

Water-Data Report 2011

**01467150 COOPER RIVER AT HADDONFIELD, NJ**

DELAWARE RIVER BASIN

LOCATION.--Lat 39°54'11", long 75°01'17" referenced to North American Datum of 1983, Cherry Hill Township, Camden County, NJ, Hydrologic Unit 02040202, on right bank just upstream of dam on Wallworth Lake in Pennypacker Park, 200 ft upstream from bridge on State Highway 41 (Kings Highway) in Haddonfield, 0.6 mi upstream from North Branch Cooper River, and 7.7 mi upstream from mouth.

DRAINAGE AREA.--17.0 mi<sup>2</sup>.

**SURFACE-WATER RECORDS**

PERIOD OF RECORD.--October 1963 to current year.

REVISED RECORDS.--WDR NJ-1969: 1967(M). WDR NJ-82-2: Drainage area. WDR NJ-04-1: 1971(M).

GAGE.--Water-stage recorder above concrete dam. Datum of gage is 9.29 ft above NGVD of 1929.

REMARKS.--Records fair, except for estimated daily discharges and discharges below 40 ft<sup>3</sup>/s, which are poor. Bypass gates were installed on both sides of the dam in August 1987. Occasional regulation at low flow from small lakes upstream. Small waste-water treatment plants in the basin were regionalized after the summer of 1987, significantly reducing low flow. Several measurements of water temperature were made during the year. Satellite telemetry at station.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft<sup>3</sup>/s and (or) maximum (\*):

| Date   | Time | Discharge<br>(ft <sup>3</sup> /s) | Gage height<br>(ft) |
|--------|------|-----------------------------------|---------------------|
| Oct 1  | 0930 | 1,100                             | 3.72                |
| Jul 8  | 2230 | 532                               | 2.84                |
| Aug 28 | 0530 | *2,910                            | *5.86               |
| Sep 8  | 1000 | 1,050                             | 3.66                |

## 01467150 COOPER RIVER AT HADDONFIELD, NJ—Continued

**DISCHARGE, CUBIC FEET PER SECOND**  
**WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**  
**DAILY MEAN VALUES**  
[e, estimated]

