

Isinglass Annual Water Use versus Stream Flow – Calendar Year 2003

The Isinglass Water Management Planning Area covers 74 square miles and includes a streamflow gage (USGS 01072870 ISINGLASS R AT ROCHESTER NECK RD, NR DOVER, NH.) However, this gage provides real time data only and does not record streamflow data. Streamflow estimation for the Isinglass was made using four nearby gages-- USGS 01073000 OYSTER RIVER NEAR DURHAM, NH with a watershed area of 12.1 square miles USGS 01073587 EXETER RIVER AT HAIGH ROAD, NEAR BRENTWOOD, NH with a watershed area of 63.5 square miles USGS 01072800 COCHECO RIVER NEAR ROCHESTER, NH with a watershed area of 85.7 square miles, and USGS 01073500 LAMPREY RIVER NEAR NEWMARKET, NH with a watershed area of 183 square miles. Average monthly streamflow was converted to cfsm and these values were averaged for the four gages. The average cfsm was then applied to the Isinglass WMPA. For this report the averaged streamflow was transposed areal to all impact points on the Designated River. There are 2 registered sources and no registered, measured returns in the Water Management Planning Area.

The Isinglass Designated Reach was not in compliance with the General Standard during any part of 2003 from the confluence with Berry River to the end of the Designated River. It must be noted however that this conclusion is drawn from surrogate gages defining stream flow and from estimated water use. Water use estimate for Rochester's withdrawal from Berry River is based on the watershed area of the diversion dam which is 8.7 square miles. Water is diverted behind this dam to a two-foot pipe¹ that feeds by gravity drainage to Rochester Reservoir. Stream flow for this drainage area was estimated based on prorating the monthly streamflows in the nearby Oyster River. Flow estimates for a two-foot diameter concrete pipe were made using Chazy-Mannings equation with any stream flow in excess of this amount assumed to overtop the dam. This matches Department staff observation that all the water above the dam is diverted at lower flows. Despite the approximations of this assessment process, the amount of the exceedence is of such magnitude, that the conclusion is correct, while the magnitude remains an estimate.

The Water Management Planning Area has no hydropower facilities. Water use is entirely for public water supplies for the cities of Rochester and Dover. Rochester diverts water from the Berry River tributary into a reservoir outside of the Water Management Planning Area. Dover withdraws water directly from the Isinglass River from a location near the end of the Designated River.

Isinglass River Affected Water User Facilities: Source and Discharge Locations

Legend

Affected Water Users

- Source
- Discharge

Stream Gages

- ▲ Active
- △ Inactive

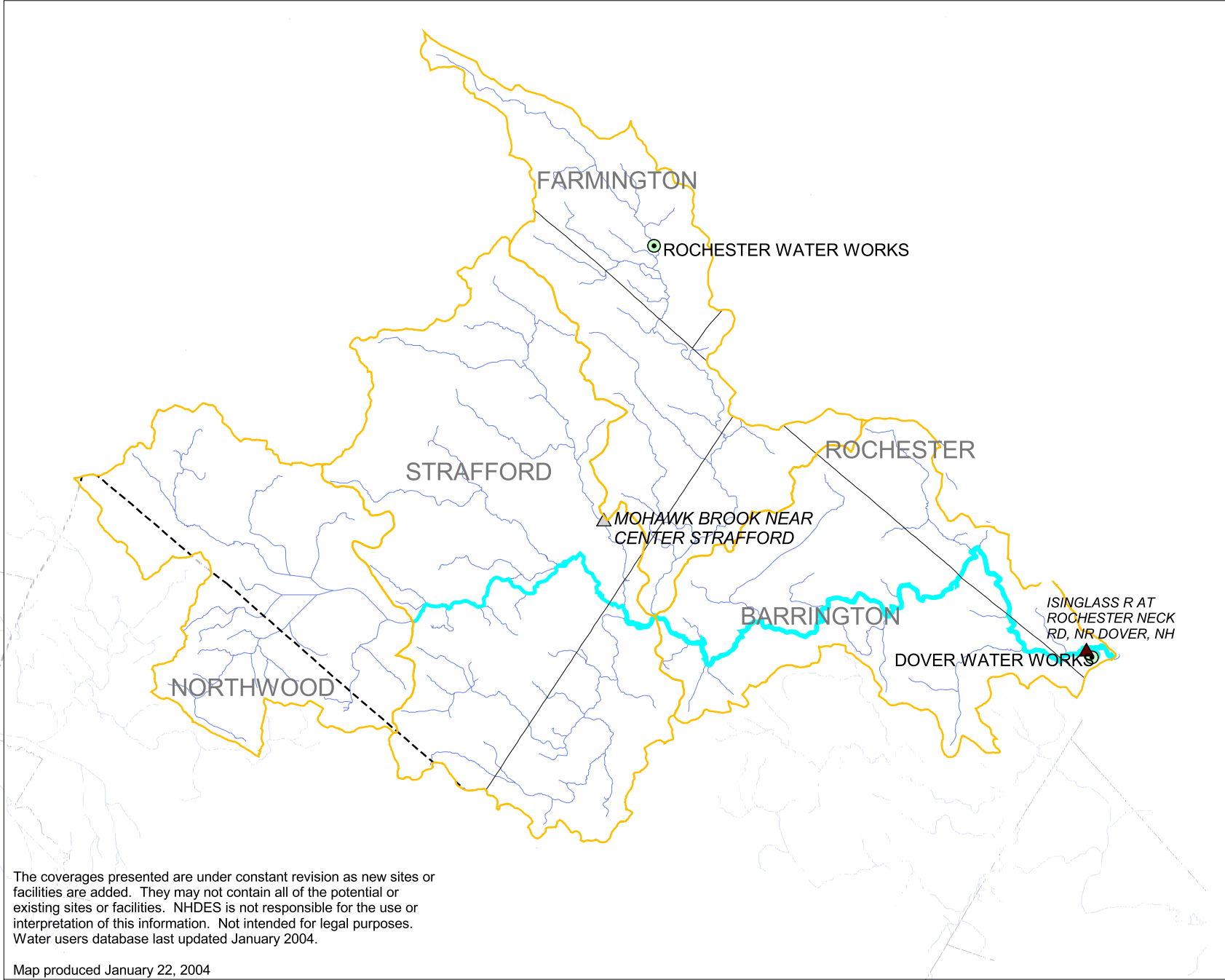
Designated Reach

Hydrology

State boundary

Town boundary

WMPA



The coverages presented are under constant revision as new sites or facilities are added. They may not contain all of the potential or existing sites or facilities. NHDES is not responsible for the use or interpretation of this information. Not intended for legal purposes. Water users database last updated January 2004.

