

### Calibration and Evaluation of ET Methods:

During Calibration, an evaluation of ET formulas and variables was performed to select the best formula or method and then calibrate it to conditions in the Rock River Basin. This was performed on Jackson Creek @ Petrie Road for Water Years 1984 to 1990.

#### Available ET Formulas:

- 1) Priestly-Taylor Method - requires solar radiation and air temperature as input.
- 2) Penman-Monteith Method – requires solar radiation , air temperature, wind speed, and relative humidity as inputs
- 3) Hargreaves Method – requires air temperature only

Actual daily temperature is available, however, the model generates all other weather

#### Explanation of Variables:

**ESCO** = Soil evaporation compensation factor adjusts the depth distribution for evaporation from the soil to account for the effect of capillary action, crusting and cracks. ESCO must be between 0.00 and 1.0. Default value is 0.95.

**EPCO** = Plant uptake compensation factor. This factor adjusts the depth distribution for plant uptake of water from the soil to account for the variation in root density and depth. EPCO must be between 0.0 and 1.0. Default value is 1.0

**ETCO** = Evapotranspiration coefficient was added by Paul Baumgart to adjust the total PET. Paul Baumgart found a value of 0.65 worked well for Hargreaves in the Upper Bower Creek Watershed.

#### Calibration Model Runs:

The following runs were conducted by holding all of the variables constant except for ESCO, EPCO, and ETCO. Results were evaluated based on the Nash-Sutcliffe coefficient of efficiency.

- 1) Priestly-Taylor Method with EPCO = 1.0, ESCO1 = 0.95, and ETCO = 1.0

Total Yield (water year)

|             | Predicted | Measured | Predicted | Measured |
|-------------|-----------|----------|-----------|----------|
| 1984        | 2591.76   | 1595.02  | 10.76     | 6.62     |
| 1985        | 2200.21   | 1603.48  | 9.13      | 6.66     |
| 1986        | 3038.77   | 3191.13  | 12.61     | 13.25    |
| 1987        | 1500.85   | 1255.56  | 6.23      | 5.21     |
| 1988        | 1782.24   | 904.71   | 7.40      | 3.76     |
| 1989        | 1606.34   | 690.18   | 6.67      | 2.86     |
| 1990        | 2112.95   | 1377.91  | 8.77      | 5.72     |
| Totals      | 14833.12  | 10617.99 | 61.57     | 44.07    |
| Efficiency: | 0.1806663 |          |           |          |

E

2) Penman-Monteith Method with EPCO = 1.0, ESCO1 = 0.95, and ETCO = 1.0

Total Yield (water year)

|        | Predicted | Measured | Predicted | Measured |
|--------|-----------|----------|-----------|----------|
| 1984   | 2259.24   | 1595.02  | 9.38      | 6.62     |
| 1985   | 1975.30   | 1603.48  | 8.20      | 6.66     |
| 1986   | 2791.36   | 3191.13  | 11.59     | 13.25    |
| 1987   | 1366.21   | 1255.56  | 5.67      | 5.21     |
| 1988   | 1555.90   | 904.71   | 6.46      | 3.76     |
| 1989   | 1402.66   | 690.18   | 5.82      | 2.86     |
| 1990   | 1845.01   | 1377.91  | 7.66      | 5.72     |
| Totals | 13195.67  | 10617.99 | 54.77     | 44.07    |

Efficiency: 0.2486561

3) Hargreaves Method with EPCO = 1.0, ESCO1 = 0.95, and ETCO = 1.0

Total Yield (water year)

|        | Predicted | Measured | Predicted | Measured |
|--------|-----------|----------|-----------|----------|
| 1984   | 2332.59   | 1595.02  | 9.68      | 6.62     |
| 1985   | 2008.02   | 1603.48  | 8.33      | 6.66     |
| 1986   | 2996.06   | 3191.13  | 12.44     | 13.25    |
| 1987   | 1559.69   | 1255.56  | 6.47      | 5.21     |
| 1988   | 1331.67   | 904.71   | 5.53      | 3.76     |
| 1989   | 1489.30   | 690.18   | 6.18      | 2.86     |
| 1990   | 1779.84   | 1377.91  | 7.39      | 5.72     |
| Totals | 13497.17  | 10617.99 | 56.02     | 44.07    |
| Mean   | 1928.17   | 1516.86  | 8.00      | 6.30     |