| Day          | Oct     | Nov  | Dec   | Jan   | Feb  | Mar   | Apr   | May  | Jun   | Jul   | Aug     | Sep   |
|--------------|---------|------|-------|-------|------|-------|-------|------|-------|-------|---------|-------|
| 1            | 567     | 13   | 103   | 12    | 13   | 37    | e32   | e18  | 11    | 8.1   | 28      | 20    |
| 2            | 73      | 12   | 47    | 35    | 85   | 22    | e24   | e18  | 11    | 8.1   | 24      | 18    |
| 3            | 21      | 11   | 21    | 26    | 57   | 17    | 19    | e18  | 8.6   | 9.0   | e12     | 16    |
| 4            | e25     | e78  | 14    | 14    | 26   | 16    | 21    | e44  | 8.7   | 9.0   | e40     | 16    |
| 5            | e45     | e48  | 12    | 12    | 26   | 15    | 40    | e28  | 8.2   | 9.5   | e12     | 16    |
| 6            | 26      | e18  | 11    | 10    | 56   | 22    | 28    | 20   | 9.1   | 8.9   | e9.0    | 21    |
| 7            | 15      | e12  | 11    | 10    | 39   | 109   | 25    | 17   | 9.6   | 45    | e9.0    | 39    |
| 8            | 12      | 13   | 11    | 10    | 44   | 56    | 54    | 16   | 9.1   | 143   | e8.0    | 379   |
| 9            | 11      | 13   | 10    | 10    | 28   | 32    | 69    | 15   | 8.8   | 202   | e42     | 78    |
| 10           | 9.6     | 12   | 10    | 9.1   | 19   | 28    | 28    | 14   | 24    | 29    | e42     | 34    |
| 11           | e11     | 12   | 11    | 9.1   | 16   | 105   | 25    | 13   | 18    | 15    | e13     | 25    |
| 12           | e28     | 12   | 61    | 10    | 15   | 54    | e40   | 13   | 21    | 13    | e9.0    | e78   |
| 13           | e13     | 12   | 77    | 10    | 15   | 32    | e74   | 14   | 12    | 12    | e8.0    | e33   |
| 14           | e38     | 11   | 24    | 9.2   | 22   | 24    | e33   | 14   | 11    | 11    | e495    | e28   |
| 15           | e41     | 11   | 16    | 9.1   | 29   | 19    | e25   | 24   | 11    | 10    | e170    | e27   |
| 16           | e15     | e15  | 13    | 9.1   | 19   | e67   | e77   | 19   | 8.7   | 9.5   | e71     | e24   |
| 17           | e11     | e35  | 12    | 9.1   | 19   | e35   | e410  | 29   | 22    | 10    | e26     | e24   |
| 18           | e11     | e17  | 12    | 78    | 23   | e28   | e57   | 28   | 10    | 9.4   | e84     | e25   |
| 19           | e24     | 15   | 12    | 63    | 20   | e24   | e36   | 26   | 8.2   | 11    | e89     | e25   |
| 20           | 13      | 14   | 12    | 35    | 17   | e23   | e30   | 35   | 8.1   | 18    | e54     | e24   |
| 21           | 13      | 13   | 11    | 34    | 16   | e45   | e25   | 38   | 8.2   | 10    | e23     | e26   |
| 22           | 11      | 11   | 11    | 20    | 19   | e32   | e23   | 24   | 9.0   | 9.2   | e23     | e28   |
| 23           | 10      | 11   | 10    | 13    | 21   | e31   | e33   | 19   | 8.3   | 8.7   | e12     | e96   |
| 24           | 10      | 10   | 9.1   | 10    | 18   | e44   | e32   | 16   | 8.3   | 9.0   | e11     | e64   |
| 25           | 10      | e14  | 9.1   | 9.1   | 52   | e29   | e22   | 15   | 7.7   | 11    | e22     | e33   |
| 26           | e12     | e16  | 9.5   | 17    | 72   | e26   | e21   | 14   | 6.8   | 11    | e36     | e28   |
| 27           | e22     | e14  | 11    | 36    | 30   | e24   | e20   | 13   | 7.0   | 8.0   | e136    | e27   |
| 28           | e37     | 11   | 10    | 28    | 30   | e22   | e25   | 13   | 9.6   | 7.4   | 1,410   | e105  |
| 29           | e16     | 11   | 10    | 20    | ---  | e20   | e24   | 13   | 9.4   | 7.5   | 107     | e58   |
| 30           | e13     | 10   | 10    | 16    | ---  | e21   | e19   | 12   | 8.8   | 8.7   | 32      | e38   |
| 31           | e13     | ---  | 9.9   | 14    | ---  | e22   | ---   | 12   | ---   | 11    | 24      | ---   |
| <b>Total</b> | 1,176.6 | 505  | 610.6 | 606.8 | 846  | 1,081 | 1,391 | 612  | 321.2 | 692.0 | 3,081.0 | 1,453 |
| <b>Mean</b>  | 38.0    | 16.8 | 19.7  | 19.6  | 30.2 | 34.9  | 46.4  | 19.7 | 10.7  | 22.3  | 99.4    | 48.4  |
| <b>Max</b>   | 567     | 78   | 103   | 78    | 85   | 109   | 410   | 44   | 24    | 202   | 1,410   | 379   |
| <b>Min</b>   | 9.6     | 10   | 9.1   | 9.1   | 13   | 15    | 19    | 12   | 6.8   | 7.4   | 8.0     | 16    |
| <b>Cfsm</b>  | 2.23    | 0.99 | 1.16  | 1.15  | 1.78 | 2.05  | 2.73  | 1.16 | 0.63  | 1.31  | 5.85    | 2.85  |
| <b>In.</b>   | 2.57    | 1.11 | 1.34  | 1.33  | 1.85 | 2.37  | 3.04  | 1.34 | 0.70  | 1.51  | 6.74    | 3.18  |