Map produced January 22, 2004

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2003 Isinglass Aggregate Water Use in CFS

| WU_NAME | FACILITY | WUSD_ID | DA on DR (SQ MILE) | | | | | | | | | | | | | | |
|------------------------|---------------------------------|-----------------|--------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|--------|--------|---|---|
| | | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | | | |
| Start DR | Bow Lake | | 14.26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Berry River | | | 57.29 | 13.578 | 15.493 | 31.569 | 31.569 | 17.629 | 8.951 | 3.534 | 2.431 | 4.693 | 6.686 | 15.800 | 15.610 | | |
| DOVER WATER DEPARTMENT | WATER WORKS | 20006 20006-S09 | 73.71 | 16.920 | 18.835 | 34.911 | 34.911 | 20.970 | 11.861 | 3.534 | 2.431 | 4.693 | 7.642 | 19.030 | 18.738 | | |
| End Point DR | Confluence Isinglass and Coheco | | 73.84 | 16.920 | 18.835 | 34.911 | 34.911 | 20.970 | 11.861 | 3.534 | 2.431 | 4.693 | 7.642 | 19.030 | 18.738 | | |

ISINGLASS RIVER

DA(mi^2) 73.8
 7Q10 (cfs) 2.5 *

Mean of daily streamflows (2003) in cfs

| | USGS 01073000 OYSTER RIVER NEAR DURHAM, NH | USGS 01073587 EXETER RIVER AT HAIGH ROAD, NEAR BRENTWOOD , NH | USGS 01072800 COCHECO RIVER NEAR ROCHESTER, NH. | USGS 01073500 LAMPREY RIVER NEAR NEWMARKET , NH | Calculated 2003 monthly mean streamflow in CFSM | General Standard in cfsm |
|---------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------|--------------------------------|
| Jan-03 | 17 | 89 | 143 | 198 | 1.39 | 0.04 |
| Feb-03 | 21 | 128 | 158 | 161 | 1.62 | 0.04 |
| Mar-03 | 60 | 289 | 366 | 799 | 4.54 | 0.16 |
| Apr-03 | 45 | 240 | 314 | 712 | 3.76 | 0.04 |
| May-03 | 21 | 112 | 181 | 337 | 1.87 | 0.04 |
| Jun-03 | 12 | 78 | 82 | 220 | 1.09 | 0.04 |
| Jul-03 | 2 | 9 | 20 | 32 | 0.17 | 0.0017 |
| Aug-03 | 3 | 24 | 40 | 80 | 0.39 | 0.0017 |
| Sep-03 | 5 | 13 | 40 | 53 | 0.35 | 0.0017 |
| Oct-03 | 16 | 49 | 133 | 206 | 1.18 | 0.04 |
| Nov-03 | 18 | 86 | 147 | 338 | 1.59 | 0.04 |
| Dec-03 | 28 | 152 | 286 | 498 | 2.69 | 0.04 |
| Gage area in sq. miles | 12.1 | 63.5 | 85.7 | 183 | | |

Using POR average streamflow for this month
 Using

* Determined by averaging values from the Oyster River and Lamprey River gages.

2003 Isinglass Estimated Monthly Stream Flow at Each Impact Point in CFS

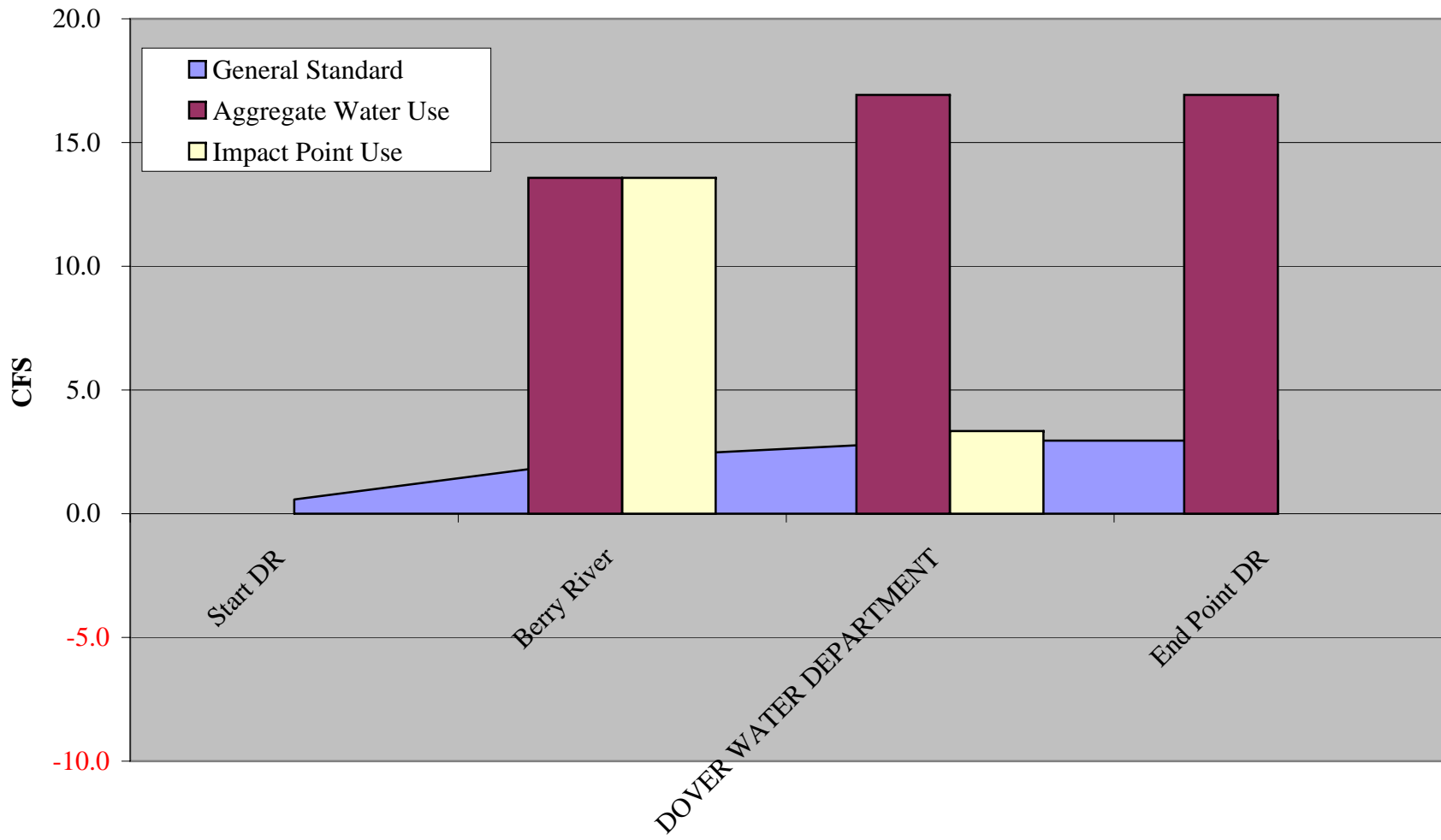
| | | | Calculated 2003 monthly mean streamflow in CFSM | | | | | | | | | | | | |
|------------------------|---------------------------------|-----------------|-------------------------------------------------|-------|-------|-------|-------|-------|------|------|------|------|------|-------|-------|
| | | | 1.39 | 1.62 | 4.54 | 3.76 | 1.87 | 1.09 | 0.17 | 0.39 | 0.35 | 1.18 | 1.59 | 2.69 | |
| WU_NAME | FACILITY | WUSD_ID | DA on DR (SQ MILE) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| Start DR | Bow Lake | | 14.26 | 19.8 | 23.0 | 64.7 | 53.6 | 26.7 | 15.6 | 2.4 | 5.6 | 5.0 | 16.9 | 22.7 | 38.4 |
| Berry River | | | 57.29 | 79.5 | 92.5 | 260.1 | 215.2 | 107.2 | 62.5 | 9.7 | 22.4 | 19.9 | 67.8 | 91.2 | 154.3 |
| DOVER WATER DEPARTMENT | WATER WORKS | 20006 20006-S09 | 73.71 | 102.3 | 119.1 | 334.6 | 276.9 | 137.9 | 80.4 | 12.5 | 28.8 | 25.7 | 87.2 | 117.3 | 198.5 |
| End Point DR | Confluence Isinglass and Coheco | | 73.84 | 102.5 | 119.3 | 335.3 | 277.4 | 138.2 | 80.6 | 12.6 | 28.9 | 25.7 | 87.4 | 117.5 | 198.9 |