Efficiency: 0.4311826

4) Hargreaves Method with EPCO = 1.0, ESCO1 = 0.95, and ETCO = 0.1

Total Yield (water year)

|        | Predicted | Measured | Predicted | Measured |
|--------|-----------|----------|-----------|----------|
| 1984   | 1518.97   | 1595.02  | 6.30      | 6.62     |
| 1985   | 1500.69   | 1603.48  | 6.23      | 6.66     |
| 1986   | 2163.52   | 3191.13  | 8.98      | 13.25    |
| 1987   | 1110.76   | 1255.56  | 4.61      | 5.21     |
| 1988   | 870.26    | 904.71   | 3.61      | 3.76     |
| 1989   | 637.64    | 690.18   | 2.65      | 2.86     |
| 1990   | 1249.38   | 1377.91  | 5.19      | 5.72     |
| Totals | 9051.20   | 10617.99 | 37.57     | 44.07    |

Efficiency: 0.3966574

E

5) Hargreaves Method with EPCO = 0.1, ESCO1 = 0.95, and ETCO = 1.0

Total Yield (water year)

|        | Predicted | Measured | Predicted | Measured |
|--------|-----------|----------|-----------|----------|
| 1984   | 2332.59   | 1595.02  | 9.68      | 6.62     |
| 1985   | 2008.02   | 1603.48  | 8.33      | 6.66     |
| 1986   | 2996.06   | 3191.13  | 12.44     | 13.25    |
| 1987   | 1559.69   | 1255.56  | 6.47      | 5.21     |
| 1988   | 1331.67   | 904.71   | 5.53      | 3.76     |
| 1989   | 1489.30   | 690.18   | 6.18      | 2.86     |
| 1990   | 1779.84   | 1377.91  | 7.39      | 5.72     |
| Totals | 13497.17  | 10617.99 | 56.02     | 44.07    |
| Mean   | 1928.17   | 1516.86  | 8.00      | 6.30     |

Efficiency: 0.4311826

6) Hargreaves Method with EPCO = 1.0, ESCO1 = 0.95, and ETCO =.80

Total Yield (water year)

|        | Predicted | Measured | Predicted | Measured |
|--------|-----------|----------|-----------|----------|
| 1984   | 2308.74   | 1595.02  | 9.58      | 6.62     |
| 1985   | 1994.56   | 1603.48  | 8.28      | 6.66     |
| 1986   | 2974.91   | 3191.13  | 12.35     | 13.25    |
| 1987   | 1546.07   | 1255.56  | 6.42      | 5.21     |
| 1988   | 1320.64   | 904.71   | 5.48      | 3.76     |
| 1989   | 1478.01   | 690.18   | 6.13      | 2.86     |
| 1990   | 1767.27   | 1377.91  | 7.34      | 5.72     |
| Totals | 13390.21  | 10617.99 | 55.58     | 44.07    |
| Mean   | 1912.89   | 1516.86  | 7.94      | 6.30     |

Efficiency: 0.4363397

7) Hargreaves Method with EPCO = 1.0, ESCO1 = 0.95, and ETCO =.50

Total Yield (water year)

|      | Predicted | Measured | Predicted | Measured |
|------|-----------|----------|-----------|----------|
| 1984 | 1827.23   | 1595.02  | 7.58      | 6.62     |
| 1985 | 1667.42   | 1603.48  | 6.92      | 6.66     |
| 1986 | 2364.05   | 3191.13  | 9.81      | 13.25    |
| 1987 | 1168.20   | 1255.56  | 4.85      | 5.21     |
| 1988 | 973.29    | 904.71   | 4.04      | 3.76     |
| 1989 | 990.39    | 690.18   | 4.11      | 2.86     |
| 1990 | 1358.63   | 1377.91  | 5.64      | 5.72     |