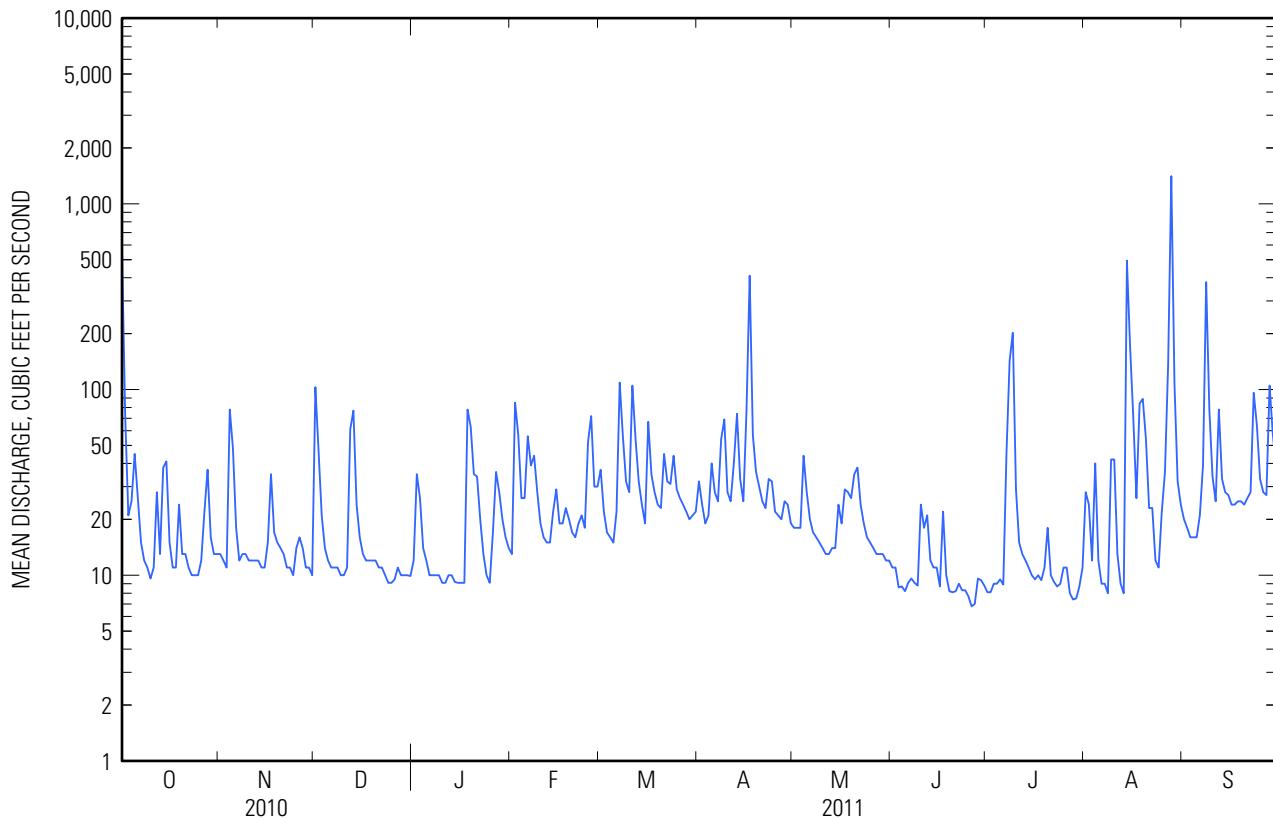
**STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 2011, BY WATER YEAR (WY)**