2003 Isinglass Estimated Monthly General Standard at Each Impact Point in CFS

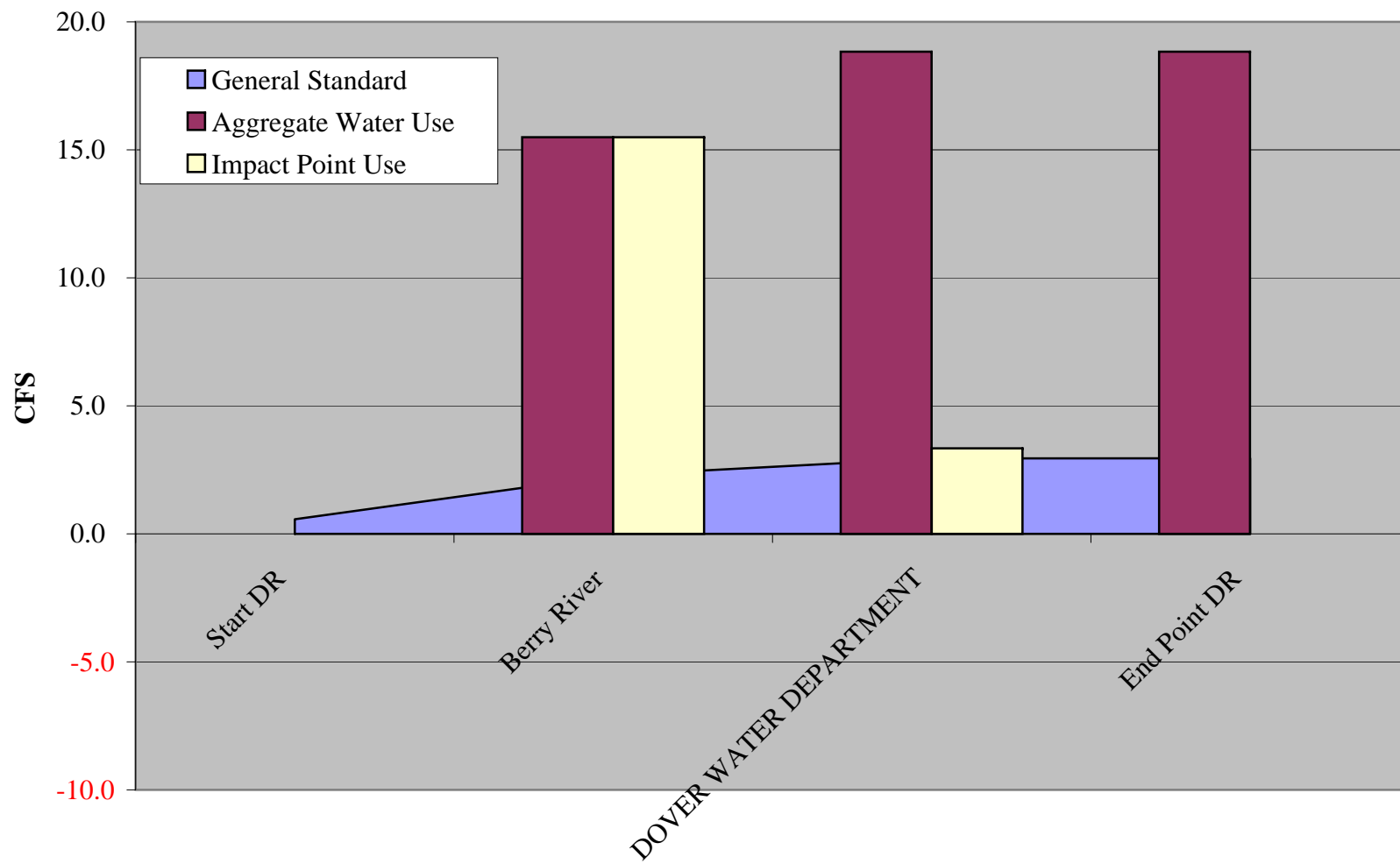
| WU_NAME | FACILITY | WUSD_ID | General Standard | | | | | | | | | | | | | |
|------------------------|---------------------------------|-----------------|------------------|-------|------|------|-------|------|------|--------|--------|--------|------|------|------|------|
| | | | in cfs | 0.04 | 0.04 | 0.16 | 0.04 | 0.04 | 0.04 | 0.0017 | 0.0017 | 0.0017 | 0.04 | 0.04 | 0.04 | |
| Start DR | Bow Lake | | DA on DR (SQ | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | |
| Berry River | | | MILE) | 14.26 | 0.57 | 0.57 | 2.28 | 0.57 | 0.57 | 0.57 | 0.02 | 0.02 | 0.02 | 0.57 | 0.57 | 0.57 |
| DOVER WATER DEPARTMENT | WATER WORKS | 20006 20006-S09 | | 57.29 | 2.29 | 2.29 | 9.17 | 2.29 | 2.29 | 2.29 | 0.10 | 0.10 | 0.10 | 2.29 | 2.29 | 2.29 |
| End Point DR | Confluence Isinglass and Coheco | | | 73.71 | 2.95 | 2.95 | 11.79 | 2.95 | 2.95 | 2.95 | 0.13 | 0.13 | 0.13 | 2.95 | 2.95 | 2.95 |
| | | | | 73.84 | 2.95 | 2.95 | 11.81 | 2.95 | 2.95 | 2.95 | 0.13 | 0.13 | 0.13 | 2.95 | 2.95 | 2.95 |

| 2003 Isinglass Estimated Monthly Margin of the Aggregate Water Use Below the General Standard in CFS | | | | | | | | | | | | | | | |
|-------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------|--------------------|---------|---------|---------|---------|---------|--------|--------|--------|--------|--------|---------|---------|
| WU_NAME | FACILITY | WUSD_ID | DA on DR (SQ MILE) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| Start DR | Bow Lake | | 14.26 | 0.57 | 0.57 | 2.28 | 0.57 | 0.57 | 0.57 | 0.02 | 0.02 | 0.02 | 0.57 | 0.57 | 0.57 |
| Berry River | | | 57.29 | (11.29) | (13.20) | (22.40) | (29.28) | (15.34) | (6.66) | (3.44) | (2.33) | (4.59) | (4.39) | (13.51) | (13.32) |
| DOVER WATER DEPARTMENT | WATER WORKS | 20006 20006-S09 | 73.71 | (13.97) | (15.89) | (23.12) | (31.96) | (18.02) | (8.91) | (3.41) | (2.30) | (4.57) | (4.69) | (16.08) | (15.79) |
| End Point DR | Confluence Isinglass and Cocheco | | 73.84 | (13.97) | (15.88) | (23.10) | (31.96) | (18.02) | (8.91) | (3.41) | (2.30) | (4.57) | (4.69) | (16.08) | (15.78) |

