of american robin |
| Fraction diet - black-capped chickadee ($P^{Chickadee}$) | FractionDietChickadee | unitless | Fraction of food diet comprised of black-capped chickadee |
| Fraction diet - bobwhite quail ($P^{Bobwhite\ quail}$) | FractionDietBobwhiteQuail | unitless | Fraction of food diet comprised of bobwhtie quail |
| Fraction diet - mallard ($P^{Mallard}$) | FractionDietMallard | unitless | Fraction of food diet comprised of mallard |
| Fraction diet - mouse ($P^{Mouse}$) | FractionDietMouse | unitless | Fraction of food diet comprised of mouse |
| Fraction diet - plants ($P^{Plants}$) | FractionDietPlant | unitless | Fraction of food diet comprised of plant |
| Fraction diet - short-tailed shrew ($P^{Short-tailed\ shrew}$) | FractionDietshorttailedshrew | unitless | Fraction of food diet comprised of short-tailed shrew |

## Non-Chemical-Dependent -- Biotic

**Terrestrial Animal Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| Fraction diet - soil ($f_{intake\_soil}$) | FractionDietSoil[b] | unitless, dry wt basis | Fraction of total dry weight intake comprised of soil (used to calculate soil ingestion rate, when necessary) |
| Fraction diet - soil arthropod ($P^{Arth}$) | FractionDietSoilArthropod | unitless | Fraction of food diet comprised of soil arthropod |
| Fraction diet - vole ($P^{Vole}$) | FractionDietvole | unitless | Fraction of food diet comprised of vole |
| Fraction diet - worm ($P^{Worm}$) | FractionDietWorm | unitless | Fraction of food diet comprised of worm |
| Fraction excretion to soil ($f_{uSs}$) | FractionExcretiontoSoil | unitless | Fraction of total excretion that goes to surface soil |
| Fraction excretion to water ($f_{uSW}$) | FractionExcretiontoWater | unitless | Fraction of total excretion that goes to surface water |
| Fraction specific compartment diet [Link property] | FractionSpecificCompartmentDiet | unitless | Fraction of food diet originating from a specific compartment; must sum to 1.0 across all links |
| Population per soil area ($PN_{area}$) | NumberofIndividualsPerSquareMeter | $\#/m^2$ | Number of individuals per unit surface area |
| Scaling constant A - inhalation rate | InhalationProps_A | unitless | Allometric scaling constant used to calculate inhalation rate based on body weight |
| Scaling constant B - inhalation rate | InhalationProps_B | unitless | Allometric scaling constant used to calculate inhalation rate based on body weight |
| Scaling constant A - water ingestion rate | WaterIngProps_A | unitless | Allometric scaling constant used to calculate water ingestion rate based on body weight |
| Scaling constant B - water ingestion rate | WaterIngProps_B | unitless | Allometric scaling constant used to calculate water ingestion rate based on body weight |
| Soil ingestion rate ($IN_{Ss}$) | SoilIngestionRate | kg[soil]/kg BW-day | Total amount of soil eaten per day, scaled to body weight (used if data available - otherwise calculated from fraction diet-soil and food ingestion rate) |

[a]TRIM.FaTE currently includes the following terrestrial animal compartment types: Terrestrial Ground-invertebrate Feeder - American Woodcock, Terrestrial Ground-invertebrate Feeder - Black-capped Chickadee, Terrestrial Ground-invertebrate Feeder - Short-tailed Shrew, Terrestrial Ground-invertebrate Feeder - Trowbridge Shrew, Terrestrial Herbivore - Bobwhite Quail, Terrestrial Herbivore - Cow, Terrestrial Herbivore - Long-tailed Vole, Terrestrial Herbivore - Meadow Vole, Terrestrial Herbivore - Mule Deer/Black-tailed Deer, Terrestrial Herbivore - White-tailed Deer, Terrestrial Insectivore - Tree Swallow, Terrestrial Omnivore - American Robin, Terrestrial Omnivore - Mouse, Terrestrial Predator/Scavenger - Long-tailed Weasel, and Terrestrial Predator/Scavenger - Red-tailed hawk.

[b]Parameter and equations using it are in process of being added to TRIM.FaTE as of publication date.