|             | Oct    | Nov    | Dec    | Jan    | Feb    | Mar    | Apr    | May    | Jun    | Jul    | Aug    | Sep    |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>Mean</b> | 26.5   | 29.7   | 37.5   | 36.6   | 35.4   | 41.6   | 40.1   | 33.0   | 28.6   | 29.6   | 29.0   | 25.9   |
| <b>Max</b>  | 57.8   | 79.6   | 85.3   | 97.8   | 76.1   | 86.2   | 102    | 66.7   | 61.5   | 88.7   | 99.4   | 65.8   |
| (WY)        | (2006) | (1973) | (1997) | (1978) | (1979) | (2010) | (2007) | (1983) | (2003) | (2004) | (2011) | (1975) |
| <b>Min</b>  | 9.26   | 8.03   | 8.21   | 14.6   | 11.0   | 14.2   | 15.1   | 14.2   | 10.7   | 10.5   | 7.79   | 5.67   |
| (WY)        | (1966) | (2002) | (1999) | (1992) | (2002) | (2009) | (1992) | (1965) | (2011) | (1999) | (1966) | (2001) |

**01467150 COOPER RIVER AT HADDONFIELD, NJ—Continued****SUMMARY STATISTICS**

|                                 | <b>Calendar Year 2010</b> | <b>Water Year 2011</b> | <b>Water Years 1964 - 2011</b> |      |
|---------------------------------|---------------------------|------------------------|--------------------------------|------|
| <b>Annual total</b>             | 10,927.4                  | 12,376.2               |                                |      |
| <b>Annual mean</b>              | 29.9                      | 33.9                   | 32.8                           |      |
| <b>Highest annual mean</b>      |                           |                        | 50.6                           | 1973 |
| <b>Lowest annual mean</b>       |                           |                        | 15.6                           | 2002 |
| <b>Highest daily mean</b>       | 567 Oct 1                 | 1,410 Aug 28           | 1,510 Aug 28, 1971             |      |
| <b>Lowest daily mean</b>        | 5.9 Sep 10                | 6.8 Jun 26             | 1.2 Jun 27, 1964               |      |
| <b>Annual seven-day minimum</b> | 6.3 Sep 5                 | 7.9 Jun 21             | 3.6 Sep 4, 2001                |      |
| <b>Maximum peak flow</b>        |                           | 2,910 Aug 28           | 3,300 Jul 13, 2004             |      |
| <b>Maximum peak stage</b>       |                           | 5.86 Aug 28            | 6.27 Jul 13, 2004              |      |
| <b>Instantaneous low flow</b>   |                           | 6.6 Jun 25-28          | <sup>a</sup> 0.80 Nov 13, 1972 |      |
| <b>Annual runoff (cfsm)</b>     | 1.76                      | 1.99                   | 1.93                           |      |
| <b>Annual runoff (inches)</b>   | 23.91                     | 27.08                  | 26.21                          |      |
| <b>10 percent exceeds</b>       | 46                        | 56                     | 58                             |      |
| <b>50 percent exceeds</b>       | 17                        | 18                     | 21                             |      |
| <b>90 percent exceeds</b>       | 8.3                       | 9.1                    | 9.8                            |      |

<sup>a</sup> Regulation from unknown source.



**01467150 COOPER RIVER AT HADDONFIELD, NJ—Continued****WATER-QUALITY RECORDS**

PERIOD OF RECORD.--Water years 1968-79, 1991 to current year.

PERIOD OF DAILY RECORD.--

SUSPENDED-SEDIMENT DISCHARGE: March 1968 to September 1969.

WATER TEMPERATURE: March 1968 to August 1969, recorded once daily; October 1998 to September 2001, recorded hourly.

REMARKS.--Cooperative Network Site Descriptor: Urban Land Use Indicator, NJ Department of Environmental Protection Watershed Management Area 18.

COOPERATION.--Physical measurements and samples for laboratory analyses were provided by personnel of the NJ Department of Environmental Protection. Determination of concentrations of ammonia in filtered water was performed by the NJ Department of Health and Senior Services, Environmental and Chemical Laboratory (DHSS-ECL) except during the period May 12 through August 25, 2011 when the determination was performed by the National Water-Quality Laboratory. Determination of concentrations of suspended solids in unfiltered water was performed by the DHSS-ECL except during the period June 17 through August 25, 2011 when samples could not be accepted.