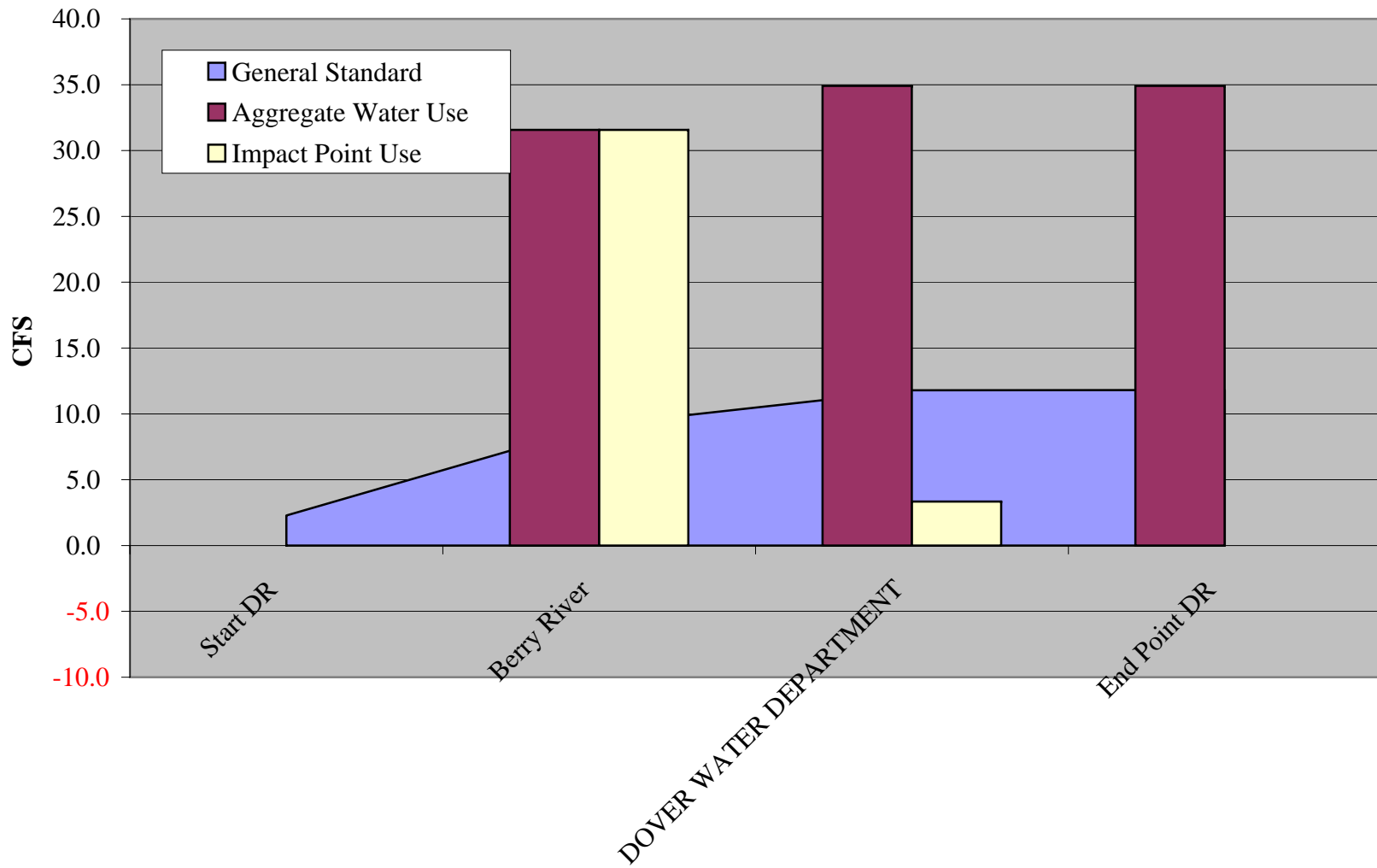
January 2003 Isinglass



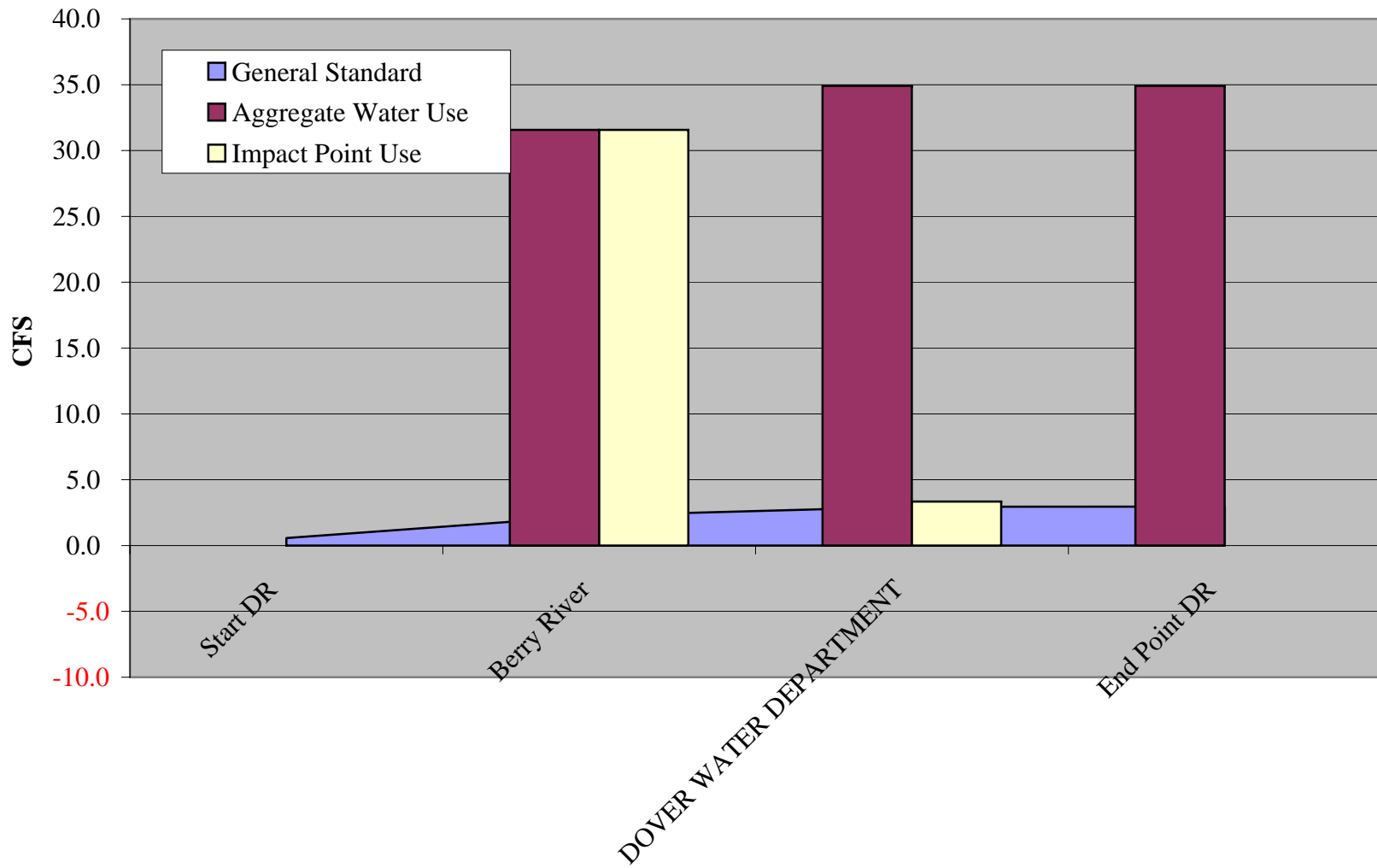
February 2003 Isinglass