# Non-Chemical-Dependent -- Biotic

**Semi-aquatic Animal Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| **All Compartment Types**[a] | | | |
| Body weight (BW) | BW | kg | Mass of individual animal |
| Food ingestion rate ($IN_D$) | FoodIngestionRate | (kg[diet wet wt]/kg[body wet wt]-day) | Total amount of food eaten per day, scaled to body weight |
| Fraction diet - algae ($P^{Algae}$) | FractionDietAlgae | unitless | Fraction of food diet comprised of algae |
| Fraction diet - american robin ($P^{American\ robin}$) | FractionDietAmericanRobin | unitless | Fraction of food diet comprised of american robin |
| Fraction diet - benthic carnivores ($P^{Fbc}$) | FractionDietFishbenthiccarnivore | unitless | Fraction of food diet comprised of benthic carnivore |
| Fraction diet - benthic invertebrates ($P^{BI}$) | FractionDietBenthicInvertebrate | unitless | Fraction of food diet comprised of benthic invertebrate |
| Fraction diet - benthic omnivores ($P^{Fbo}$) | FractionDietFishbenthicomnivore | unitless | Fraction of food diet comprised of benthic omnivore |
| Fraction diet - black-capped chickadee ($P^{Chickadee}$) | FractionDietChickadee | unitless | Fraction of food diet comprised of black-capped chickadee |
| Fraction diet - bobwhite quail ($P^{Bobwhite\ quail}$) | FractionDietBobwhiteQuail | unitless | Fraction of food diet comprised of bobwhite quail |
| Fraction diet - macrophyte ($P^{Mp}$) | FractionDietMacrophyte | unitless | Fraction of food diet comprised of macrophyte |
| Fraction diet - mallard ($P^{Mallard}$) | FractionDietMallard | unitless | Fraction of food diet comprised of mallard |
| Fraction diet - mouse ($P^{Mouse}$) | FractionDietMouse | unitless | Fraction of food diet comprised of mouse |
| Fraction diet - plants ($P^{Plants}$) | FractionDietPlant | unitless | Fraction of food diet comprised of plant |
| Fraction diet - short-tailed shrew ($P^{Short\text{-}tailed\ shrew}$) | FractionDietshorttailedshrew | unitless | Fraction of food diet comprised of short-tailed shrew |
| Fraction diet - soil ($f_{intake\_soil}$) | FractionDietSoil[b] | unitless, dry wt basis | Fraction of total dry weight intake comprised of soil (used to calculate soil ingestion rate, when necessary) |
| Fraction diet - soil arthropod ($P^{Arth}$) | FractionDietSoilArthropod | unitless | Fraction of food diet comprised of soil arthropod |

## Non-Chemical-Dependent -- Biotic

**Semi-aquatic Animal Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| Fraction diet - vole ($P^{Vole}$) | FractionDietvole | unitless | Fraction of food diet comprised of vole |
| Fraction diet - water-column carnivores ($P^{Fwcc}$) | FractionDietFishcarnivore | unitless | Fraction of food diet comprised of water-column carnivore |
| Fraction diet - water-column herbivores ($P^{Fwch}$) | FractionDietFishherbivore | unitless | Fraction of food diet comprised of water-column herbivore |
| Fraction diet - water-column omnivores ($P^{Fwco}$) | FractionDietFishomnivore | unitless | Fraction of food diet comprised of water-column omnivore |
| Fraction diet - worm ($P^{Worm}$) | FractionDietWorm | unitless | Fraction of food diet comprised of worm |
| Fraction excretion to soil ($f_{uSW}$) | FractionExcretiontoSoil | unitless | Fraction of total excretion that goes to soil |
| Fraction excretion to water ($f_{uSs}$) | FractionExcretiontoWater | unitless | Fraction of total excretion that goes to surface water |
| Fraction specific compartment diet [Link property] | FractionSpecificCompartmentDiet | unitless | Fraction of food diet originating from a specific compartment; must sum to 1.0 across all links |
| Population per soil area ($PN_{area}$) | NumberofIndividualsPerSquareMeter | $\#/m^2$ | Number of individuals per unit area |
| Scaling constant A - inhalation rate | InhalationProps_A | unitless | Allometric scaling constant used to calculate inhalation rate based on body weight |
| Scaling constant B - inhalation rate | InhalationProps_B | unitless | Allometric scaling constant used to calculate inhalation rate based on body weight |
| Scaling constant A - water ingestion rate | WaterIngProps_A | unitless | Allometric scaling constant used to calculate water ingestion rate based on body weight |
| Scaling constant B - water ingestion rate | WaterIngProps_B | unitless | Allometric scaling constant used to calculate water ingestion rate based on body weight |
| Soil ingestion rate ($IN_{Ss}$) | SoilIngestionRate | kg[soil]/kg BW-day | Total amount of soil eaten per day, scaled to body weight (used if data available - otherwise calculated from fraction diet-soil and food ingestion rate) |

[a]TRIM.FaTE currently includes the following semi-aquatic animal compartment types: Semi-aquatic Omnivore - Mallard, Semi-aquatic Omnivore - Mink, Semi-aquatic Omnivore - Raccoon, Semi-aquatic Piscivore - Common Loon, Semi-aquatic Piscivore - Kingfisher, and Semi-aquatic Predator/Scavenger - Bald Eagle.

[b]Parameter and equations using it are in process of being added to TRIM.FaTE as of publication date.

## Non-Chemical-Dependent -- Biotic

**Aquatic Animal Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| **Benthic Invertebrate Compartment Type** | | | |
| Biomass per water area | BiomassPerArea_kg_m2 | $kg/m^2$ | Mass of benthic invertebrates per unit surface water area |
| Body weight (BW) or ($m_{BI}$) | BW | kg[inv wet wt] | Mass of individual organisms comprising the benthic invertebrate compartment |
| **All Fish Compartment Types**[a] | | | |
| Body weight (BW) OR ($m_f$) | BW | kg[fish wet wt] | Mass of individual fish |
| Fraction diet - algae ($P^{Algae}$) | FractionDietAlgae | unitless | Fraction of food diet comprised of algae |
| Fraction diet - benthic carnivores ($P^{Fbc}$) | FractionDietFishbenthiccarnivore | unitless | Fraction of food diet comprised of benthic carnivore |
| Fraction diet - benthic invertebrates ($P^{BI}$) | FractionDietBenthicInvertebrate | unitless | Fraction of food diet comprised of benthic invertebrate |
| Fraction diet - benthic omnivores ($P^{Fbo}$) | FractionDietFishbenthicomnivore | unitless | Fraction of food diet comprised of benthic omnivore |
| Fraction diet - macrophyte ($P^{Mp}$) | FractionDietMacrophyte | unitless | Fraction of food diet comprised of macrophyte |
| Fraction diet - water-column carnivores ($P^{Fwcc}$) | FractionDietFishcarnivore | unitless | Fraction of food diet comprised of water-column carnivore |
| Fraction diet - water-column herbivores ($P^{Fwch}$) | FractionDietFishherbivore | unitless | Fraction of food diet comprised of water-column herbivore |
| Fraction diet - water-column omnivores ($P^{Fwco}$) | FractionDietFishomnivore | unitless | Fraction of food diet comprised of water-column omnivore |
| Fraction lipid weight ($f_{lipid}$) | FishLipidFraction | kg[lipid]/kg[fish wet wt] | Mass fraction of fish that is lipid (wet wt basis) |
| Population per water area | NumberofFishperSquareMeter | $\#/m^2$ | Number of fish per unit surface water area |

