**CE 3354 Engineering Hydrology**
**Exercise Set 4**

**Exercises**

1. Use the Oklahoma data you prepared in ES-3 and analyze using the Bulletin 17C procedure (using the PeakFQ software tool - use station skew option).

   If starting from just the data in ES3 you will have to carefully build an input file – the **Beargrass-B17C.txt**[1] file is the correct format.

   **Solution**

   The **Beargrass-B17C.txt** file is shown below

```
* WCF2.DATA  1/9/89 -- BULLETIN 17 EXAMPLES
*---+----1----+----2----+----3----+----4---+----5---+----6---+----7---+---8

Z                              USGS

*              LAT   LON                    AREA          ELEV
* STATIONID    DDMMSSDDDMMSS                1234567123456712345678

H 12345678     3527470973329               645.55        1202.01
N 12345678     OKLAHOMA FROM ES3
Y 12345678     20.0
2 12345678
3 12345678     19230101 200000
3 12345678     19240101 42000
3 12345678     19250101 11300
3 12345678     19260101 32400
3 12345678     19270101 108000
3 12345678     19280101 73000
3 12345678     19290101 76500
3 12345678     19300101 47800
3 12345678     19310101 28200
3 12345678     19320101 33700
3 12345678     19330101 25700
3 12345678     19340101 11700
3 12345678     19350101 77800
3 12345678     19360101 26600
```

---

[1]This file is located in same directory as this document

```
3 12345678      19370101 47500
3 12345678      19380101 75600
3 12345678      19390101 19200
3 12345678      19400101 27800
3 12345678      19410101 51000
3 12345678      19420101 94000
3 12345678      19430101 97200
3 12345678      19440101 179000
3 12345678      19450101 124000
3 12345678      19460101 110000
3 12345678      19470101 114000
3 12345678      19480101 70200
3 12345678      19490101 70700
3 12345678      19500101 92800
3 12345678      19510101 135000
3 12345678      19520101 25800
3 12345678      19530101 17500
3 12345678      19540101 18700
3 12345678      19550101 36300
3 12345678      19560101 49200
3 12345678      19570101 120000
3 12345678      19580101 56800
3 12345678      19590101 54800
3 12345678      19600101 158000
3 12345678      19610101 165000
3 12345678      19620101 103000
3 12345678      19630101 19700
3 12345678      19640101 21100
3 12345678      19650101 171000
3 12345678      19660101 10400
3 12345678      19670101 42000
3 12345678      19680101 52800
3 12345678      19690101 77000
3 12345678      19700101 101000
3 12345678      19710101 17100
*
```

Now load this file into PeakFQ, adjust the settings (EMA, and set skew to *station skew*), like below