E

|        |          |          |       |       |
|--------|----------|----------|-------|-------|
| Totals | 10349.21 | 10617.99 | 42.96 | 44.07 |
| Mean   | 1478.46  | 1516.86  | 6.14  | 6.30  |

Efficiency: 0.4569846

8) Hargreaves Method with EPCO = .80, ESCO1 = 0.95, and ETCO =.50

Total Yield (water year)

|      | Predicted | Measured | Predicted | Measured |
|------|-----------|----------|-----------|----------|
| 1984 | 1841.57   | 1595.02  | 7.64      | 6.62     |
| 1985 | 1676.86   | 1603.48  | 6.96      | 6.66     |
| 1986 | 2379.33   | 3191.13  | 9.88      | 13.25    |
| 1987 | 1176.41   | 1255.56  | 4.88      | 5.21     |
| 1988 | 980.70    | 904.71   | 4.07      | 3.76     |
| 1989 | 1003.90   | 690.18   | 4.17      | 2.86     |
| 1990 | 1370.44   | 1377.91  | 5.69      | 5.72     |

|        |          |          |       |       |
|--------|----------|----------|-------|-------|
| Totals | 10429.20 | 10617.99 | 43.29 | 44.07 |
| Mean   | 1489.89  | 1516.86  | 6.18  | 6.30  |

Efficiency: 0.4652579

9) Hargreaves Method with EPCO = .50, ESCO1 = 0.95, and ETCO =.50

Total Yield (water year)

|      | Predicted | Measured | Predicted | Measured |
|------|-----------|----------|-----------|----------|
| 1984 | 1871.48   | 1595.02  | 7.77      | 6.62     |
| 1985 | 1699.27   | 1603.48  | 7.05      | 6.66     |
| 1986 | 2420.51   | 3191.13  | 10.05     | 13.25    |
| 1987 | 1194.28   | 1255.56  | 4.96      | 5.21     |
| 1988 | 997.38    | 904.71   | 4.14      | 3.76     |
| 1989 | 1037.59   | 690.18   | 4.31      | 2.86     |
| 1990 | 1397.71   | 1377.91  | 5.80      | 5.72     |

|        |          |          |       |       |
|--------|----------|----------|-------|-------|
| Totals | 10618.20 | 10617.99 | 44.07 | 44.07 |
| Mean   | 1516.89  | 1516.86  | 6.30  | 6.30  |

Efficiency: 0.4898472

10) Hargreaves Method with EPCO = .50, ESCO1 = 0.95, and ETCO =.20

Total Yield (water year)

|      | Predicted | Measured | Predicted | Measured |
|------|-----------|----------|-----------|----------|
| 1984 | 1612.01   | 1595.02  | 6.69      | 6.62     |
| 1985 | 1553.63   | 1603.48  | 6.45      | 6.66     |
| 1986 | 2266.90   | 3191.13  | 9.41      | 13.25    |
| 1987 | 1143.44   | 1255.56  | 4.75      | 5.21     |
| 1988 | 908.59    | 904.71   | 3.77      | 3.76     |

E

|             |      |           |          |       |       |
|-------------|------|-----------|----------|-------|-------|
|             | 1989 | 802.06    | 690.18   | 3.33  | 2.86  |
|             | 1990 | 1302.01   | 1377.91  | 5.40  | 5.72  |
| Totals      |      | 9588.64   | 10617.99 | 39.80 | 44.07 |
| Mean        |      | 1369.81   | 1516.86  | 5.69  | 6.30  |
| Efficiency: |      | 0.4584707 |          |       |       |