[a]TRIM.FaTE currently includes the following fish compartment types: Benthic Carnivore, Benthic Omnivore, Water-column Carnivore, Water-column Herbivore, and Water-column Omnivore.

## Chemical-Dependent -- Independent of Compartment Type

| Parameter Name[a] (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| Diffusion coefficient in pure air ($D_{air}$) | D_pureair | $m^2$[air]/day | Coefficient that (when combined with chemical concentration) predicts how quickly a chemical spreads out in gas phase due to diffusion | all |
| Diffusion coefficient in pure water ($D_{water}$) | D_purewater | $m^2$[water]/day | Coefficient that (when combined with chemical concentration) predicts how quickly a chemical spreads out in aqueous phase due to diffusion | all |
| Henry's Law constant (H) | HenryLawConstant | Pa-$m^3$ /mol | Ratio of the aqueous-phase concentration of a chemical to its equilibrium partial pressure in the gas phase | all |
| Melting point ($T_m$) | MeltingPoint | °K | Temperature at which a solid becomes a liquid at standard atmospheric pressure | all |
| Molecular weight ($M_w$) | molecularWeight | g/mol | Weight of 1 mole of the chemical | all |
| Octanol-water partition coefficient ($K_{OW}$) | K_ow | L[water]/kg[octanol] | Equilibrium ratio of concentration dissolved in octanol to concentration dissolved in water | all |
| Reference bird body weight (BW(Ref)) | ReferenceBird_BodyWeight | kg | Mass of individual reference bird used for allometric scaling of degradation rate | organics |
| Reference bird chemical degradation rate($k_{degradation}$) | ReferenceBird_GeneralDegradation Rate | 1/day | First-order rate constant for chemical degradation in reference bird used for allometric scaling of degradation rate | organics |
| Reference bird elimination rate | TerrestrialBird_EliminationRate | 1/day | First-order rate constant for elimination of chemical from the body (terrestrial birds) | organics |
| Reference mammal body weight (BW(Ref)) | ReferenceMammal_BodyWeight | kg | Mass of individual reference mammal used for allometric scaling of degradation rate | organics |
| Reference mammal chemical degradation rate ($k_{degradation}$) | ReferenceMammal_GeneralDegrada tionRate | 1/day | First-order rate constant for chemical degradation in reference mammal used for allometric scaling of degradation rate | organics |
| Reference mammal elimination rate | TerrestrialMammal_EliminationRate | 1/day | First-order rate constant for elimination of chemical from the body (terrestrial mammals) | organics |
| Vapor pressure ($P_{vapor}$) | VaporPressure | Pa | Pressure exerted by a vapor in equilibrium with its solid or liquid phase | organics |
| Vapor washout ratio ($w_{rV}$) | VaporWashoutRatio | $m^3$[air]/$m^3$[rain] | Precipitation scavenging ratio for vapors (ratio of concentration in rain to concentration in vapor form in air); used in estimating wet deposition of vapors | Hg species |

[a]All parameters in this table are TRIM.FaTE chemical properties.

## Chemical-Dependent -- Abiotic

**Air Compartment Type**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| Initial concentration | initialConcentration_g_per_m3 | $g/m^3$ | Bulk air concentration at beginning of modeling period | all |
| Boundary concentration [VE property][a] | boundaryConcentration_g_per_m3 | $g/m^3$ | Air concentration at the outer boundary of the modeling region (i.e., concentration in air flowing into the modeling region) | all |
| Particle dry deposition velocity ($V_{dry}$) | vdep | m/day | Speed at which chemical in particle form in air moves downward; used in estimating dry deposition of particles | all |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |

[a]Only used in model runs specified as including non-zero air boundary contributions. Only applicable for air volume elements with at least one boundary on the outer edge of the modeling region (zero boundary contribution for all internal air compartments).