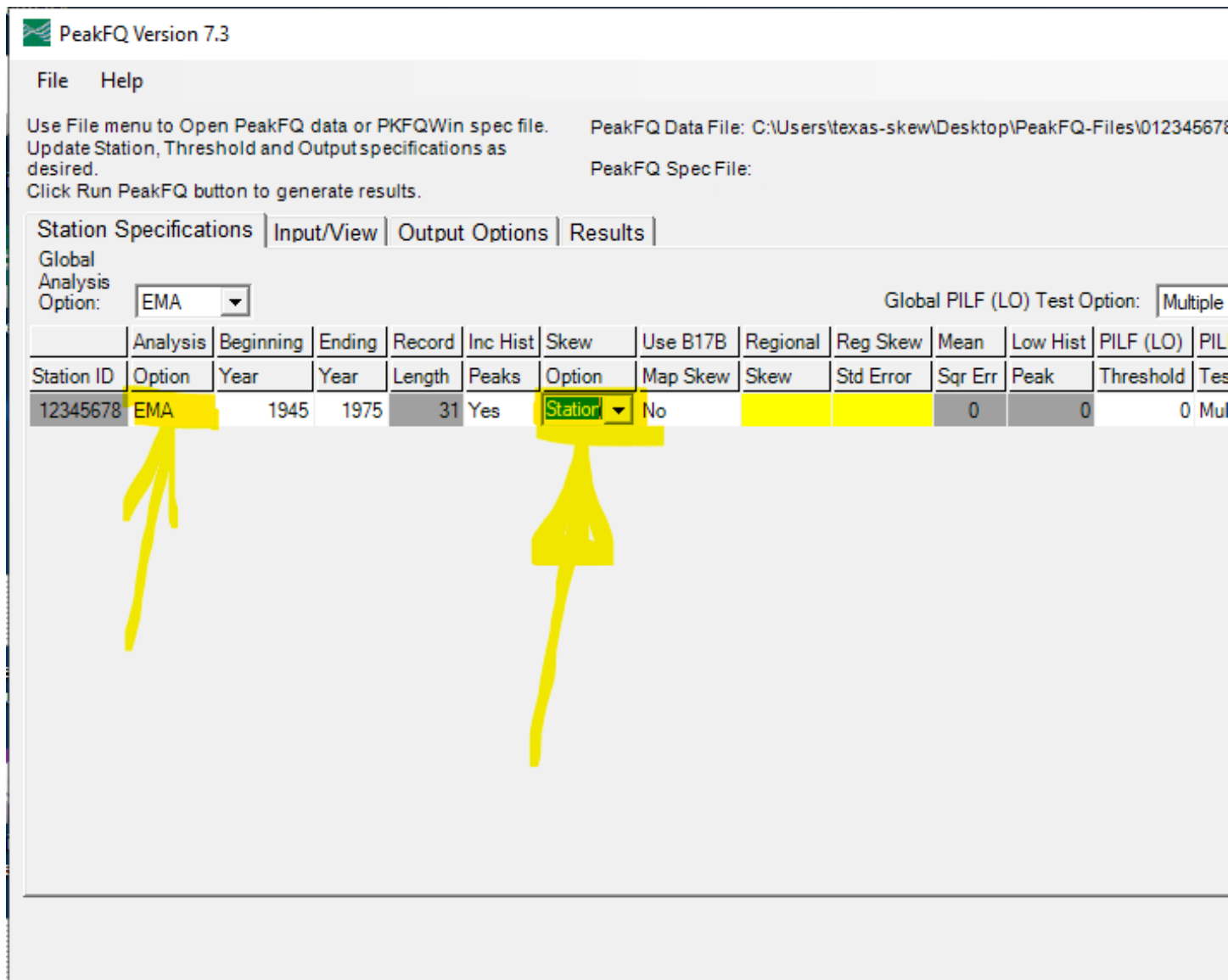Then run the program and extract results (either graphically, or using the output file Table 4)

Figure 1: PeakFQ 7.3 Set up screen for Beargrass Creek Data Analysis

2. Locate USGS Station 08144800 Brady Creek near Eden, TX. and analyze the historical peaks using the Bulletin 17C procedures (using the PeakFQ software tool use station skew option). Determine the median discharge predicted for this station by PeakFQ. Also determine the discharge per square mile of contributing drainage area.