11) Hargreaves Method with EPCO = .50, ESCO1 = 0.95, and ETCO =.40

Total Yield (water year)

|             | Predicted | Measured  | Predicted | Measured |  |
|-------------|-----------|-----------|-----------|----------|--|
| 1984        | 1805.68   | 1595.02   | 7.49      | 6.62     |  |
| 1985        | 1645.47   | 1603.48   | 6.83      | 6.66     |  |
| 1986        | 2388.52   | 3191.13   | 9.91      | 13.25    |  |
| 1987        | 1172.21   | 1255.56   | 4.87      | 5.21     |  |
| 1988        | 968.66    | 904.71    | 4.02      | 3.76     |  |
| 1989        | 988.89    | 690.18    | 4.10      | 2.86     |  |
| 1990        | 1359.19   | 1377.91   | 5.64      | 5.72     |  |
| Totals      | 10328.62  | 10617.99  | 42.87     | 44.07    |  |
| Mean        | 1475.52   | 1516.86   | 6.12      | 6.30     |  |
| Efficiency: |           | 0.5002534 |           |          |  |

12) Hargreaves Method with EPCO = .70, ESCO1 = 0.95, and ETCO =.40

Total Yield (water year)

|             | Predicted | Measured  | Predicted | Measured |  |
|-------------|-----------|-----------|-----------|----------|--|
| 1984        | 1786.13   | 1595.02   | 7.41      | 6.62     |  |
| 1985        | 1629.71   | 1603.48   | 6.76      | 6.66     |  |
| 1986        | 2359.50   | 3191.13   | 9.79      | 13.25    |  |
| 1987        | 1160.48   | 1255.56   | 4.82      | 5.21     |  |
| 1988        | 958.01    | 904.71    | 3.98      | 3.76     |  |
| 1989        | 967.79    | 690.18    | 4.02      | 2.86     |  |
| 1990        | 1341.10   | 1377.91   | 5.57      | 5.72     |  |
| Totals      | 10202.72  | 10617.99  | 42.35     | 44.07    |  |
| Mean        | 1457.53   | 1516.86   | 6.05      | 6.30     |  |
| Efficiency: |           | 0.4772565 |           |          |  |

13) Hargreaves Method with EPCO = .70, ESCO1 = 0.95, and ETCO =.60

Total Yield (water year)

|      | Predicted | Measured | Predicted | Measured |
|------|-----------|----------|-----------|----------|
| 1984 | 1888.73   | 1595.02  | 7.84      | 6.62     |
| 1985 | 1705.68   | 1603.48  | 7.08      | 6.66     |

E

|             |           |          |       |       |
|-------------|-----------|----------|-------|-------|
| 1986        | 2424.30   | 3191.13  | 10.06 | 13.25 |
| 1987        | 1195.62   | 1255.56  | 4.96  | 5.21  |
| 1988        | 1010.34   | 904.71   | 4.19  | 3.76  |
| 1989        | 1051.84   | 690.18   | 4.37  | 2.86  |
| 1990        | 1424.86   | 1377.91  | 5.91  | 5.72  |
| Totals      | 10701.38  | 10617.99 | 44.42 | 44.07 |
| Mean        | 1528.77   | 1516.86  | 6.35  | 6.30  |
| Efficiency: | 0.4737236 |          |       |       |
| R-sq:       | 0.8860607 |          |       |       |

14) Hargreaves Method with EPCO = .40, ESCO1 = 0.95, and ETCO =.40

Total Yield (water year)

|             | Predicted | Measured | Predicted | Measured |
|-------------|-----------|----------|-----------|----------|
| 1984        | 1818.59   | 1595.02  | 7.55      | 6.62     |
| 1985        | 1665.66   | 1603.48  | 6.91      | 6.66     |
| 1986        | 2411.20   | 3191.13  | 10.01     | 13.25    |
| 1987        | 1185.86   | 1255.56  | 4.92      | 5.21     |
| 1988        | 979.87    | 904.71   | 4.07      | 3.76     |
| 1989        | 1007.63   | 690.18   | 4.18      | 2.86     |
| 1990        | 1372.80   | 1377.91  | 5.70      | 5.72     |
| Totals      | 10441.61  | 10617.99 | 43.34     | 44.07    |
| Mean        | 1491.66   | 1516.86  | 6.19      | 6.30     |
| Efficiency: | 0.5138633 |          |           |          |
| R-sq:       | 0.9086147 |          |           |          |