## Chemical-Dependent -- Abiotic

**Soil Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| **Surface Soil Compartment Type** | | | | |
| Initial concentration | initialConcentration_g_per_m3 | $g/m^3$ | Bulk surface soil concentration at beginning of modeling period | all |
| Input characteristic depth (X*) | InputCharacteristicDepth_m | m | Distance from top of the soil compartment at which soil concentration has dropped to 36.79% (1/e * 100%) of the concentration at top of compartment | all |
| Soil/water partition coefficient ($K_d$) | Kd | L[water]/kg[soil wet wt] | Equilibrium ratio of concentration sorbed to solids and concentration dissolved | all |
| Use input characteristic depth | UseInputCharacteristicDepth_0_MeansNo_ElseYes | 0 = no , Else = yes | If = 0, use model-calculated characteristic depth, else use user-provided characteristic depth | all |
| Vapor dry deposition velocity ($v_{vapor}$) | VaporDryDepositionVelocity_m_day | m/day | Speed at which chemical in vapor form in air moves downward; used in estimating dry deposition of vapors to soil | Hg2 |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |
| **Root Zone Soil Compartment Type** | | | | |
| Initial concentration | initialConcentration_g_per_m3 | $g/m^3$ | Bulk root zone soil concentration at beginning of modeling period | all |
| Input characteristic depth (X*) | InputCharacteristicDepth_m | m | Distance from top of the soil compartment at which soil concentration has dropped to 36.79% (1/e * 100%) of the concentration at top of compartment | all |
| Soil-water partition coefficient ($K_d$) | Kd | L[water]/kg[soil wet wt] | Equilibrium ratio of concentration sorbed to solids and concentration dissolved | all |

# Chemical-Dependent -- Abiotic

**Soil Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| Use input characteristic depth | UseInputCharacteristicDepth_0_MeansNo_ElseYes | 0 = no , Else = yes | If = 0, use model-calculated characteristic depth, else use user-provided characteristic depth | all |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |
| **Vadose Zone Soil Compartment Type** | | | | |
| Initial concentration | initialConcentration_g_per_m3 | $g/m^3$ | Bulk vadose zone soil concentration at beginning of modeling period | all |
| Input characteristic depth (X*) | InputCharacteristicDepth_m | m | Distance from top of the soil compartment at which soil concentration has dropped to 36.79% (1/e * 100%) of the concentration at top of compartment | all |
| Soil-water partition coefficient ($K_d$) | Kd | L[water]/kg[soil wet wt] | Equilibrium ratio of concentration sorbed to solids and concentration dissolved | all |
| Use input characteristic depth | UseInputCharacteristicDepth_0_MeansNo_ElseYes | 0 = no , Else = yes | If = 0, use model-calculated characteristic depth, else use user-provided characteristic depth | all |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |

## Chemical-Dependent -- Abiotic

**Soil Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| **Ground Water Compartment Type** | | | | |
| Initial concentration | initialConcentration_g_per_L | g/L | Ground water concentration at beginning of modeling period | all |
| Soil-water partition coefficient ($K_d$) | Kd | L[water]/kg[soil wet wt] | Equilibrium ratio of concentration sorbed to solids and concentration dissolved | all |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |

## Chemical-Dependent -- Abiotic

**Surface Water Compartment Type**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| Initial concentration | initialConcentration_g_per_L | g/L | Surface water concentration at beginning of modeling period | all |
| Algal surface area-specific uptake rate constant (U) | AlgaeUptakeRate | nmol/[$\mu m^2$-day-nmol] | Surface area-specific rate constant for uptake into algae of a chemical in water | Hg species |
| BCF-algae | RatioOfConcinAlgaeToConcDissolvedinWater | L[water]/kg[algae wet wt] | Ratio of concentration in algae to concentration dissolved in surface water (bioconcentration factor) | organics |
| Dow ("overall Kow") ($D_{ow}$) | D_ow | unitless | Weighted (by mass fraction) sum of individual Kow values for all chemical species present | Hg species[a] |
| Soil-water partition coefficient ($K_d$) | Kd | L[water]/kg[soil wet wt] | Equilibrium ratio of concentration sorbed to solids and concentration dissolved | all |
| Vapor dry deposition velocity ($v_{vapor}$) | VaporDryDepositionVelocity_m_day | m/day | Speed at which chemical in vapor form in air moves downward; used in estimating dry deposition of vapors to surface water | Hg2 |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |

[a]For Hg2 and MHg, Dow is included in TRIM.FaTE as a Formula Property (calculated within TRIM.FaTE) rather than a Constant Property (supplied as an input) because the value is dependent on surface water pH and chloride concentration. However, the relationships between Dow and pH and chloride are a user input.

## Chemical-Dependent -- Abiotic

**Sediment Compartment Type**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| Initial concentration | initialConcentration_g_per_m3 | $g/m^3$ | Bulk sediment concentration at beginning of modeling period | all |
| Soil-water partition coefficient ($K_d$) | Kd | L[water]/kg[soil wet wt] | Equilibrium ratio of concentration sorbed to solids and concentration dissolved | all |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | days | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |

## Chemical-Dependent -- Biotic

**Terrestrial Plant Compartment Types**[a]

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| **Leaf Compartment Type** | | | | |
| Initial concentration | initialConcentration_g_per_kg | g/kg | Leaf concentration at beginning of modeling period (wet wt basis) | all |
| Transfer factor to leaf particle ($T_{Leaf \rightarrow LeafP}$) | TransferFactortoLeafParticle | 1/day | First-order rate constant for transfer from leaf to leaf particle | all |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |
| **Particle-on-Leaf Compartment Type** | | | | |
| Initial concentration | initialConcentration_g_per_kg | g/kg | Particle on leaf concentration at beginning of modeling period (dry wt basis) | all |
| Transfer factor to leaf ($T_{LeafP \rightarrow Leaf}$) | TransferFactortoLeaf | 1/day | First-order rate constant for transfer from leaf particle to leaf | all |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |

## Chemical-Dependent -- Biotic

**Terrestrial Plant Compartment Types**[a]

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| **Root Compartment Type - Nonwoody Plants Only**[b] | | | | |
| Initial concentration | initialConcentration_g_per_kg | g/kg | Root concentration at beginning of modeling period (wet wt basis) | all |
| Alpha for root-root zone bulk soil (α) | Root_RootZonePartitioningBulkSoil_AlphaofSteadyState | unitless | Proportion of equilibrium value reached | Hg species |
| Alpha for root-soil water interaction (α) | RootSoilWaterInteraction_Alpha | unitless | Proportion of equilibrium value reached | organics |
| Root/root-zone-soil-water partition coefficient ($K_{Root\text{-}SrW}$) | Root_RootZonePartitioningBulkSoil_PartitionCoefficient | $m^3$[water]/$m^3$[root] | Equilibrium ratio of concentration in root to concentration in root zone | Hg species |
| talpha for root-root zone bulk soil ($t_\alpha$) | Root_RootZonePartitioningBulkSoil_TimetoReachAlphaofSteadyState | day | Time to reach 100α percent of equilibrium | Hg species |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |
| **Stem Compartment Type - Nonwoody Plants Only**[b] | | | | |
| Initial concentration | initialConcentration_g_per_kg | g/kg | Stem concentration at beginning of modeling period (wet wt basis) | all |
| Transpiration stream concentration factor (TSCF) | TSCF | g[chemical]/$m^3$[xylem] per g[chemical]/$m^3$[soil pore water]) | Ratio of concentration dissolved in xylem fluid to concentration dissolved in soil pore water | Hg species |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |

## Chemical-Dependent -- Biotic

**Terrestrial Plant Compartment Types**[a]

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |

[a]TRIM.FaTE currently includes four kinds of terrestrial plants: deciduous forest, coniferous forest, grasses/herbs, and agricultural.
[b]Roots and stems are not modeled for deciduous and coniferous forest in the current version of TRIM.FaTE.

## Chemical-Dependent -- Biotic

**Aquatic Plant Compartment Type**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| **Macrophyte Compartment Type** | | | | |
| Initial concentration | initialConcentration_g_per_kg | g/kg | Macrophyte concentration at beginning of modeling period (wet wt basis) | all |
| Alpha for macrophyte (α) | WaterColumnDissolvedPartitioning_AlphaofEquilibrium | unitless | Proportion of equilibrium value reached | Hg species |
| Macrophyte/water partition coefficient ($K_{Mp-W}$) | WaterColumnDissolvedPartitioning_PartitionCoefficient | L[water]/kg[macrophyte] | Equilibrium ratio of concentration in macrophyte to concentration dissolved in water | Hg species |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg species |
| talpha ($t_\alpha$) | WaterColumnDissolvedPartitioning_TimeToReachAlphaofEquilibrium | day | Time to reach 100α percent of equilibrium | Hg species |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |

## Chemical-Dependent -- Biotic

**Terrestrial Animal Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| **Soil Detritivore - Earthworm** | | | | |
| Initial concentration | initialConcentration_g_per_kg | g/kg | Earthworm concentration at beginning of modeling period (wet wt basis) | all |
| Alpha for earthworm-soil pore water (α) | WormSoilWaterInteraction_alpha | unitless | Proportion of equilibrium value reached | organics |
| Alpha for worm-bulk soil (α) | WormSoilInteraction_alpha | unitless | Proportion of equilibrium value reached | Hg species |
| Earthworm/dry-soil partition coefficient ($K_{dworm\text{-}Sr\text{-}dry}$) | WormSoilPartitionCoefficient_dryweight | kg [soil dry wt]/kg[worm dry wt] | Equilibrium ratio of concentration in earthworm to concentration in soil (dry wt basis) | Hg species |
| talpha for earthworm-soil pore water ($t_\alpha$) | WormSoilWaterInteraction_t_alpha | day | Time to reach 100α percent of equilibrium | organics |
| talpha for worm-bulk soil ($t_\alpha$) | WormSoilInteraction_t_alpha | day | Time to reach 100α percent of equilibrium | Hg species |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |
| **Soil Detritivore - Soil Arthropod** | | | | |
| Initial concentration | initialConcentration_g_per_kg | g/kg | Soil arthropod concentration at beginning of modeling period (wet wt basis) | all |
| Alpha for arthropod-soil (α) | ArthropodSoilPartitioning_AlphaofEquilibrium | unitless | Proportion of equilibrium value reached | all |
| Arthropod/bulk-soil partition coefficient ($K_{Arth\text{-}Sr}$) | Arthropod_SoilPartitionCoefficient | kg[soil wet wt]/kg[arthropod wet wt]) | Equilibrium ratio of concentration in arthropod to concentration in soil | all |
| talpha for arthropod-soil ($t_\alpha$) | ArthropodSoilPartitioning_TimetoReachAlphaofEquilibrium | day | Time to reach 100α percent of equilibrium | all |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |
| **All Other Terrestrial Animal Compartment Types**[a] | | | | |
| Initial concentration | initialConcentration_g_per_kg | g/kg | Terrestrial animal concentration at beginning of modeling period (wet wt basis) | all |
| Assimilation efficiency for inhalation ($AE_{Air}$) | InhalationAssimilationEfficiency | unitless | Fraction of amount of chemical breathed that is actually absorbed by the animal | all |
| Assimilation efficiency from arthropods ($AE_{Arth}$) | AssimilationEfficiencyFromArthropods | unitless | Fraction of amount of chemical in arthropods eaten that is actually absorbed by the animal | all |

