The **chan.inp** file is an additional input file that was added to WEPP version 2012.8 to support the Kinematic Wave, Muskingum-Cunge and Muskingum-Cunge (variable) watershed channel routing methods. This file should be placed in the "runs" subfolder along with all the other WEPP input files. The filename is fixed and must be **chan.inp** for the WEPP model to process the information. To use these new channel routing methods the ipeak parameter of the original channel file now supports the following types:

1. Use modified EPIC computation method
2. Use CREAM computation method
3. Kinematic Wave
4. Muskingum-Cunge
5. Muskingum-Cunge (variable)

The original watershed channel file format can found on pages 68-69 of the WEPP User Summary (https://www.ars.usda.gov/ARSUserFiles/50201000/WEPP/usersum.pdf). The channel routing type is specified on line 3 of the file. If the type is specified as 3-5 then the **chan.inp** file is expected to contain additional input for these channel routing methods.

For more information on the new WEPP channel routing methods see the paper by Li Wang: https://www.fs.usda.gov/treesearch/pubs/40457

Title: Implementation of channel-routing routines in the Water Erosion Prediction Project (WEPP) model
Author(s): Li Wang; Joan Q. Wu; William J. Elliott; Shuhui Dun; Sergey Lapin; Fritz R. Fiedler; Dennis C. Flanagan
Date: 2010
Source: In: Proceedings of the Society for Industrial and Applied Mathematics Conference on Mathematics for Industry: Challenges and Frontiers; October 9-10, 2009; San Francisco, CA. MI09. Philadelphia, PA: Society for Industrial and Applied Mathematics: 120-127.

The format of the **chan.inp** file is the following:

Line 1: This contains 2 input parameters for output type and timestep:

- Output Type –
    0=none
    1=peak flow time and rate
    2=daily average flowrate
    3=timestep flowrate

- Timestep for routing (seconds)

Line 2: Unit area baseflow coefficient ($m^3/s/m^2$) , range 1e-6 or smaller

Line 3: Number of channels in the watershed

Line 4: Channel element identifiers. These match the identifiers used in the channel structure file. WEPP watershed identifiers are numbered with the hillslopes starting at ID #1 followed by the channels. See the WEPP User Summary pages 64-66 (https://www.ars.usda.gov/ARSUserFiles/50201000/WEPP/usersum.pdf) for how watershed elements are identified.

Example chan.inp file:

```
2  600
7e-007
3
6  7  8
```

This represents a 3 channel watershed with 5 hillslopes, daily average flowrate outputs, 10 minute timestep for routing (600 seconds), 7e-07 unit area baseflow coefficient. The runoff peak calculation method is not specified in this file but in the main channel input file.
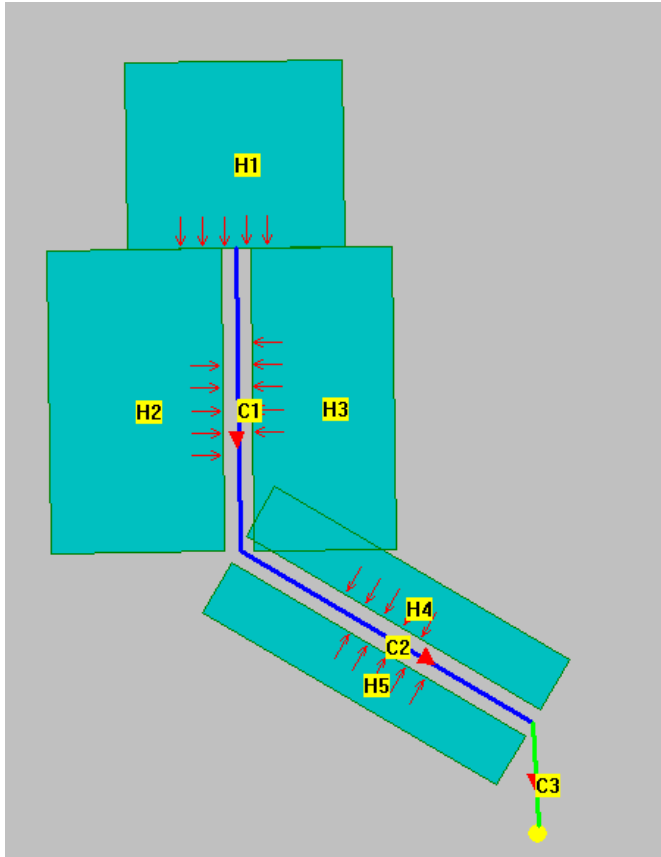
Additional Output Files