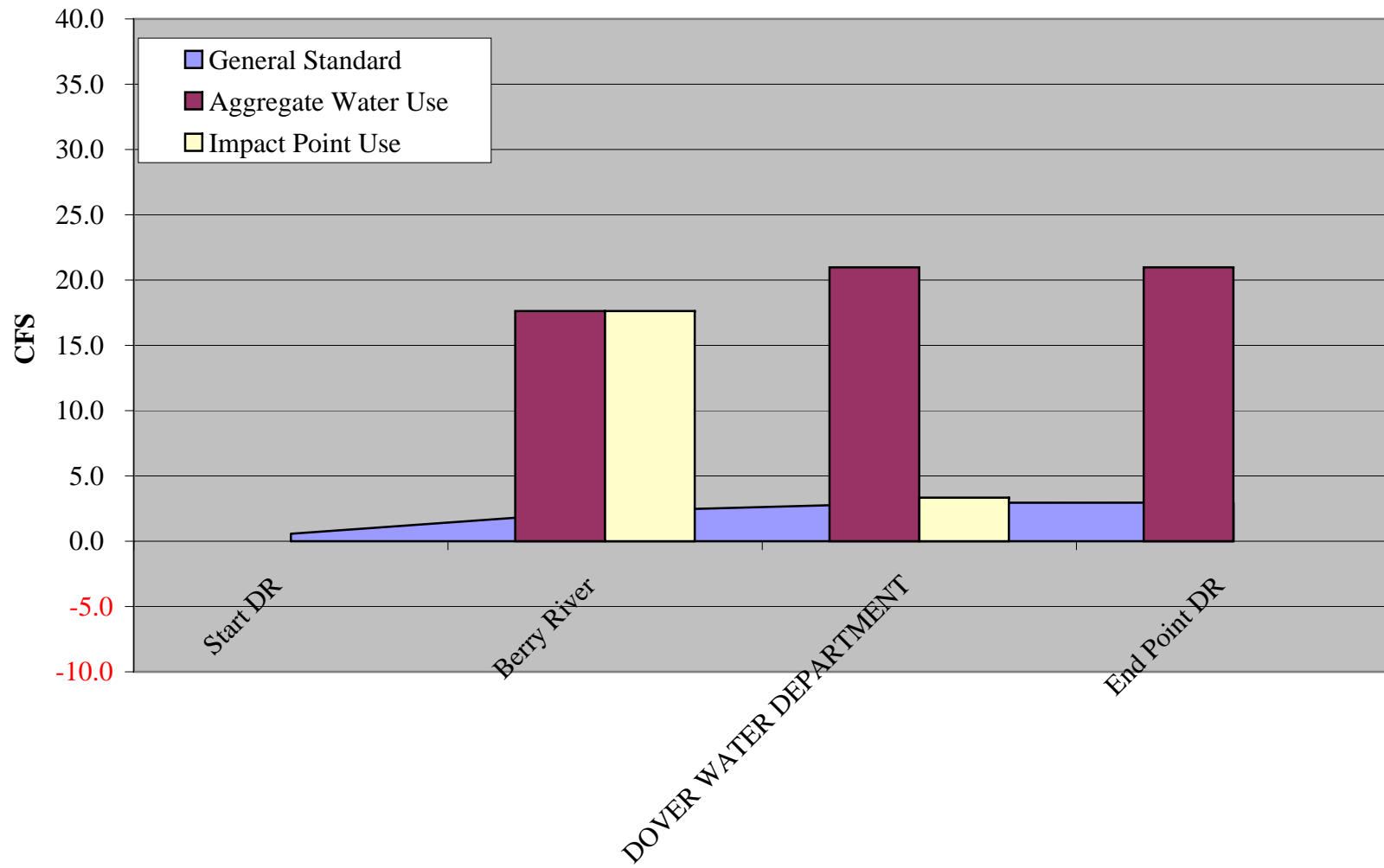
March 2003 Isinglass



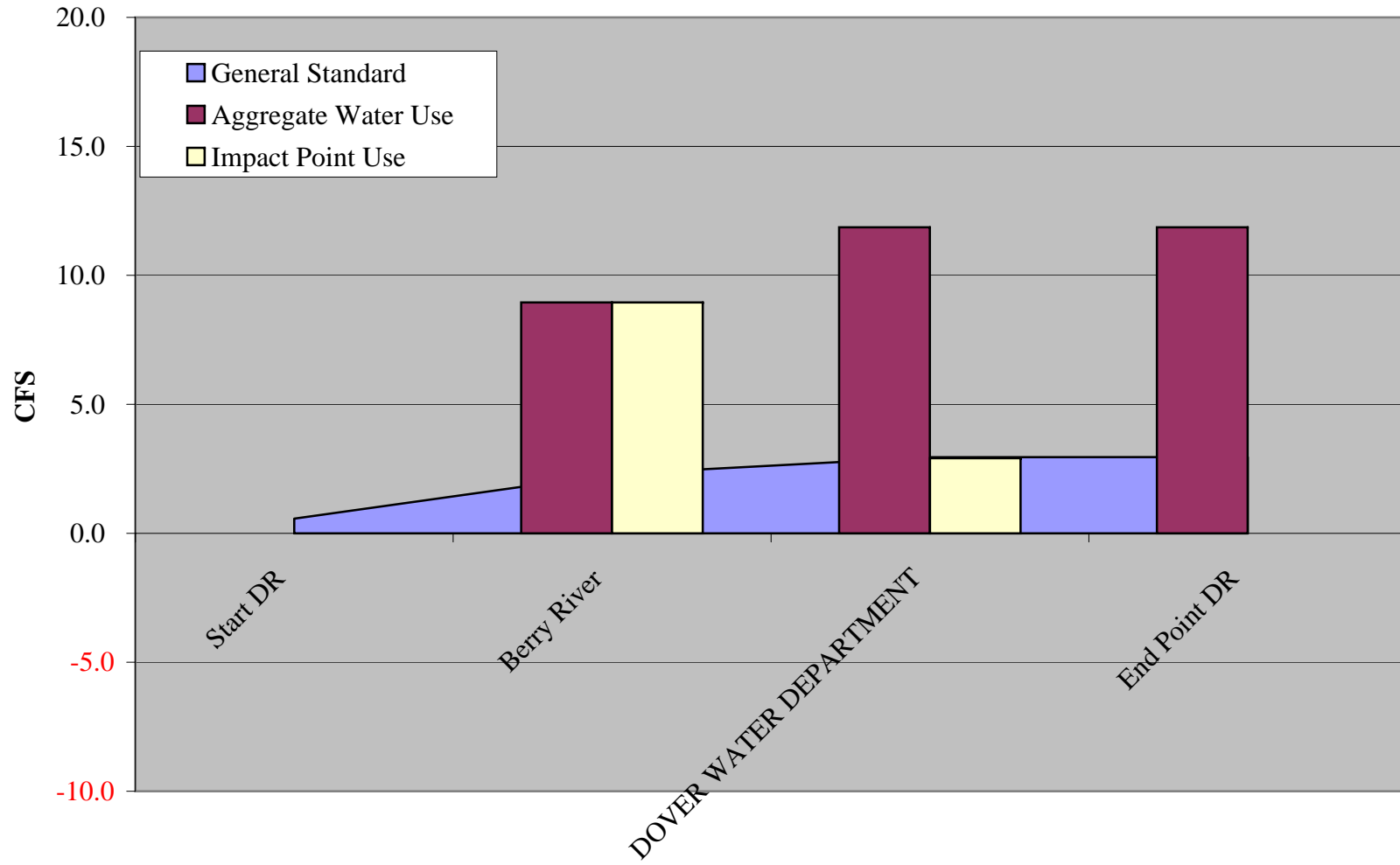
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