15) Hargreaves Method with EPCO = .30, ESCO1 = 0.95, and ETCO =.30

Total Yield (water year)

|             | Predicted | Measured | Predicted | Measured |
|-------------|-----------|----------|-----------|----------|
| 1984        | 1738.10   | 1595.02  | 7.21      | 6.62     |
| 1985        | 1636.69   | 1603.48  | 6.79      | 6.66     |
| 1986        | 2378.25   | 3191.13  | 9.87      | 13.25    |
| 1987        | 1180.32   | 1255.56  | 4.90      | 5.21     |
| 1988        | 958.08    | 904.71   | 3.98      | 3.76     |
| 1989        | 969.52    | 690.18   | 4.02      | 2.86     |
| 1990        | 1361.48   | 1377.91  | 5.65      | 5.72     |
| Totals      | 10222.45  | 10617.99 | 42.43     | 44.07    |
| Mean        | 1460.35   | 1516.86  | 6.06      | 6.30     |
| Efficiency: | 0.5052154 |          |           |          |
| R-sq:       | 0.9282406 |          |           |          |

16) Hargreaves Method with EPCO = .30, ESCO1 = 0.95, and ETCO =.40

Total Yield (water year)

|             | Predicted | Measured | Predicted | Measured |
|-------------|-----------|----------|-----------|----------|
| 1984        | 1859.87   | 1595.02  | 7.72      | 6.62     |
| 1985        | 1690.65   | 1603.48  | 7.02      | 6.66     |
| 1986        | 2445.05   | 3191.13  | 10.15     | 13.25    |
| 1987        | 1201.79   | 1255.56  | 4.99      | 5.21     |
| 1988        | 993.81    | 904.71   | 4.12      | 3.76     |
| 1989        | 1030.19   | 690.18   | 4.28      | 2.86     |
| 1990        | 1392.01   | 1377.91  | 5.78      | 5.72     |
| Totals      | 10613.36  | 10617.99 | 44.05     | 44.07    |
| Mean        | 1516.19   | 1516.86  | 6.29      | 6.30     |
| Efficiency: | 0.5344591 |          |           |          |
| R-sq:       | 0.9026932 |          |           |          |

17) Hargreaves Method with EPCO = .30, ESCO1 = 0.5, and ETCO =.40

Total Yield (water year)

|             | Predicted | Measured | Predicted | Measured |
|-------------|-----------|----------|-----------|----------|
| 1984        | 1551.88   | 1595.02  | 6.44      | 6.62     |
| 1985        | 1557.12   | 1603.48  | 6.46      | 6.66     |
| 1986        | 2285.15   | 3191.13  | 9.48      | 13.25    |
| 1987        | 997.61    | 1255.56  | 4.14      | 5.21     |
| 1988        | 790.13    | 904.71   | 3.28      | 3.76     |
| 1989        | 696.90    | 690.18   | 2.89      | 2.86     |
| 1990        | 1144.21   | 1377.91  | 4.75      | 5.72     |
| Totals      | 9023.00   | 10617.99 | 37.45     | 44.07    |
| Mean        | 1289.00   | 1516.86  | 5.35      | 6.30     |
| Efficiency: | 0.5644405 |          |           |          |
| R-sq:       | 0.929797  |          |           |          |

18) Hargreaves Method with EPCO = .30, ESCO1 = 0.5, and ETCO =.60

Total Yield (water year)

|      | Predicted | Measured | Predicted | Measured |
|------|-----------|----------|-----------|----------|
| 1984 | 1664.44   | 1595.02  | 6.91      | 6.62     |
| 1985 | 1635.21   | 1603.48  | 6.79      | 6.66     |
| 1986 | 2378.94   | 3191.13  | 9.87      | 13.25    |
| 1987 | 1084.06   | 1255.56  | 4.50      | 5.21     |
| 1988 | 896.93    | 904.71   | 3.72      | 3.76     |
| 1989 | 861.90    | 690.18   | 3.58      | 2.86     |
| 1990 | 1329.45   | 1377.91  | 5.52      | 5.72     |

