```
Attribute VB_Name = "FoodWeb"
Sub Input_foodweb()
If InitialTimestepCalc = True Then GoTo nodynfood
If tim = 0 Then GoTo nodynfood
If tim > timestep Then GoTo DynamicIterations
If tim = timestep Then GoTo DynamicIterations

nodynfood:
'for types of "organisms"/compartments:
' 1 = Water
' 2 = Sediment
' 3 = Phytoplankton
' 4 = Zooplankton
' 5 = Benthic organisms
' 6 = Forage fish A
' 7 = Forage fish B
' 8 = Piscivorous fish

Sheets("AGRO").Select
[AGRO!C17] = ""

Sheets("FWModel").Select
[h27].Select
For organism = 3 To 8
    Fraction_Resp(1, organism) = ActiveCell.Offset(1, organism).Value
    Fraction_Resp(2, organism) = ActiveCell.Offset(2, organism).Value
Next organism

Sheets("Foodweb").Select

'organism and foodweb characteristics are read in from FW-Inputs and FW-Estimation Calcs
Worksheets
'these worksheets are exactly the same as Gobas 2004-Metaflumizone Final.xls
'all of the k-values are dependent on Kow as inputs on Chemical worksheet


orgname(1) = "Water, dissolved"
orgname(2) = "Sediment, particles"

[c1].Select
For organism = 3 To 8
    'organism characteristics
    orgname(organism) = ActiveCell.Offset(organism, 0)
    mass_org(organism) = ActiveCell.Offset(organism, 1)
    lipidfract_org(organism) = ActiveCell.Offset(organism, 2)
    ' Rate Constants
    k1_d(organism) = ActiveCell.Offset(organism, 3)
    k2_d(organism) = ActiveCell.Offset(organism, 4)
    ke_d(organism) = ActiveCell.Offset(organism, 5)
    kd_d(organism) = ActiveCell.Offset(organism, 6)
    km_d(organism) = ActiveCell.Offset(organism, 7)
    kg_d(organism) = ActiveCell.Offset(organism, 8)
Next organism
```

```
' Feeding Matrix
' initialize all values to be zero
For predator = 2 To 8
    For prey = 0 To 8
        FeedingRate(predator, prey) = 0
        Corganism(predator) = 0
        CD(predator) = 0
    Next prey
Next predator

'Read in values from Feeding Matrix
[a13].Select
For predator = 3 To 8
    For prey = 1 To 8
        FeedingRate(predator, prey) = ActiveCell.Offset(prey - 1, predator)
    Next prey
Next predator


    ' rate constant unit conversions (per day to per hour)
    For organism = 3 To 8
        k1_h(organism) = k1_d(organism) / 24
        k2_h(organism) = k2_d(organism) / 24
        ke_h(organism) = ke_d(organism) / 24
        kd_h(organism) = kd_d(organism) / 24

        kT_d(organism) = k2_d(organism) + ke_d(organism) + km_d(organism) + kg_d(organism)
        kT_h(organism) = kT_d(organism) / 24

    Next organism

'Characteristic Time is quantified to determine the minimum timestep for Dynamic runs
'this is unchanging for the foodweb (k-values don't change with time)
minChartime = 100

    For organism = 3 To 8
        Chartime(organism) = 1 / kT_h(organism)
        If Chartime(organism) < minChartime Then
            minChartime = Chartime(organism)
        End If
    Next organism

 timestepf = minChartime / 10
 '7/12/2007 speeding up model execution times - fast processes
 'can be treated as at equilibrium with current concentrations
 'thus timestep need not be so short
 '/10 is OK

'7/17/2007 - taken out to allow eq conc for fast processes
' If timestepf < timestep Then [AGRO!b16] = timestepf

 'If timestepf < timestep Then timestep = timestepf
' if 24 hours is not entirely divisible by timestep then
```

```
' we should make timestep slightly shorter so that it is
' 6/6/2007
If timestepf > 3 Then timestepf = 3
If 24 / timestepf - Round(24 / timestepf, 0) <> 0 Then
    timestepf = 24 / (Round(24 / timestepf, 0) + 1)
End If

If keepcalcdtimestepconstant = False Then
    If Not noAGRO Then
        Call Main.CalcMinTimestep
    End If
End If

If Not noAGRO Then
    Corganism(2) = ConcSub(2, 2) * MolMass * g2ug / Density_kg(2) ' Sediment solids only mol/m3
    to ug/Kg
    CW = ConcSub(1, 1) * MolMass * g2ug / 1000# ' water (dissolved fraction only) mol/m3 to
    ug/L (or ug/kg as 1L=1kg)
    Corganism(1) = CW
    CPW = ConcSub(2, 1) * MolMass * g2ug / 1000# ' pore water mol/m3 to ug/L (or ug/kg as 1L=1kg)
End If

'When calculating initial timestep using button, skip model calcs and go to end
If InitialTimestepCalc = True Then
    GoTo noIterations
End If


'Determine the initial concentration of each participant according to it's dietary exposure
'    and existing contamination at time = 0

Corganism(3) = (k1_d(3) * (Fraction_Resp(1, 3) * CW + Fraction_Resp(2, 3) * CPW) / kT_d(3))
For prey = 1 To 8
    CD(4) = CD(4) + Corganism(prey) * FeedingRate(4, prey)
Next prey

Corganism(4) = (k1_d(4) * (Fraction_Resp(1, 4) * CW + Fraction_Resp(2, 4) * CPW) + kd_d(4) * CD(
4)) / kT_d(4)
For prey = 1 To 8
    CD(5) = CD(5) + Corganism(prey) * FeedingRate(5, prey)
Next prey

Corganism(5) = (k1_d(5) * (Fraction_Resp(1, 5) * CW + Fraction_Resp(2, 5) * CPW) + kd_d(5) * CD(
5)) / kT_d(5)
For prey = 1 To 8
    CD(6) = CD(6) + Corganism(prey) * FeedingRate(6, prey)
Next prey

Corganism(6) = (k1_d(6) * (Fraction_Resp(1, 6) * CW + Fraction_Resp(2, 6) * CPW) + kd_d(6) * CD(
6)) / kT_d(6)
For prey = 1 To 8
    CD(7) = CD(7) + Corganism(prey) * FeedingRate(7, prey)
Next prey
```