**Solution**

The **Brady Creek STA_08144800.txt** file is shown below
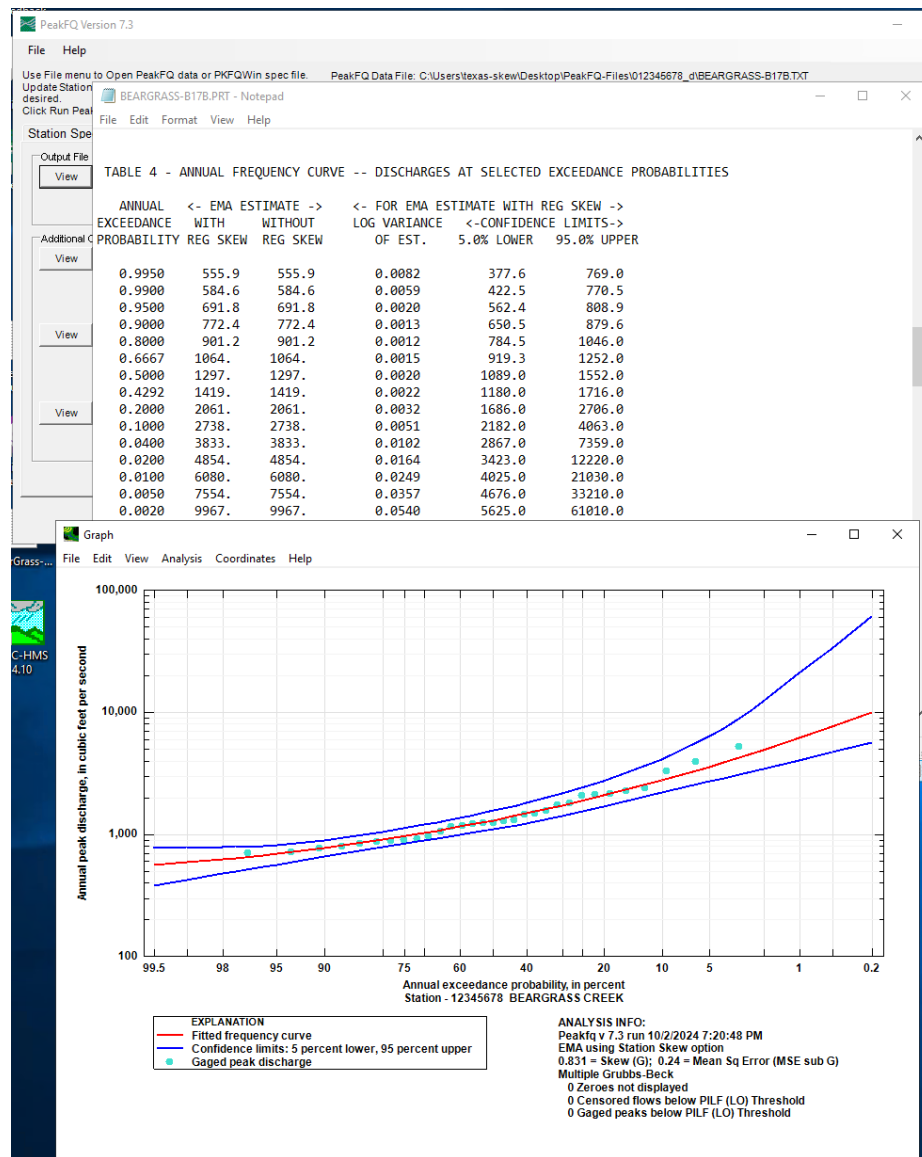
Figure 2: PeakFQ 7.3 results for Beargrass Creek Data Analysis

```
Z08144800                                    USGS
H08144800          3111030995027004848095SW12090110101      101      2000.99
N08144800          Brady Ck nr Eden, TX
Y08144800
308144800          19611009    2786              3.18
308144800          19630505    3.006             1.45
308144800          19631001    0.006
308144800          19650518    57.06             2.24
```

Figure 3: Find NWIS data for Brady Creek Data Analysis

| 308144800 | 19660428 | 51106 | 7.08 |
| 308144800 | 19670817 | 45606 | 6.72 |
| 308144800 | 19680310 | 11.06 | 1.78 |
| 308144800 | 19690911 | 9466 | 4.37 |
| 308144800 | 19700515 | 12.06 | 1.83 |
| 308144800 | 19710530 | 10206 | 4.04 |
| 308144800 | 19720615 | 3756 | 3.00 |
| 308144800 | 19730603 | 4106 | 3.07 |

```
308144800        19731012    33206            6.16
308144800        19750511     2446            3.07
308144800        19760711     4736            3.51
308144800        19770624    37206            6.45
308144800        19780528    38.06            1.84
308144800        19790809    10.06            1.51
308144800        19800909    13506            4.58
308144800        19810516    48.06            2.03
308144800        19820505     1776            2.71
308144800        19830606     1356            2.55
308144800        19840812     3336            3.14
308144800        19841231    60.06            2.08
```