## Chemical-Dependent -- Biotic

**Terrestrial Animal Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| Assimilation efficiency from food ($AE_{Twl}$) | AssimilationEfficiencyFromFood | unitless | Fraction of amount of chemical in food eaten that is actually absorbed by the animal | all |
| Assimilation efficiency from plants ($AE_{Plant}$) | AssimilationEfficiencyFromPlants | unitless | Fraction of amount of chemical in plants eaten that is actually absorbed by the animal | all |
| Assimilation efficiency from soils ($AE_S$) | AssimilationEfficiencyFromSoils | unitless | Fraction of amount of chemical in soils eaten that is actually absorbed by the animal | all |
| Assimilation efficiency from water ($AE_W$) | AssimilationEfficiencyFromWater | unitless | Fraction of amount of chemical in drinking water that is actually absorbed by the animal | all |
| Assimilation efficiency from worms ($AE_{Worm}$) | AssimilationEfficiencyFromWorms | unitless | Fraction of amount of chemical in worms eaten that is actually absorbed by the animal | all |
| Total elimination rate ($k_{ET}$) | TotalExcretionRate | 1/day | First-order rate constant for elimination of chemical from the body (in urine, feces, feathers, fur) | Hg species |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |

[a]TRIM.FaTE currently includes the following terrestrial animal compartment types: Terrestrial Ground-invertebrate Feeder - American Woodcock, Terrestrial Ground-invertebrate Feeder - Black-capped Chickadee, Terrestrial Ground-invertebrate Feeder - Short-tailed Shrew, Terrestrial Ground-invertebrate Feeder - Trowbridge Shrew, Terrestrial Herbivore - Bobwhite Quail, Terrestrial Herbivore - Cow, Terrestrial Herbivore - Long-tailed Vole, Terrestrial Herbivore - Meadow Vole, Terrestrial Herbivore - Mule Deer/Black-tailed Deer, Terrestrial Herbivore - White-tailed Deer, Terrestrial Insectivore - Tree Swallow, Terrestrial Omnivore - American Robin, Terrestrial Omnivore - Mouse, Terrestrial Predator/Scavenger - Long-tailed Weasel, and Terrestrial Predator/Scavenger - Red-tailed Hawk.

## Chemical-Dependent -- Biotic

**Semi-aquatic Animal Compartment Types[a]**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| Initial concentration | initialConcentration_g_per_kg | g/kg | Semiaquatic animal concentration at beginning of modeling period (wet wt basis) | all |
| Assimilation efficiency for inhalation ($AE_{Air}$) | InhalationAssimilationEfficiency | unitless | Fraction of amount of chemical breathed that is actually absorbed by the animal | all |
| Assimilation efficiency from arthropods ($AE_{Arth}$)[b] | AssimilationEfficiencyFromArthropods | unitless | Fraction of amount of chemical in arthropods eaten that is actually absorbed by the animal | all |
| Assimilation efficiency from food ($AE_{Twl}$)($AE_{Fish}$)[c] | AssimilationEfficiencyFromFood | unitless | Fraction of amount of chemical in food eaten that is actually absorbed by the animal | all |
| Assimilation efficiency from plants ($AE_{Plant}$)[b] | AssimilationEfficiencyFromPlants | unitless | Fraction of amount of chemical in plants eaten that is actually absorbed by the animal | all |
| Assimilation efficiency from soils ($AE_S$) | AssimilationEfficiencyFromSoils | unitless | Fraction of amount of chemical in soils eaten that is actually absorbed by the animal | all |
| Assimilation efficiency from water ($AE_W$) | AssimilationEfficiencyFromWater | unitless | Fraction of amount of chemical in drinking water that is actually absorbed by the animal | all |
| Assimilation efficiency from worms ($AE_{Worm}$)[d] | AssimilationEfficiencyFromWorms | unitless | Fraction of amount of chemical in worms eaten that is actually absorbed by the animal | all |
| Total elimination rate ($k_{ET}$) | TotalExcretionRate | 1/day | First-order rate constant for elimination of chemical from the body (in urine, feces, feathers, fur) | Hg species |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |

[a]TRIM.FaTE currently includes the following semi-aquatic animal compartment types: Semi-aquatic Omnivore - Mallard, Semi-aquatic Omnivore - Mink, Semi-aquatic Omnivore - Raccoon, Semi-aquatic Piscivore - Common Loon, Semi-aquatic Piscivore - Kingfisher, and Semi-aquatic Predator/Scavenger - Bald Eagle.
[b]Parameter applies only to Semi-aquatic Omnivore - Mallard.
[c]TSD uses two symbols, one for terrestrial wildlife and one for fish.
[d]Parameter applies only to Semi-aquatic Omnivore - Raccoon.