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Corganism(7) = (k1_d(7) * (Fraction_Resp(1, 7) * CW + Fraction_Resp(2, 7) * CPW) + kd_d(7) * CD(
7)) / kT_d(7)
For prey = 1 To 8
    CD(8) = CD(8) + Corganism(prey) * FeedingRate(8, prey)
Next prey

Corganism(8) = (k1_d(8) * (Fraction_Resp(1, 8) * CW + Fraction_Resp(2, 8) * CPW) + kd_d(8) * CD(
8)) / kT_d(8)


If Dynamic = False Then GoTo noIterations
If tim = timestep Then GoTo noIterations
If tim < timestep Then GoTo noIterations




' ************************************
' *     DYNAMIC MODEL STARTS HERE     *
' ************************************

DynamicIterations:
'start the dynamic iterations here
'this section is run every time through the time loop
'the section above is only run at the start to read in the model parameters
'and calculate the rates

If noAGRO Then
    'CW has been set in LoopForFood
    'CPW has been set in LoopForFood
    Corganism(2) = CSedSol
Else
    ' water (dissolved fraction only) mol/m3 to ug/L (or ug/kg as 1L=1kg)
    CW = ConcSub(1, 1) * MolMass * g2ug / 1000#
    Corganism(1) = CW

    ' pore water mol/m3 to ug/L (or ug/kg as 1L=1kg)
    CPW = ConcSub(2, 1) * MolMass * g2ug / 1000#

    ' Sediment solids only mol/m3 to ug/Kg
    Corganism(2) = ConcSub(2, 2) * MolMass * g2ug / Density_kg(2)
End If

'Determine concentration of each participant according to it's dietary exposure at each timestep
For predator = 3 To 8
CD(predator) = 0
    For prey = 0 To 7
        CD(predator) = CD(predator) + Corganism(prey) * FeedingRate(predator, prey)
    Next prey
Next predator

dCorganism(5) = timestep * (k1_h(5) * (Fraction_Resp(1, 5) * CW + Fraction_Resp(2, 5) * CPW) + (
kd_h(5) * CD(5)) - (kT_h(5) * Corganism(5)))
```

```
dCorganism(3) = timestep * (k1_h(3) * (Fraction_Resp(1, 3) * CW + Fraction_Resp(2, 3) * CPW) -
kT_h(3) * Corganism(3))
dCorganism(4) = timestep * (k1_h(4) * (Fraction_Resp(1, 4) * CW + Fraction_Resp(2, 4) * CPW) +
kd_h(4) * CD(4) - kT_h(4) * Corganism(4))
dCorganism(6) = timestep * (k1_h(6) * (Fraction_Resp(1, 6) * CW + Fraction_Resp(2, 6) * CPW) +
kd_h(6) * CD(6) - kT_h(6) * Corganism(6))
dCorganism(7) = timestep * (k1_h(7) * (Fraction_Resp(1, 7) * CW + Fraction_Resp(2, 7) * CPW) +
kd_h(7) * CD(7) - kT_h(7) * Corganism(7))
dCorganism(8) = timestep * (k1_h(8) * (Fraction_Resp(1, 8) * CW + Fraction_Resp(2, 8) * CPW) +
kd_h(8) * CD(8) - kT_h(8) * Corganism(8))

For organism = 3 To 8
'7/17/2007
'the following test is put in to allow, for fast processes, the organism concentration to
'be estimated as the equilibrium concentration, rather than estimating through integration
'this should avoid very short timesteps - the timestep will be set by the exposure model only
'and the food web model will not set the timestep (mods to code elsewhere)
'NOTE: need to check if the first test is OK.
'i.e. should it be characteristic time > timestep as the test, or characteristic time >
timestep/10 or timestep/20?
    If Chartime(organism) > timestep Then
        Corganism(organism) = Corganism(organism) + dCorganism(organism)
    Else
        [AGRO!C17] = "***"
        If organism = 3 Then
            Corganism(3) = k1_h(3) * (CW * Fraction_Resp(1, 3) + CPW * Fraction_Resp(2, 3)) /
            kT_h(3)
        Else
            Corganism(organism) = (k1_h(organism) * (CW * Fraction_Resp(1, organism) + CPW *
            Fraction_Resp(2, organism)) + kd_h(organism) * CD(organism)) / kT_h(organism)
        End If
    End If
Next organism


noIterations:


End Sub
```