3. Use the NOAA Precipitation Frequency Data Server to prepare Intensity-Duration-Frequency curves for Eden, Texas (Concho County). The desired ARI are 2-yr, 10-yr, 50-yr, and 100-yr (4 curves).

4. Use the NOAA Precipitation Frequency Data Server and the SCS Rainfall Distributions to prepare a 50-yr, 24-hour hyetograph for Eden, Texas.

5. Use the NOAA Precipitation Frequency Data Server and the Texas Hyetograph Tool (TxHYETO-2015.xlsx) to prepare a 50-yr, 24-hour hyetograph for Eden, Texas.

**Save these 50-yr, 24-hour hyetograph for Eden, Texas.; you will reuse them as inputs for the Hardin Branch project.**

**Beargrass-B17C in PeakFQ format (minor editing may still be needed)**

```
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Z                              USGS


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3 12345678        19270101 108000
3 12345678        19280101 73000
3 12345678        19290101 76500
3 12345678        19300101 47800
3 12345678        19310101 28200
3 12345678        19320101 33700
3 12345678        19330101 25700
3 12345678        19340101 11700
3 12345678        19350101 77800
3 12345678        19360101 26600
3 12345678        19370101 47500
3 12345678        19380101 75600
3 12345678        19390101 19200
3 12345678        19400101 27800
3 12345678        19410101 51000
3 12345678        19420101 94000
3 12345678        19430101 97200
3 12345678        19440101 179000
3 12345678        19450101 124000
3 12345678        19460101 110000
3 12345678        19470101 114000
3 12345678        19480101 70200
3 12345678        19490101 70700
```

```
3 12345678      19500101 92800
3 12345678      19510101 135000
3 12345678      19520101 25800
3 12345678      19530101 17500
3 12345678      19540101 18700
3 12345678      19550101 36300
3 12345678      19560101 49200
3 12345678      19570101 120000
3 12345678      19580101 56800
3 12345678      19590101 54800
3 12345678      19600101 158000
3 12345678      19610101 165000
3 12345678      19620101 103000
3 12345678      19630101 19700
3 12345678      19640101 21100
3 12345678      19650101 171000
3 12345678      19660101 10400
3 12345678      19670101 42000
3 12345678      19680101 52800
3 12345678      19690101 77000
3 12345678      19700101 101000
3 12345678      19710101 17100
*
```

**Station 08144800 in PeakFQ format (minor editing may still be needed)**

```
Z08144800                        USGS
H08144800        3111030995027004848095SW12090110101     101     2000.99
N08144800        Brady Ck nr Eden, TX
Y08144800
308144800        19611009    2786              3.18
308144800        19630505    3.006             1.45
308144800        19631001    0.006
308144800        19650518    57.06             2.24
308144800        19660428    51106             7.08
308144800        19670817    45606             6.72
308144800        19680310    11.06             1.78
308144800        19690911    9466              4.37
308144800        19700515    12.06             1.83
308144800        19710530    10206             4.04
308144800        19720615    3756              3.00
308144800        19730603    4106              3.07
308144800        19731012    33206             6.16
308144800        19750511    2446              3.07
308144800        19760711    4736              3.51
308144800        19770624    37206             6.45
308144800        19780528    38.06             1.84
308144800        19790809    10.06             1.51
308144800        19800909    13506             4.58
308144800        19810516    48.06             2.03
308144800        19820505    1776              2.71
308144800        19830606    1356              2.55
308144800        19840812    3336              3.14
308144800        19841231    60.06             2.08
```