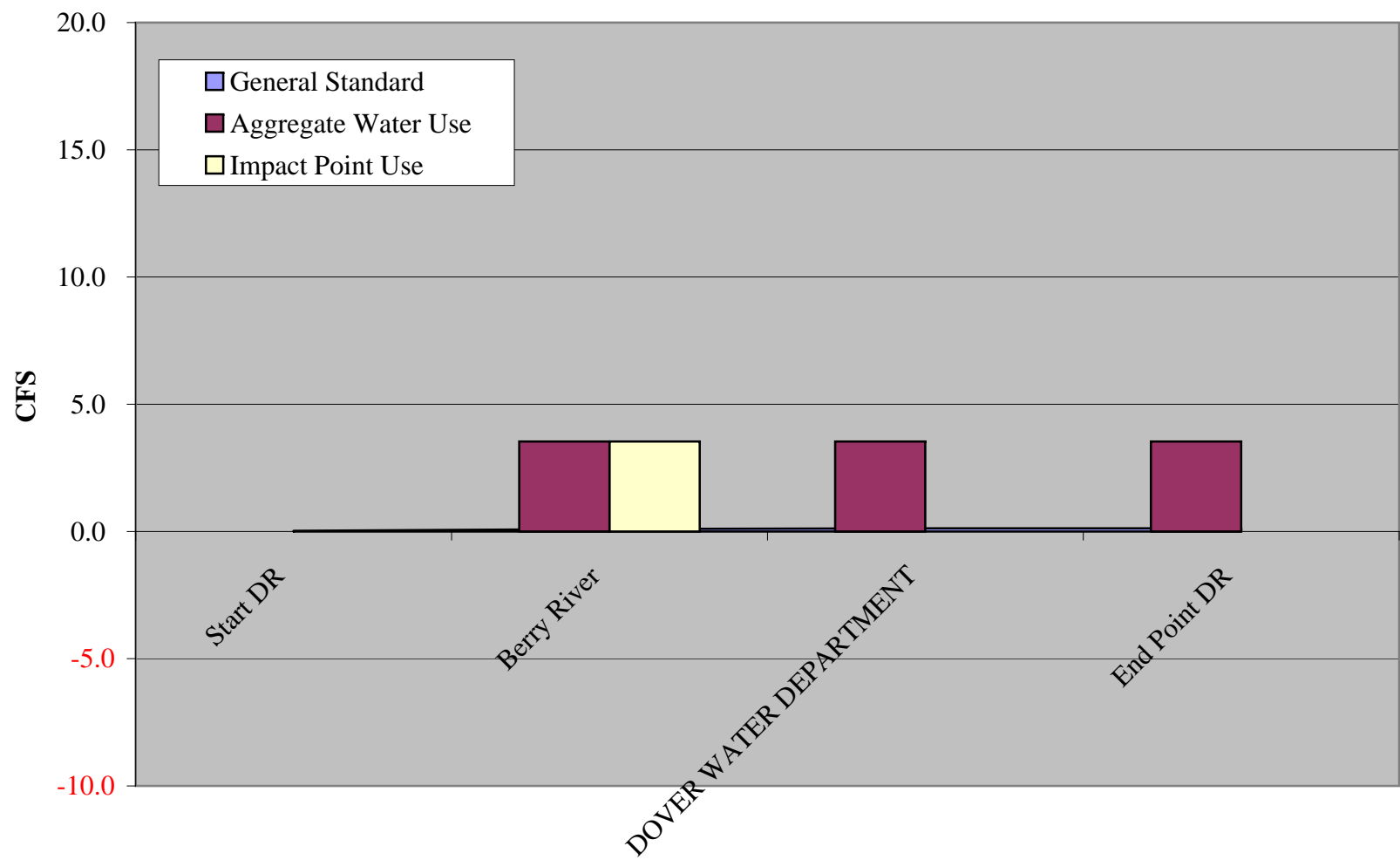
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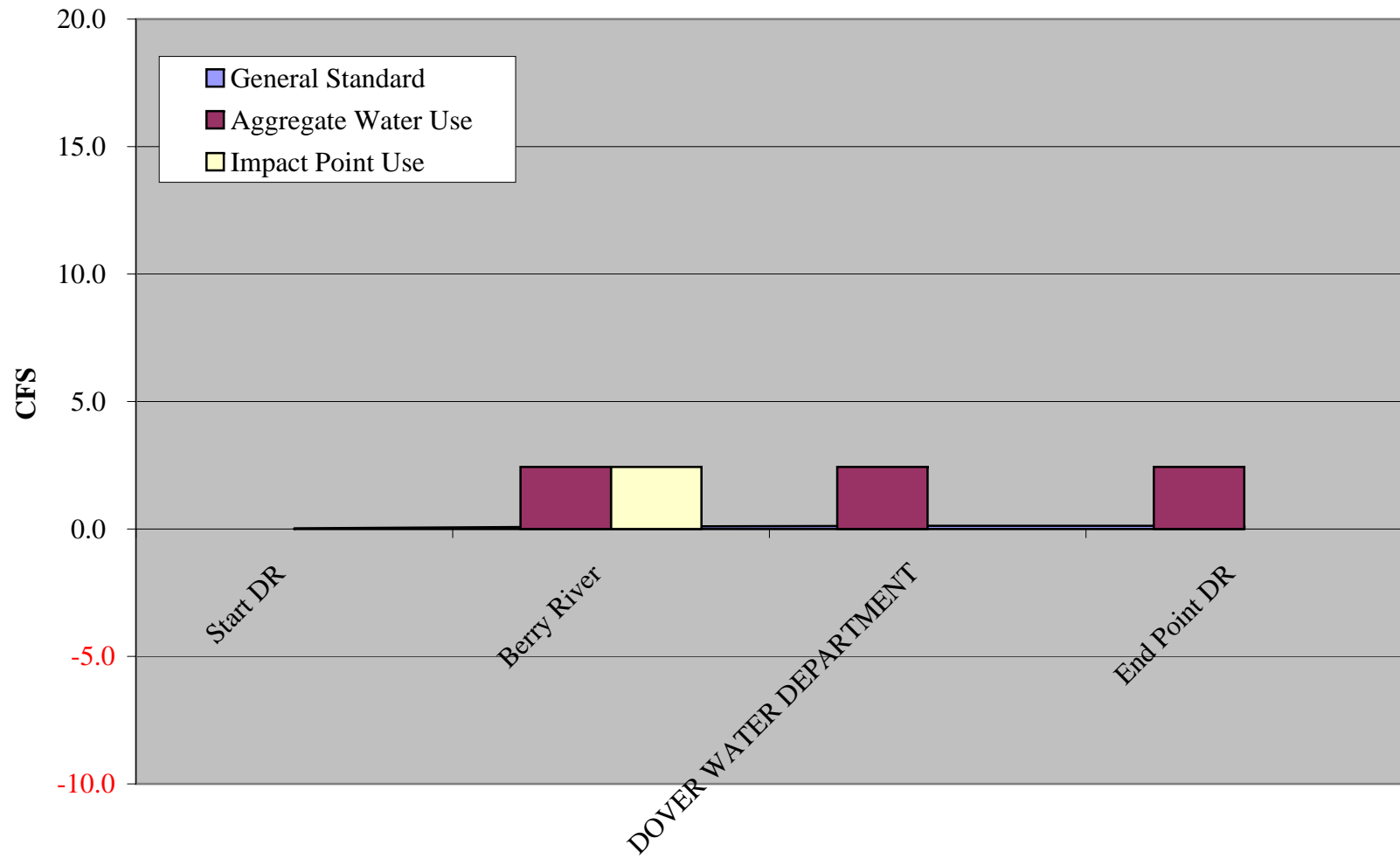
June 2003 Isinglass