**WATER-QUALITY DATA  
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**

Part 1 of 5

[%, percent; ANC, acid neutralizing capacity; CaCO<sub>3</sub>, calcium carbonate; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; SiO<sub>2</sub>, silicon dioxide; cm, centimeter; ft<sup>3</sup>/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; <, less than]

| Date       | Sample start time | Barometric pressure, mm Hg (00025) | Tempera-ture, air, °C (00020) | Absorbance, UV, organic  |  | Discharge, instant-aneous, ft <sup>3</sup> /s (61726) | Dissolved oxygen, mg/L (00061) | Dissolved oxygen, mg/L (00300) | pH, water, unfiltered, % saturation (00301) | pH, water, unfiltered, field, standard units (00400) |
|------------|-------------------|------------------------------------|-------------------------------|--|--|---|--------------------------------|--------------------------------|---|--|
|            |                   |                                    |                               | UV, 254 nm, 1 cm path length, cm path length, water, filtered, units | 280 nm, 1 cm path length, water, filtered, units |   |                                |                                |   |  |
| 12-09-2010 | 0900              | 770                                | 1.2                           | .076   | .069   | 10  | 10.3                           | 76                             | 7.0   |  |
| 02-10-2011 | 1000              | 764                                | .1                            | .137   | .114   | 19  | 11.1                           | 81                             | 7.0   |  |
| 06-14-2011 | 1030              | 760                                | 24.0                          | .135   | .106   | 10  | 5.4                            | 61                             | 7.0   |  |
| 08-30-2011 | 1100              | 764                                | 22.3                          | .261   | .209   | 35  | 6.4                            | 72                             | 7.0   |  |

## 01467150 COOPER RIVER AT HADDONFIELD, NJ—Continued

**WATER-QUALITY DATA**  
**WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**

Part 2 of 5

[%, percent; ANC, acid neutralizing capacity; CaCO<sub>3</sub>, calcium carbonate; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; SiO<sub>2</sub>, silicon dioxide; cm, centimeter; ft<sup>3</sup>/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; <, less than]

| Date       | Sample start time | Turbidity, water, unfiltered, broad band light source              |                                   |  |   | Dissolved   |   |  |   | Suspended |  |
|------------|-------------------|--|-----------------------------------|--|---|---|---|--|---|-----------|--|
|            |                   | Specific conductance, water, unfiltered, µS/cm at 25 °C<br>(00095) | Temperature, water, °C<br>(00010) | Including 90 +/- 30 degrees, ratiometric correction, NTRU<br>(63676) | Dissolved solids at multiple angles<br>(400-680 nm), detectors at 180 °C, water, dried at filtered, mg/L<br>(70300) | Dissolved solids, water, filtered, sum of constituents, mg/L<br>(70301) | Hardness, water, mg/L as CaCO <sub>3</sub><br>(00900) | Solids, water, unfiltered, mg/L<br>(00530) | Calcium, water, filtered, mg/L<br>(00915) |           |  |
| 12-09-2010 | 0900              | 308  | 1.4                               | 14   | 194   | 161   | 71.0  | 7  | 19.5                                      |           |  |
| 02-10-2011 | 1000              | 702  | 1.5                               | 14   | 381   | 370   | 70.7  | 22   | 19.4                                      |           |  |
| 06-14-2011 | 1030              | 352  | 20.0                              | 33   | 219   | 192   | 69.4  | 30   | 18.7                                      |           |  |
| 08-30-2011 | 1100              | 209  | 19.9                              | 22   | 130   | 114   | 50.0  | 10   | 13.7                                      |           |  |

