

# RECLAMATION

*Managing Water in the West*

## Moss Effects on River Stage



U.S. Department of the Interior  
Bureau of Reclamation

# Lenny's First Experience with the BHR



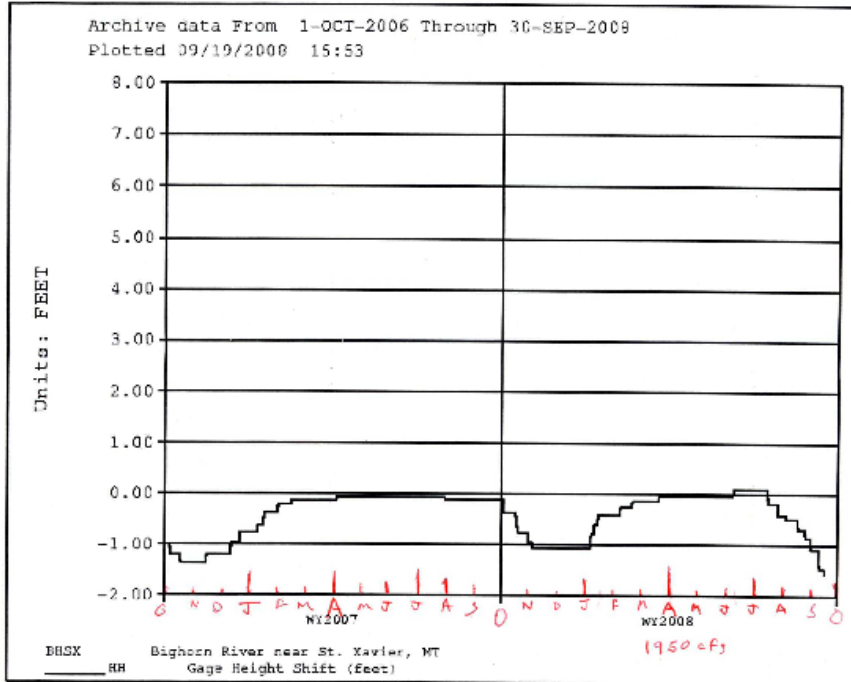
RECLAMATION

# Bighorn River near St. Xavier MT

## Gage Height Shift (Feet)

HYDROMET AMYPLT

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# Bighorn River System near St. Xavier MT

## Gage Height Shift 1999 to 2008 (in feet)

Year	Nov. Flow (CFS)	Shift Oct/Nov Max	Shift Jan/Feb Min	Shift Mar/Apr Min	Riv. Drop (Oct/Nov) to (Jan/Feb)	Riv. Drop (Oct/Nov) to (Mar/Apr)
2008	1,900	1.06	0.14	0.05	0.92	1.01
2007	1,500	1.2	0.15	0.08	1.05	1.12
2006	2,500	1.46	0.12	0.12	1.34	1.34
2005	1,500	1.15	0.2	0.11	0.95	1.04
2004	1,500	1.08	0.27	0.13	0.81	0.95
2003	1,300	1.04	0.28	0.17	0.76	0.87
2002	1,500	1.12	0.4	0.15	0.72	0.97
2001	2,000	0.99	0.06	0.04	0.93	0.95
2000	2,750	1.16	0.06	0.06	1.1	1.1
1999	3,500	0.96	0.14	0.14	0.82	0.82
<b>Average (99 to 08)</b>		1.12	0.18	0.11	0.94	1.02

# Bighorn River System near St. Xavier MT

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Year	Nov. Flow (CFS)	Shift	Shift	Shift	Riv. Drop	Riv. Drop
		Oct/Nov	Jan/Feb	Mar/Apr	(Oct/Nov)	(Oct/Nov)
		Max	Min	Min	to (Jan/Feb)	to (Mar/Apr)
2008	1,900	1.06	0.14	0.05	0.92	1.01
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<b>Average (99 to 08)</b>		<b>1.12</b>	<b>0.18</b>	<b>0.11</b>	<b>0.94</b>	<b>1.02</b>
<b>Projections for 2009</b>						
2009	2500	1.55	<b>0.18</b>	<b>0.11</b>	<b>1.37</b>	<b>1.44</b>

**1,500 cfs**

*7/2007*





## Option to Reduce Impact of Stage Shift

2009	Flow CFS	Shift	Gage Ht.	Drop (ft.)	Total
Oct	2,000	1.55	61.13	Increment	Drop (ft.)
Nov	2,100	1.45	61.13	0	0
Dec	2,400	0.8	60.72	0.41	0.41
Jan	2,800	0.25	60.49	0.23	0.64
Feb	2,900	0.18	60.5	-0.01	0.63
Mar	2,800	0.18	60.42	0.08	0.71
Avg.	<b><u>2,500</u></b>		Total	<b><u>0.71</u></b>	



## Option to Protect Rearing Habitat and Reduce Impact of Shift

	Constant	Modified	Estimated		Drop (ft.)	Total
2009	Flow CFS	Flow CFS	Shift	Gage Ht.	Increment	Drop (ft.)
Oct	2500	1,900	1.55	61.04		
Nov	2500	2,000	1.45	61.03	0.01	0.01
Dec	2500	2,300	0.8	60.64	0.39	0.4
Jan	2500	2,400	0.25	60.17	0.47	0.87
Feb	2500	2,500	0.18	60.18	-0.01	0.86
Mar	2500	2,500	0.18	60.18	0	0.86
Apr	1900	2,400	0.11	60.03	0.15	1.01
May	1900	2,400	0.11	60.03	0	1.01
June	1900	2,300	0.11	59.95	0.08	1.09
<b>Avg.</b>	<b><u>2,300</u></b>	<b><u>2,300</u></b>		<b>Total</b>	<b><u>1.09</u></b>	