## Chemical-Dependent -- Biotic

**Aquatic Animal Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| **Benthic Invertebrate Compartment Type** | | | | |
| Initial concentration | initialConcentration_g_per_kg | g/kg | Benthic invertebrate concentration at beginning of modeling period (wet wt basis) | all |
| Alpha (α) | SedimentPartitioning_AlphaofEquilibrium | unitless | Proportion of equilibrium value reached | Hg species |
| Benthic invertebrate-bulk sediment partition coefficient ($K_{BI\text{-}Sed}$) | SedimentPartitioning_PartitionCoefficient | kg[sediment wet wt]/kg[invertebrates wet wt] | Equilibrium ratio of concentration in benthic invertebrate to concentration in sediment | Hg species |
| Clearance constant ($CL_u$) | ClearanceConstant | L[water cleared]/kg[BI wet wt]-hr | Rate of water passing over respiratory surface scaled to benthic invertebrate mass | organics |
| talpha ($t_\alpha$) | SedimentPartitioning_TimeToReachAlphaofEquilibrium | day | Time to reach 100α percent of equilibrium | Hg species |
| Proportionality constant ($p_c$) | V_d | L[water]/kg[BI wet wt] | Ratio of concentration in benthic invertebrates to concentration in water | organics |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |
| **All Fish Compartment Types**[a] | | | | |
| Initial concentration | initialConcentration_g_per_kg | g/kg | Fish concentration at beginning of modeling period (wet wt basis) | all |
| Gamma_fish ($\gamma_{ASF}$) | Gamma_fish | unitless | Allometric scaling factor used in estimating gill uptake | organics |
| Demethylation rate ($k_{Dm}$) | DemethylationRate | 1/day | First-order rate constant for demethylation (MHg->Hg2) | MHg |
| Methylation rate ($k_M$) | MethylationRate | 1/day | First-order rate constant for methylation (Hg2->MHg) | Hg2 |
| Oxidation rate ($k_O$) | OxidationRate | 1/day | First-order rate constant for oxidation (Hg0->Hg2) | Hg0 |
| Reduction rate ($k_R$) | ReductionRate | 1/day | First-order rate constant for reduction (Hg2->Hg0) | Hg2 |
| Half-life *(half-life)* | Halflife | day | Length of time for chemical amount to be reduced by one-half by degradation reactions | organics |

## Chemical-Dependent -- Biotic

**Aquatic Animal Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| **Water-column Carnivore Compartment Type** | | | | |
| Alpha for water-column carnivore (α) | OmnivorePartitioning_AlphaofEquilibrium | unitless | Proportion of equilibrium value reached | Hg species |
| Assimilation efficiency from food ($AE_D$) | AssimilationEfficiencyFromFood | unitless | Fraction of amount of chemical in food eaten that is actually absorbed by the fish | all |
| Elimination adjustment factor | HowMuchFasterHgEliminationIsThanForMHg | unitless | Factor used to adjust experimental data on elimination rate for MHg to Hg0 and Hg2 | Hg species |
| Fish(water-column carnivore)-fish(water-column omnivore) partition coefficient ($K_{Fwcc-Fwco}$) | OmnivorePartitioning_PartitionCoefficient | kg[Fwco wet wt]/kg[Fwcc wet wt] | Equilibrium ratio of concentration in water-column carnivore to concentration in water-column omnivore | Hg species |
| talpha for water-column carnivore ($t_\alpha$) | OmnivorePartitioning_TimeToReachAlphaofEquilibrium | day | Time to reach 100α percent of equilibrium | Hg species |
| **Water-column Herbivore Compartment Type** | | | | |
| Alpha for algae (α) | AlgaePartitioning_AlphaofEquilibrium | unitless | Proportion of equilibrium value reached | Hg species |
| Assimilation efficiency from food ($AE_D$) | AssimilationEfficiencyFromFood | unitless | Fraction of amount of chemical in food eaten that is actually absorbed by the fish | all |
| Elimination adjustment factor | HowMuchFasterHgEliminationIsThanForMHg | unitless | Factor used to adjust experimental data on elimination rate for MHg to Hg0 and Hg2 | Hg species |
| Fish (water-column herbivore)-algae partition coefficient ($K_{Fwch-Algae}$) | AlgaePartitioning_PartitionCoefficient | kg[algae wet wt]/kg[Fwch wet wt] | Equilibrium ratio of concentration in water-column herbivore to concentration in algae | Hg species |
| talpha for algae ($t_\alpha$) | AlgaePartitioning_TimeToReachAlphaofEquilibrium | day | Time to reach 100α percent of equilibrium | Hg species |
| **Water-column Omnivore Compartment Type** | | | | |
| Alpha for water-column herbivore (α) | HerbivorePartitioning_AlphaofEquilibrium | unitless | Proportion of equilibrium value reached | Hg species |
| Assimilation efficiency from food ($AE_D$) | AssimilationEfficiencyFromFood | unitless | Fraction of amount of chemical in food eaten that is actually absorbed by the fish | all |
| Elimination adjustment factor | HowMuchFasterHgEliminationIsThanForMHg | unitless | Factor used to adjust experimental data on elimination rate for MHg to Hg0 and Hg2 | Hg species |
| Fish (water-column omnivore)-fish (water-column herbivore) partition coefficient ($K_{Fwco-Fwch}$) | HerbivorePartitioning_PartitionCoefficient | kg[Fwch wet wt]/kg[Fwco wet wt] | Equilibrium ratio of concentration in water-column omnivore to concentration in water-column herbivore | Hg species |