**WATER-QUALITY DATA**  
**WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**

Part 3 of 5

[%, percent; ANC, acid neutralizing capacity; CaCO<sub>3</sub>, calcium carbonate; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; SiO<sub>2</sub>, silicon dioxide; cm, centimeter; ft<sup>3</sup>/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; <, less than]

| Date       | Sample start time | ANC, water, unfiltered, fixed endpoint (inorganic) |   |  |  | Carbon   |  |  |      | Inorganic carbon, suspended sediment, total, mg/L<br>(00688) | Silica, water, filtered, mg/L as SiO <sub>2</sub><br>(00955) |
|------------|-------------------|--|---|--|--|--|--|--|------|--|--|
|            |                   | Magnesium, water, filtered, mg/L<br>(00925)        | Potassium, water, filtered, mg/L<br>(00935) | Sodium, water, filtered, mg/L<br>(00930) | Laboratory titration, mg/L as CaCO <sub>3</sub><br>(90410) | plus organic, suspended sediment, total, mg/L<br>(00694) | Chloride, water, filtered, mg/L<br>(00940) | Fluoride, water, filtered, mg/L<br>(00950) |      |  |  |
| 12-09-2010 | 0900              | 5.43   | 4.21  | 22.7                                     | 28.4   | .57  | 48.7                                       | .15  | <.03 | 14.0   |  |
| 02-10-2011 | 1000              | 5.41   | 3.38  | 104                                      | 29.7   | .57  | 182  | .16  | <.03 | 9.58   |  |
| 06-14-2011 | 1030              | 5.52   | 4.52  | 36.8                                     | 35.8   | .98  | 69.2                                       | .21  | .03  | 12.6   |  |
| 08-30-2011 | 1100              | 3.82   | 3.06  | 17.3                                     | 29.4   | 1.25   | 30.7                                       | .09  | <.03 | 8.98   |  |

**01467150 COOPER RIVER AT HADDONFIELD, NJ—Continued**

**WATER-QUALITY DATA**  
**WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**

Part 4 of 5

[%, percent; ANC, acid neutralizing capacity; CaCO<sub>3</sub>, calcium carbonate; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; SiO<sub>2</sub>, silicon dioxide; cm, centimeter; ft<sup>3</sup>/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; <, less than]

| Date       | Sample start time | Ammonia plus organic nitrogen, water, filtered. |                   | Nitrate plus nitrite, water, filtered. |                   | Particulate nitrogen, suspended in water, filtered. | Phosphorus, water, filtered. | Phosphorus, water, unfiltered. | Total nitrogen, water, filtered. | Total nitrogen, water, unfiltered. |
|------------|-------------------|---|-------------------|--|-------------------|---|------------------------------|--------------------------------|----------------------------------|------------------------------------|
|            |                   | Sulfate, water, filtered,                       | mg/L as N (00945) | Ammonia, water, filtered,              | mg/L as N (00623) | mg/L as N (00608)                                   | mg/L as N (00631)            | mg/L (49570)                   | mg/L as P (00666)                | mg/L as P (00665)                  |
| 12-09-2010 | 0900              | 27.5  | .36               | .193                                   | .26               | .060  | < .004                       | .141                           | .62                              | .68                                |
| 02-10-2011 | 1000              | 26.3  | .39               | .177                                   | .45               | .078  | .023                         | .162                           | .84                              | .92                                |
| 06-14-2011 | 1030              | 20.8  | .65               | .391                                   | .30               | .096  | .033                         | .310                           | .95                              | 1.0                                |
| 08-30-2011 | 1100              | 17.5  | .62               | .166                                   | .28               | .116  | .083                         | .276                           | .90                              | 1.0                                |

**WATER-QUALITY DATA**  
**WATER YEAR OCTOBER 2010 TO SEPTEMBER**  
**2011**

Part 5 of 5

[%, percent; ANC, acid neutralizing capacity; CaCO<sub>3</sub>, calcium carbonate; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; SiO<sub>2</sub>, silicon dioxide; cm, centimeter; ft<sup>3</sup>/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; <, less than]

| Date       | Sample start time | Organic carbon, suspended sediment, total, mg/L |              |
|------------|-------------------|---|--------------|
|            |                   | (00689)   | mg/L (00681) |
| 12-09-2010 | 0900              | .57   | 1.42         |
| 02-10-2011 | 1000              | .57   | 1.90         |
| 06-14-2011 | 1030              | .94   | 2.78         |
| 08-30-2011 | 1100              | 1.25  | 4.86         |