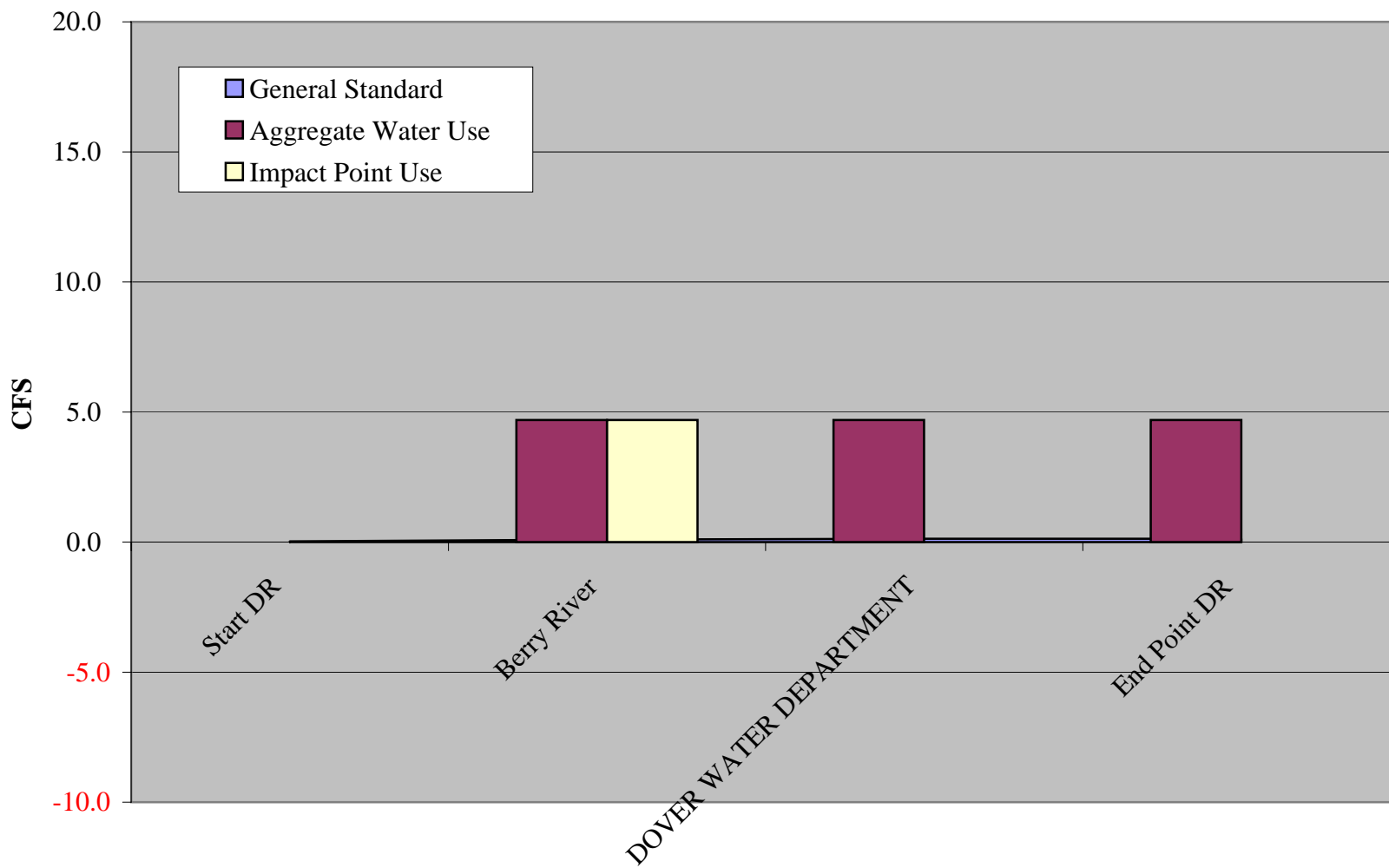
July 2003 Isinglass



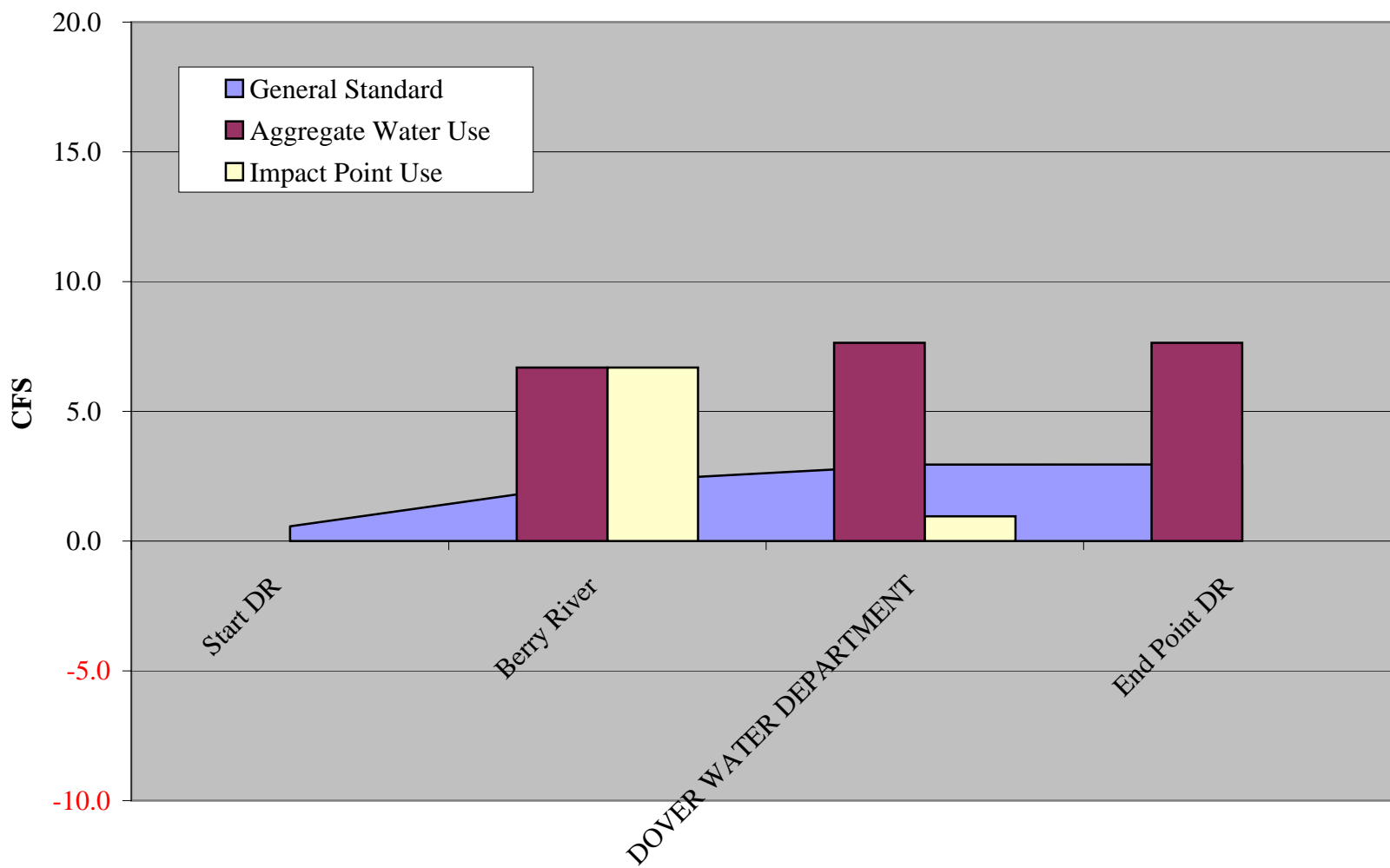
August 2003 Isinglass



