Bighorn Lake/Yellowtail Dam Operations

November 5, 2015
BIGHORN BASIN WATER SUPPLY & RESERVOIR OPERATIONS MEETING

Billings, Montana
November 5, 2015

Introduction and Purpose of Meeting
Tom Sawatzke, Acting Area Manager, Montana Area Office

Water Supply Outlook & Reservoir Operations
WYAO - Boysen & Buffalo Bill Operations
MTAO - Yellowtail Operations
Agency Reports

Bighorn River System Issues Group Meeting
Sediment Control Project
Crow Tribe Water Rights Settlement
Yellowstone River Conservation District Council
Operating Criteria
Basin above Buffalo Bill Reservoir

Snow Water Equivalent

<table>
<thead>
<tr>
<th>Water Year</th>
<th>April-July Inflow (acre-feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>576,500</td>
</tr>
<tr>
<td>2014</td>
<td>1,062,400 (103% of avg)</td>
</tr>
<tr>
<td>2015</td>
<td>696,400</td>
</tr>
<tr>
<td>2016</td>
<td>???</td>
</tr>
</tbody>
</table>

Average = 677,800
2015 Monthly Precipitation above Buffalo Bill Reservoir

Shoshone River Basin Precipitation

Precipitation (inches)

Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep

2015 30 year avg
Buffalo Bill Reservoir 2015 Operations

Archive Data From 1-OCT Through 30-SEP
Plotted 10/28/2015 14:02 (Provisional Data Subject to Revision)

Units: FEET

Units: CFS

BBR  Buffalo Bill Reservoir, Shoshone River near Cody, WY
FB  Reservoir Forebay Elevation (feet)  2015 2016
QD  Daily Mean Total Discharge (cfs)  2015
IN  Daily Mean Computed Inflow (cfs)  2015

RECLAMATION
BUFFALO BILL RESERVOIR OPERATIONS

Water Year 2016 Projection (October actuals)

- Top of Conservation = 5393.5 ft
- Approximate Powerplant Capacity = 1,500 cfs

Inflow
Outflow
Elevation

Tick marks represent end of month
Basin above Boysen Reservoir
Snow Water Equivalent

<table>
<thead>
<tr>
<th>Water Year</th>
<th>April-July Inflow (acre-feet)</th>
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<tbody>
<tr>
<td>2013</td>
<td>216,300</td>
</tr>
<tr>
<td>2014</td>
<td>694,500</td>
</tr>
<tr>
<td>2015</td>
<td>749,700 (140% of avg)</td>
</tr>
<tr>
<td>2016</td>
<td>???</td>
</tr>
</tbody>
</table>

Average = 533,800
2015 Monthly Precipitation above Boysen Reservoir

Wind River Basin Precipitation

- October: 0.5 inches (2015), 0.5 inches (30 year avg)
- November: 0.2 inches (2015), 0.2 inches (30 year avg)
- December: 0.3 inches (2015), 0.3 inches (30 year avg)
- January: 0.1 inches (2015), 0.1 inches (30 year avg)
- February: 1.5 inches (2015), 1.5 inches (30 year avg)
- March: 0.2 inches (2015), 0.2 inches (30 year avg)
- April: 1.0 inches (2015), 1.0 inches (30 year avg)
- May: 4.8 inches (2015), 4.8 inches (30 year avg)
- June: 1.0 inches (2015), 1.0 inches (30 year avg)
- July: 1.0 inches (2015), 1.0 inches (30 year avg)
- August: 0.5 inches (2015), 0.5 inches (30 year avg)
- September: 1.0 inches (2015), 1.0 inches (30 year avg)
Boysen Reservoir 2015 Operation

Archive Data From 1-OCT Through 30-SEP
Plotted 10/28/2015 14:00 (Provisional Data Subject to Revision)

Units: FEET

Boysen Reservoir, Wind River near Thermopolis, WY

Reservoir Forebay Elevation (feet)

Daily Mean Total Discharge (cfs)

Daily Mean Computed Inflow (cfs)

RECLAMATION
2016 Boysen Reservoir Reservoir Operations

BOYSEN RESERVOIR OPERATIONS
Water Year 2016 Projection

Top of Joint Use Pool = 4725 ft
Approximate Powerplant Capacity = 2,300 cfs

Inflow
Outflow
Elevation

Tick marks represent end of month
Water Year 2015 Review for Yellowtail Dam/Bighorn Lake
April-July Runoff
2015: 1,543 KAF
2014: 1,725 KAF
Avg:   1,082 KAF
Mountain Snowpack

April-July Runoff
2015: 1,543 KAF
2004: 392 KAF
Avg: 1,082 KAF
Bighorn River Basin Precipitation

Precipitation (inches)
Bighorn Lake Operations 2015

Lake Elevation (feet)

- 2015
- Top of Joint Use

Flow (cfs)

- Inflow
- Releases
- Powerplant Capacity

Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct

Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct

Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Water Year 2016
Fall and Winter Outlook
Conditions on
November 1, 2015

Elevation 3634.0 - 6.0 feet below full pool
3.5 feet lower than last year

Storage 951,353 acre-feet: 107% of average
93% full

Inflows 1,840 cfs

Outflow 2,500 cfs
November through March Gains and Release

April-October Gain = 239,300 acre-feet

Calculated November-March Gain = 258,200 acre-feet

Upstream Reservoir Fall & Winter Releases =
  Boysen = 850 cfs
  Buffalo Bill = 205 cfs

End-of-October Storage = 952,900 acre-feet

Projected End-of-March Target Elevation = 3617 (807,900 acre-feet)

Calculated Fall & Winter Release for Yellowtail:
  River = 2,450 cfs
November Monthly Operating Plans
Most and Minimum Probable Inflow Operations

Elevation (feet)

River Flow (cfs)
Questions and Comments
Reclamation’s Internet Website

www.usbr.gov/gp/lakes_reservoirs/wareprts/main_menu.html

- near real-time data available through the HYDROMET data system
- summaries and plots of historical data
- annual reservoir operating plan publication
- monthly water supply reports
- project data
- snow plots
- links to related internet sites