Bighorn Lake Apr-July Rule Curves

- A series of Revised Flood Control/Operation Rule Curves Designed to:
  - Higher Spring & Summer Reservoir Levels
  - Provides Better Assurance of Filling Reservoir in Summer
  - Reduce Significant Release Reduction During Fill Season
  - Provide More Transparent View of Spring Operations
# Bighorn Lake Inflow Percentiles

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>95%</td>
<td>244.1</td>
<td>482.2</td>
<td>845.3</td>
<td>428.1</td>
<td>2,000.7</td>
</tr>
<tr>
<td>90%</td>
<td></td>
<td>235.5</td>
<td>454.0</td>
<td>791.1</td>
<td>1,883.6</td>
</tr>
<tr>
<td>75%</td>
<td></td>
<td>191.1</td>
<td>397.8</td>
<td>646.5</td>
<td>1,554.0</td>
</tr>
<tr>
<td>50%</td>
<td></td>
<td>131.3</td>
<td>258.4</td>
<td>442.4</td>
<td>1,076.5</td>
</tr>
<tr>
<td>28% MF</td>
<td>127.0</td>
<td>221.1</td>
<td>239.9</td>
<td>131.9</td>
<td>719.9</td>
</tr>
<tr>
<td>25%</td>
<td>121.5</td>
<td>211.5</td>
<td>229.5</td>
<td>126.2</td>
<td>688.7</td>
</tr>
<tr>
<td>10%</td>
<td>97.2</td>
<td>154.1</td>
<td>165.3</td>
<td>82.6</td>
<td>499.2</td>
</tr>
<tr>
<td>5%</td>
<td>86.3</td>
<td>136.8</td>
<td>146.8</td>
<td>73.3</td>
<td>443.2</td>
</tr>
</tbody>
</table>
High Runoff Years

Archive Data From 1-APR Through 31-JUL
Plotted 01/12/2009  15:45

Units: CFS

BHR  Bighorn Lake (Yellowtail), Bighorn River near Fort Smith, MT
      Daily Mean Computed Inflow (cfs)  1995 1997 1999
Medium Runoff Years

Archive Data From 1-APR Through 31-JUL
Plotted 01/12/2009 15:49

Units: CFS

Bighorn Lake (Yellowtail), Bighorn River near Fort Smith, MT
Daily Mean Computed Inflow (cfs)

RECLAMATION
Drought Years

Archive Data From 1-APR Through 31-JUL
Plotted 01/12/2009 15:52

Units: CFS

BHR
Bighorn Lake (Yellowtail), Bighorn River near Fort Smith, MT
Daily Mean Computed Inflow (cfs)

2002 2003 2004
Bighorn Lake UD Inflow

Elevation feet vs. CFS

3/31
4/7
4/14
4/21
4/28
5/5
5/12
5/19
5/26
6/2
6/9
6/16
6/23
6/30
7/7
7/14
7/21
7/28

Elevation
Inflow
River Release

RECLAMATION
# Rule Curve Evaluation

## Six Years Evaluated to Test Results

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent of Avg</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995 High Runoff</td>
<td>149%</td>
<td>85</td>
</tr>
<tr>
<td>1997 High Runoff</td>
<td>173%</td>
<td>98</td>
</tr>
<tr>
<td>1998 Near Average</td>
<td>110%</td>
<td>61</td>
</tr>
<tr>
<td>1999 High Runoff</td>
<td>172%</td>
<td>95</td>
</tr>
<tr>
<td>2000 Low Runoff</td>
<td>57%</td>
<td>24</td>
</tr>
<tr>
<td>2008 Near Average</td>
<td>115%</td>
<td>63</td>
</tr>
</tbody>
</table>
1995 Apr 1       Apr-Jul Forecast
897,000 acre-feet      36 Percentile Year

Bighorn Lake Elevation
for Forecast A-J Inflow with Rule Curves

Elevation in feet

Min Fill  Max  Forecast

RECLAMATION
1997 Apr 1        Apr-Jul Forecast
2,099,000 acre-feet      99 Percentile Year

Bighorn Lake Elevation
for Forecast A-J Inflow with Rule Curves
1998 Apr 1       Apr-Jul Forecast
1,267,000 acre-feet      62 Percentile Year

Bighorn Lake Elevation
for Forecast A-J Inflow with Rule Curves

- Min Fill
- Max
- Forecast
1999 Apr 1       Apr-Jul Forecast
1,445,000 acre-feet      72 Percentile Year

Bighorn Lake Elevation
for Forecast A-J Inflow with Rule Curves

Min Fill     Max     Forecast
2000 Apr 1       Apr-Jul Forecast
1,228,000 acre-feet      60 Percentile Year

Bighorn Lake Elevation
for Forecast A-J Inflow with Rule Curves

Elevation in feet

Min Fill
Max
Forecast

RECLAMATION
2008 Apr 1       Apr-Jul Forecast
820,000 acre-feet      32 Percentile Year

Bighorn Lake Elevation
for Forecast A-J Inflow with Rule Curves

Elevation in feet

Min Fill  Max  Forecast

RECLAMATION
COMPARISON
RULE CURVES VS ACTUAL
Archive Data From 1-OCT Through 30-SEP
Plotted 01/14/2009 08:57

Units: INCHES

BBR  Buffalo Bill Reservoir, Shoshone River near Cody, WY

SE  Snow Water Equivalent (inches)  2009  2008
SE_AVG  Snow Water Equivalent Average (inches)  2008

RECLAMATION
Archive Data From 1-OCT Through 30-SEP
Plotted 01/14/2009 08:56

BHR  Bighorn Lake (Yellowtail), Bighorn River near Fort Smith, MT
      Snow Water Equivalent (inches) 2009 2008
SE    Snow Water Equivalent Average (inches) 2008
SE_AVG
Boysen Reservoir Elevation 2008 vs 2009

Archive Data From 1-OCT Through 30-SEP
Plotted 01/14/2009 13:36
Buffalo Bill Elevation 2008 vs 2009

Archive Data From 1-OCT Through 30-SEP
Plotted 01/14/2009 13:39

Units: FEET

BBR  Buffalo Bill Reservoir, Shoshone River near Cody, WY
FB  Reservoir Forebay Elevation (feet) 2008 2009
2009 Jan 1       Apr-Jul Forecast
948,800 acre-feet      38 Percentile Year

Bighorn Lake Elevation
for Forecast A-J Inflow with Rule Curves
Discussion & Questions