E

|        |         |          |       |       |
|--------|---------|----------|-------|-------|
| Totals | 9850.93 | 10617.99 | 40.89 | 44.07 |
| Mean   | 1407.28 | 1516.86  | 5.84  | 6.30  |

Efficiency: 0.599503  
R-sq: 0.9298605

19) Hargreaves Method with EPCO = .50, ESCO1 = 0.5, and ETCO =.60

Total Yield (water year)

|        | Predicted | Measured | Predicted | Measured |
|--------|-----------|----------|-----------|----------|
| 1984   | 1628.96   | 1595.02  | 6.76      | 6.62     |
| 1985   | 1589.68   | 1603.48  | 6.60      | 6.66     |
| 1986   | 2325.02   | 3191.13  | 9.65      | 13.25    |
| 1987   | 1059.61   | 1255.56  | 4.40      | 5.21     |
| 1988   | 873.30    | 904.71   | 3.62      | 3.76     |
| 1989   | 821.10    | 690.18   | 3.41      | 2.86     |
| 1990   | 1288.57   | 1377.91  | 5.35      | 5.72     |
| Totals | 9586.24   | 10617.99 | 39.79     | 44.07    |
| Mean   | 1369.46   | 1516.86  | 5.68      | 6.30     |

Efficiency: 0.5542024  
R-sq: 0.931113

20) Hargreaves Method with EPCO = .30, ESCO1 = 0.6, and ETCO =.60

Total Yield (water year)

|        | Predicted | Measured | Predicted | Measured |
|--------|-----------|----------|-----------|----------|
| 1984   | 1672.54   | 1595.02  | 6.94      | 6.62     |
| 1985   | 1642.62   | 1603.48  | 6.82      | 6.66     |
| 1986   | 2388.30   | 3191.13  | 9.91      | 13.25    |
| 1987   | 1090.33   | 1255.56  | 4.53      | 5.21     |
| 1988   | 905.80    | 904.71   | 3.76      | 3.76     |
| 1989   | 876.43    | 690.18   | 3.64      | 2.86     |
| 1990   | 1341.06   | 1377.91  | 5.57      | 5.72     |
| Totals | 9917.09   | 10617.99 | 41.16     | 44.07    |
| Mean   | 1416.73   | 1516.86  | 5.88      | 6.30     |

Efficiency: 0.6016196  
R-sq: 0.9297798

21) Hargreaves Method with EPCO = .30, ESCO1 = 0.7, and ETCO =.60

Total Yield (water year)

|      | Predicted | Measured | Predicted | Measured |
|------|-----------|----------|-----------|----------|
| 1984 | 1692.80   | 1595.02  | 7.03      | 6.62     |
| 1985 | 1660.03   | 1603.48  | 6.89      | 6.66     |

E

|             |           |          |       |       |
|-------------|-----------|----------|-------|-------|
| 1986        | 2410.83   | 3191.13  | 10.01 | 13.25 |
| 1987        | 1100.20   | 1255.56  | 4.57  | 5.21  |
| 1988        | 921.32    | 904.71   | 3.82  | 3.76  |
| 1989        | 898.24    | 690.18   | 3.73  | 2.86  |
| 1990        | 1360.75   | 1377.91  | 5.65  | 5.72  |
| Totals      | 10044.16  | 10617.99 | 41.69 | 44.07 |
| Mean        | 1434.88   | 1516.86  | 5.96  | 6.30  |
| Efficiency: | 0.6138618 |          |       |       |
| R-sq:       | 0.9285224 |          |       |       |