Channel Water Balance

```
Channel Water Balance

Inflow   = Total inflow above channel outlet, includes baseflow, all sources m^3
Outflow  = Water flow out of channel outlet, m^3
Storage  = Water surface storage at the end of the day, m^3
Baseflow = Portion of inflow from baseflow, m^3
Loss     = Transmission loss in channel, infiltration, m^3
Balance  = Water balance error at end of day, 0=balanced m^3
   inflow-outflow-loss-(change in surface storage)

Year   Day  Elmt_ID Chan_ID   Inflow   Outflow   Storage   Baseflow    Loss    Balance
  1     1      6       1      3819.55   3797.07    45.82    3819.55    22.49     0.00
  1     1      7       2      4893.09   4838.18   113.09    1096.02     9.09     0.00
  1     1      8       3      4838.18   4721.92   135.30       0.00     3.17     0.00
  1     2      6       1      3819.55   3813.23    45.92    3819.55     6.23     0.00
  1     2      7       2      4909.25   4906.43   113.40    1096.02     2.51     0.00
  1     2      8       3      4906.43   4905.21   135.68       0.00     0.85     0.00
  1     3      6       1      3819.55   3819.06    45.95    3819.55     0.46     0.00
  1     3      7       2      4915.09   4914.79   113.50    1096.02     0.19     0.00
  1     3      8       3      4914.79   4913.94   135.81       0.00     0.72     0.00
  1     4      6       1      3819.55   3819.02    45.95    3819.55     0.54     0.00
  1     4      7       2      4915.04   4914.83   113.50    1096.02     0.22     0.00
  1     4      8       3      4914.83   4914.03   135.81       0.00     0.80     0.00
  1     5      6       1      3819.55   3812.89    45.92    3819.55     6.70     0.00
  1     5      7       2      4908.91   4906.32   113.39    1096.02     2.71     0.00
  1     5      8       3      4906.32   4905.85   135.67       0.00     0.61     0.00
  1     6      6       1      3819.55   3819.00    45.95    3819.55     0.52     0.00
  1     6      7       2      4915.03   4914.70   113.50    1096.02     0.21     0.00
  1     6      8       3      4914.70   4913.78   135.81       0.00     0.78     0.00
  1     7      6       1      3819.55   3813.05    45.92    3819.55     6.54     0.00
  1     7      7       2      4909.07   4906.54   113.39    1096.02     2.64     0.00
  1     7      8       3      4906.54   4906.08   135.67       0.00     0.60     0.00
```

Channel Routing Output – Peak Flow Time and Rate (output type 1)

```
Channel Routing Output
  Kinematic wave method

Peak Flow Time and Rate

 Year      Day    Elmt_ID Chan_ID  Time(s)  Peak_Discharge(m^3/s)
   1        1        6       1       600.         4.39E-02
   1        1        7       2       600.         5.65E-02
   1        1        8       3       600.         5.65E-02
   1        2        6       1     42000.         4.41E-02
   1        2        7       2     45600.         5.68E-02
   1        2        8       3     45600.         5.68E-02
   1        3        6       1     40800.         4.42E-02
   1        3        7       2     42000.         5.69E-02
   1        3        8       3     42000.         5.69E-02
   1        4        6       1       600.         4.42E-02
   1        4        7       2       600.         5.69E-02
   1        4        8       3       600.         5.69E-02
   1        5        6       1       600.         4.42E-02
   1        5        7       2       600.         5.69E-02
   1        5        8       3       600.         5.69E-02
   1        6        6       1     40800.         4.42E-02
   1        6        7       2     43800.         5.69E-02
   1        6        8       3     44400.         5.69E-02
   1        7        6       1       600.         4.42E-02
   1        7        7       2       600.         5.69E-02
   1        7        8       3       600.         5.69E-02
   1        8        6       1     40800.         4.42E-02
   1        8        7       2     43800.         5.69E-02
   1        8        8       3     43200.         5.69E-02
   1        9        6       1       600.         4.42E-02
   1        9        7       2       600.         5.69E-02
```

Channel Routing Output – Daily Average Flow Rate (output type 2)

```
 Channel Routing Output
   Kinematic wave method

Daily Average Flow Rate

  Qavg   = Daily average discharge, m^3/s
  Runvol = Total runoff, m^3

  Year    Day    Elmt_ID Chan_ID    Qavg        Runvol
    1      1       6       1       4.39E-02     3797.07
    1      1       7       2       5.60E-02     4838.18
    1      1       8       3       5.47E-02     4721.92
    1      2       6       1       4.41E-02     3813.23
    1      2       7       2       5.68E-02     4906.43
    1      2       8       3       5.68E-02     4905.21
    1      3       6       1       4.42E-02     3819.06
    1      3       7       2       5.69E-02     4914.79
    1      3       8       3       5.69E-02     4913.94
    1      4       6       1       4.42E-02     3819.02
    1      4       7       2       5.69E-02     4914.83
    1      4       8       3       5.69E-02     4914.03
```

Channel Routing Output – Timestep Flow Rate (output type 3)

```
| Channel Routing Output
   Kinematic wave method

Timestep Flow Rate

  Year    Day    Elmt_ID Chan_ID  Time(s)   Discharge(m^3/s)
    1      1       6       1        600.         4.39E-02
    1      1       6       1       1200.         4.39E-02
    1      1       6       1       1800.         4.39E-02
    1      1       6       1       2400.         4.39E-02
    1      1       6       1       3000.         4.39E-02
    1      1       6       1       3600.         4.39E-02
    1      1       6       1       4200.         4.39E-02
    1      1       6       1       4800.         4.39E-02
    1      1       6       1       5400.         4.39E-02
    1      1       6       1       6000.         4.39E-02
    1      1       6       1       6600.         4.39E-02
    1      1       6       1       7200.         4.39E-02
    1      1       6       1       7800.         4.39E-02
    1      1       6       1       8400.         4.39E-02
    1      1       6       1       9000.         4.39E-02
    1      1       6       1       9600.         4.39E-02
```