## Chemical-Dependent -- Biotic

**Aquatic Animal Compartment Types**

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description | Applicable Chemicals |
|---|---|---|---|---|
| talpha for water-column herbivore ($t_\alpha$) | HerbivorePartitioning_TimeToReachAlphaofEquilibrium | day | Time to reach 100α percent of equilibrium | Hg species |
| **Benthic Carnivore Compartment Type** | | | | |
| Alpha for benthic omnivore (α) | BenthicOmnivorePartitioning_AlphaofEquilibrium | unitless | Proportion of equilibrium value reached | Hg species |
| Assimilation efficiency from food ($AE_D$) | AssimilationEfficiencyFromFood | unitless | Fraction of amount of chemical in food eaten that is actually absorbed by the fish | all |
| Elimination adjustment factor | HowMuchFasterHgEliminationIsThanForMHg | unitless | Factor used to adjust experimental data on elimination rate for MHg to Hg0 and Hg2 | Hg species |
| Fish(benthic carnivore)-fish(benthic omnivore) partition coefficient ($K_{Fbc\text{-}Fbo}$) | BenthicOmnivorePartitioning_PartitionCoefficient | kg[Fbo wet wt]/kg[Fbc wet wt] | Equilibrium ratio of concentration in benthic carnivore to concentration in benthic omnivore | Hg species |
| talpha for benthic omnivore ($t_\alpha$) | BenthicOmnivorePartitioning_TimeToReachAlphaofEquilibrium | day | Time to reach 100α percent of equilibrium | Hg species |
| **Benthic Omnivore Compartment Type** | | | | |
| Alpha for benthic omnivore (α) | BenthicInvertebratePartitioning_AlphaofEquilibrium | unitless | Proportion of equilibrium value reached | Hg species |
| Assimilation efficiency from food ($AE_D$) | AssimilationEfficiencyFromFood | unitless | Fraction of amount of chemical in food eaten that is actually absorbed by the fish | all |
| Elimination adjustment factor | HowMuchFasterHgEliminationIsThanForMHg | unitless | Factor used to adjust experimental data on elimination rate for MHg to Hg0 and Hg2 | Hg species |
| Fish(benthic omnivore)-benthic invertebrate partition coefficient ($K_{Fbo\text{-}Bl}$) | BenthicInvertebratePartitioning_PartitionCoefficient | kg[Bl wet wt]/kg[Fbo wt wt] | Equilibrium ratio of concentration in benthic omnivore to concentration in benthic invertebrate | Hg species |
| talpha for benthic omnivore ($t_\alpha$) | BenthicInvertebratePartitioning_TimeToReachAlphaofEquilibrium | day | Time to reach 100α percent of equilibrium | Hg species |

[a]TRIM.FaTE currently includes the following fish compartment types: Benthic Carnivore, Benthic Omnivore, Water-column Carnivore, Water-column Herbivore, and Water-column Omnivore.

## Source, Meteorological, and Other Input Data and Settings

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|
| **Source Inputs (all TRIM.FaTE source properties)[a]** | | | |
| Emission rate (needed for each chemical emitted) | emissionRate | g/day | Quantity of chemical emitted from the source per unit time |
| Source location | X, Y | x and y spatial coordinates | X-and Y-coordinates of the source (can be designated as UTM or latitude/longitude) |
| Source height | elevation | m | Height of the emission point(s) above ground level |
| **Meteorological Inputs (all TRIM.FaTE scenario properties)[b]** | | | |
| Air temperature (T) | AirTemperature_K | degrees K | Temperature of the air |
| Horizontal wind speed (v or μ)[c] | horizontalWindSpeed | m/sec | Wind speed horizontally between volume elements |
| Wind direction (ϑ) | windDirection | degrees clockwise from N (blowing from) | Direction from which the wind is blowing (degrees clockwise from due north) |
| Rainfall rate (rain) | Rain | $m^3$[rain]/$m^2$[surface area]-day | Amount of precipitation per unit surface area and unit time |
| Day/night (IsDay) | isDay | 1=day, 0=night | Day/night switch; used for certain plant algorithms |
| **Other Settings (all TRIM.FaTE scenario properties)** | | | |
| Start of simulation | simulationBeginDateTime | date/time | The starting date and time for the modeling period |
| End of simulation | simulationEndDateTime | date/time | The inclusive ending date and time for the modeling period |
| Simulation time step | simulationTimeStep | hr | The duration (hours) of each time increment at which the model calculates and stores a new moles/mass distribution; must be an integer value |
| Output time step[d] | N/A | hr | The time increment at which the model reports a new moles/mass distribution (based on distributions calculated at simulation time steps); must be an integer value and evenly divisible by the selected simulation time step |

[a]Separate source inputs are needed for each source modeled.

## Source, Meteorological, and Other Input Data and Settings

| Parameter Name (TSD Symbol) | TRIM FaTE Code Name | Input Units | Description |
|---|---|---|---|

[b]The meteorological parameter “mixing height” is not required for any algorithms, but can be used to set the vertical boundary (top) of a layer of air volume elements. The meteorological parameter “stability class” is not currently used in any algorithms, but may be in the future and is a required model input (named stabilityClass, input as an integer value of 1 through 6, representing stability classes A through F, respectively). (Because it is not currently used in any algorithms, dummy values may be used as inputs, if desired).

[c]When multiple layers of air compartments are modeled, vertical wind speed (m/sec, positive for up and negative for down) is also an input parameter. To date, the modeling of multiple air layers in TRIM.FaTE has not been fully implemented and tested.

[d]Not a direct model input, but set using the scenario property, simulationStepsPerOutput (simulationStepsPerOutput is determined by dividing the desired output time step by the selected simulation time step).