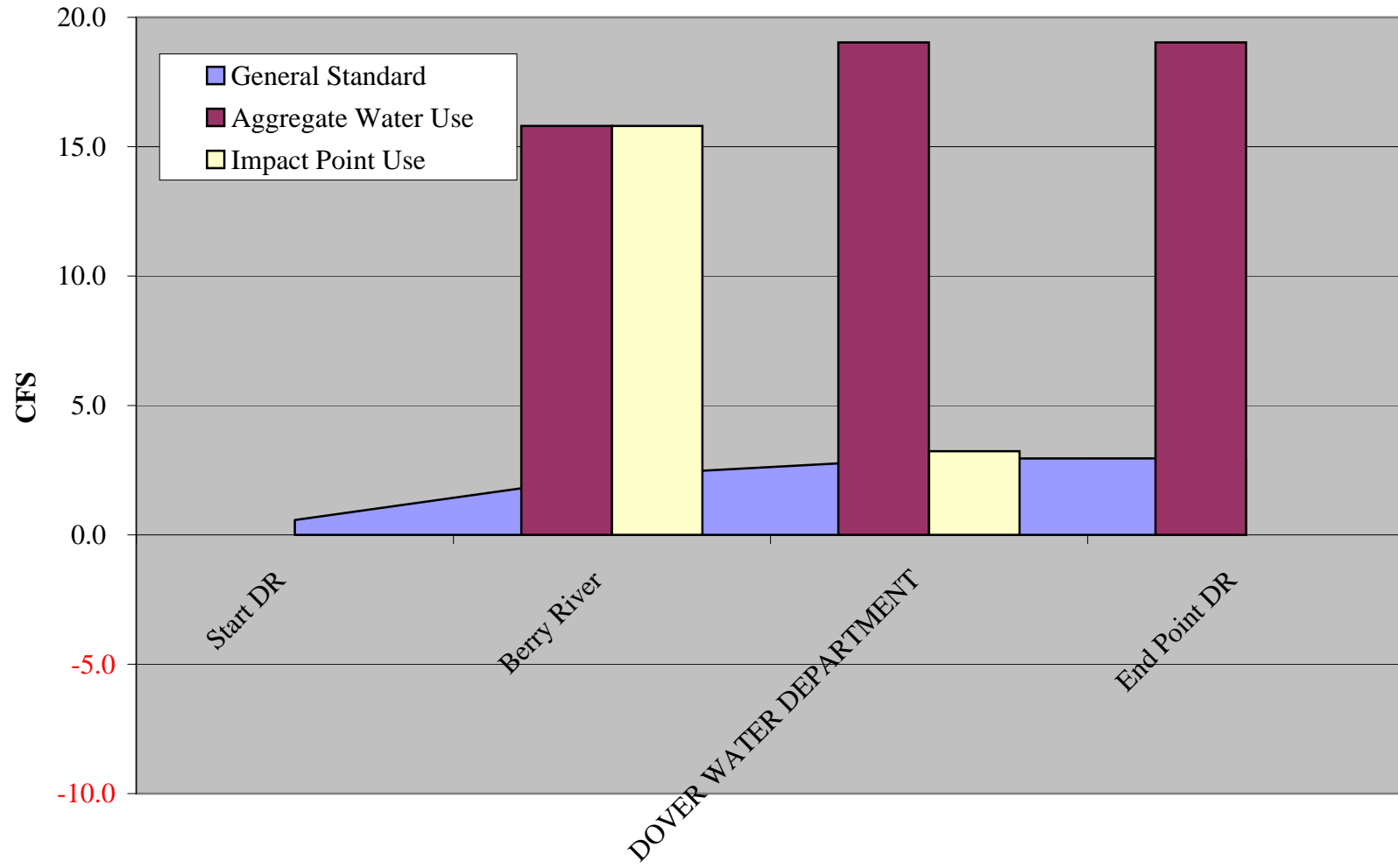
September 2003 Isinglass



October 2003 Isinglass



November 2003 Isinglass



December 2003 Isinglass