22) Hargreaves Method with EPCO = .30, ESCO1 = 0.8, and ETCO =.60

Total Yield (water year)

|             | Predicted | Measured | Predicted | Measured |
|-------------|-----------|----------|-----------|----------|
| 1984        | 1762.70   | 1595.02  | 7.32      | 6.62     |
| 1985        | 1701.17   | 1603.48  | 7.06      | 6.66     |
| 1986        | 2452.49   | 3191.13  | 10.18     | 13.25    |
| 1987        | 1120.46   | 1255.56  | 4.65      | 5.21     |
| 1988        | 948.13    | 904.71   | 3.94      | 3.76     |
| 1989        | 953.54    | 690.18   | 3.96      | 2.86     |
| 1990        | 1386.23   | 1377.91  | 5.75      | 5.72     |
| Totals      | 10324.71  | 10617.99 | 42.85     | 44.07    |
| Mean        | 1474.96   | 1516.86  | 6.12      | 6.30     |
| Efficiency: | 0.6230233 |          |           |          |
| R-sq:       | 0.9165687 |          |           |          |

23) Hargreaves Method with EPCO = .30, ESCO1 = 0.8, and ETCO =.50

Total Yield (water year)

|             | Predicted | Measured | Predicted | Measured |
|-------------|-----------|----------|-----------|----------|
| 1984        | 1710.17   | 1595.02  | 7.10      | 6.62     |
| 1985        | 1666.39   | 1603.48  | 6.92      | 6.66     |
| 1986        | 2402.85   | 3191.13  | 9.97      | 13.25    |
| 1987        | 1077.57   | 1255.56  | 4.47      | 5.21     |
| 1988        | 894.10    | 904.71   | 3.71      | 3.76     |
| 1989        | 871.28    | 690.18   | 3.62      | 2.86     |
| 1990        | 1279.95   | 1377.91  | 5.31      | 5.72     |
| Totals      | 9902.30   | 10617.99 | 41.10     | 44.07    |
| Mean        | 1414.61   | 1516.86  | 5.87      | 6.30     |
| Efficiency: | 0.624535  |          |           |          |
| R-sq:       | 0.9161152 |          |           |          |

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24) Hargreaves Method with EPCO = .30, ESCO1 = 0.8, and ETCO =.65

Total Yield (water year)

|             | Predicted | Measured | Predicted | Measured |
|-------------|-----------|----------|-----------|----------|
| 1984        | 1800.04   | 1595.02  | 7.47      | 6.62     |
| 1985        | 1714.31   | 1603.48  | 7.12      | 6.66     |
| 1986        | 2475.86   | 3191.13  | 10.28     | 13.25    |
| 1987        | 1153.46   | 1255.56  | 4.79      | 5.21     |
| 1988        | 975.52    | 904.71   | 4.05      | 3.76     |
| 1989        | 996.71    | 690.18   | 4.14      | 2.86     |
| 1990        | 1438.05   | 1377.91  | 5.97      | 5.72     |
| Totals      | 10553.94  | 10617.99 | 43.81     | 44.07    |
| Mean        | 1507.71   | 1516.86  | 6.26      | 6.30     |
| Efficiency: | 0.6099707 |          |           |          |
| R-sq:       | 0.9152385 |          |           |          |

25) Hargreaves Method with EPCO = .30, ESCO1 = 0.7, and ETCO =.65

Total Yield (water year)

|             | Predicted | Measured | Predicted | Measured |
|-------------|-----------|----------|-----------|----------|
| 1984        | 1747.96   | 1595.02  | 7.26      | 6.62     |
| 1985        | 1674.76   | 1603.48  | 6.95      | 6.66     |
| 1986        | 2435.47   | 3191.13  | 10.11     | 13.25    |
| 1987        | 1132.79   | 1255.56  | 4.70      | 5.21     |
| 1988        | 949.33    | 904.71   | 3.94      | 3.76     |
| 1989        | 952.35    | 690.18   | 3.95      | 2.86     |
| 1990        | 1412.35   | 1377.91  | 5.86      | 5.72     |
| Totals      | 10305.02  | 10617.99 | 42.77     | 44.07    |
| Mean        | 1472.15   | 1516.86  | 6.11      | 6.30     |
| Efficiency: | 0.6012083 |          |           |          |
| R-sq:       | 0.9228448 |          |           |          |