

RECLAMATION

Managing Water in the West

BIGHORN LAKE SEDIMENT MANAGEMENT STUDY



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Bighorn River System Issues Group

Purpose Statement

The Bighorn River System Issues Group is formed to identify, explore, and recommend alternative courses of action to local, tribal, state, and federal entities responsible for managing the Bighorn River system resources for their consideration as part of a long-term management strategy. The challenge is to re-examine the uses and needs of the Bighorn River system to find an appropriate balance of public benefits, while recognizing the respective agencies' commitments to authorized project purposes, legal obligations, contemporary needs and public expectations.

Problem Statement

Local, state, tribal, and federal entities are concerned that the Bighorn River system is not being managed in a way that fully protects and utilizes the system's resources to address the multiple demands, needs, and expectations of the public.



(Above) Yellowtail Dam and Bighorn Canyon National Recreation Area.

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Managing Water in the West

Technical Report No. SRH-2012-26

Bighorn River Side Channel Investigation: Hydraulic and Sediment Transport Analysis



U.S. Department of the Interior
Bureau of Reclamation
Technical Services Center
Denver, CO

September 2012



US Army Corps
of Engineers®
Omaha District

Yellowtail Dam Reallocation Study

Final



REVISED: 1 April 2010

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DRAFT BIGHORN LAKE OPERATING CRITERIA EVALUATION STUDY & REPORT



**U. S. Department of the Interior
Bureau of Reclamation
Great Plains Region
GP-4600**

**Draft Report
September 14, 2010**

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Yellowtail Dam & Bighorn Lake Operation Rule Curves

Billings, MT
January 15, 2009

DRAFT

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BIGHORN LAKE SEDIMENT MANAGEMENT STUDY

FINAL DRAFT REPORT
September 2009



**US Army Corps
of Engineers** ®
Omaha District

R Coff
4/2010

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BIGHORN LAKE SEDIMENT MANAGEMENT STUDY

FINAL REPORT
March 2010



Bighorn River Systems Issues Group

Sediment Control Sub-Committee
Formed Spring of 2010
Superintendent Jerry Case – BICA
as chairman

STUKENHOLTZ LABORATORY, INC.

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SIMPLOT GROWER SOLUTIONS
P.O. BOX 565
303 S BENT STREET
POWELL WY 82435

307/754-4833 307/754-2463
Report No.: 13611
Date Received: 3/31/11
Date Reported: 4/01/11

SOIL TEST DATA	Sample 1	Sample 2	Sample 1	Sample 2
			Grower:	FRIENDS BIG HORN
pH	7.6	H	Sample Identity	KANE RAMP - sediment removed in 2007 & piled
Salts, mmhos/cm	2.0	M	Crop	NATIVE PLANTS
Chlorides, ppm	10	VL	Yield Goal	2
Sodium, meq/100g	0.3	VL	Acres	
CEC, meq/100g	16.6	M	Prev. Crop T/Acre	NATIVE PLANTS
Excess Lime, %	7.5	H	Manure T/Acre	
Organic Matter, %	1.69	M	Prev. Applied Nutrients	
Organic N, lb/Acre	35	L	RECOMMENDATIONS, lbs. Nutrients or Units Per Acre.	
Ammonium - N, ppm	4.2	VL	Nitrogen	125
Nitrate - N, ppm	5	VL	P ₂ O ₅ - Phosphate	120
Phosphorus, ppm	3	VL	K ₂ O - Potash	20
Potassium, ppm	175	M	Calcium	0
Calcium, meq/100g	12.4	H	Magnesium	0
Magnesium, meq/100g	3.3	H	Sulfate - Sulfur	0
Sulfate - S, ppm	342	VH	Zinc	7
Zinc, ppm	0.7	L	Iron	0
Iron, ppm	12.4	H	Manganese	0
Manganese, ppm	5.2	H	Copper	0
Copper, ppm	1.3	M	Boron	0
Boron, ppm	0.90	M	Elemental Sulfur	100

RELATION OF CEC TO SOIL TEXTURE	S A M P L E	ACTUAL AND RECOMMENDED PERCENT OF CEC							
		Actual % Potassium	Recommended Potassium	Actual % Calcium	Recommended Calcium	Actual % Magnesium	Recommended Magnesium	Actual % Sodium	Recommended Sodium
0 - 5 Sand									
5 - 12 Loamy Sand									
12 - 16 Sandy Loam	1	3.5	3.0 - 6.0 %	74.7	65 - 80 %	19.9	15 - 25 %	1.8	< 3.0 %
18 - 24 Silt Loam									
24 - 36 Clay Loam									
36 + Clay	2								

Crop1: Split application of N is advised. Monitor crop with plant tissue tests and add N as needed.



05.06.2011



05.20.2011



04.28.2011





04.28.2011



















04.28.2011



04.28.2011

Bighorn River System Issues Group
Sediment Control Sub-Committee
Onsite Tour of south Bighorn Lake
April 10, 2012

Purpose of Tour: To get a first hand look at the area for the possible sediment ponds and discuss what the next step needs to be toward construction of ponds

Those on Tour: Lenny Duberstein – MT USBR, Dan Pridal – Omaha USACOE, Rob Hilldale – Denver USBR, Bob Croft - FOBHL & Sediment Sub-Committee member

Location of Tour: Looked at highway 14AE Causeway, possible locations of ponds near old ML Ranch dyke and on south near the Five Springs Ranch. All the property being considered is government owned. Also looked at an active bentonite mine on BLM land near the Crystal Creek road to see how the sediment might be used for top soil reclamation.

Topics Discussed:

Where are possible locations for the ponds?

Possible locations to pile the sediment removed?

How the bentonite companies will use the sediment? How many cuyds/year are needed?

How will the sediment be removed? By the USBR or the bentonite company's.

Abandoned mines that still need reclaimed and the funding for this. (Rep Elaine Harvey is working on this)

Ponds could be allowed to fill up and new ones made.....

Over all benefits of extending the life of YT Reservoir.....

YT role in wind powered electrical generation.....

Some major thoughts on the subject:

Dan

1. To extend the life of any reservoir is very important. YT has a major role in flood control and as a peaking power generation plant for wind generation
2. Extending the life of YT will benefit everyone and everything. The public, Tribal, state government, federal government and all who use the water for any use
3. Since all will benefit all should help in funding this project
4. The COR, USBR, BLM, NPS, WAPA, NRCS, MT, WY, and others can contribute thru the process of investigation, design, development and construction

BIGHORN LAKE

SEDIMENT MANAGEMENT RECONNAISSANCE STUDY SCOPE

April 2012

Introduction

Bighorn Lake was created when the Bureau of Reclamation constructed Yellowtail Dam across the Bighorn River in the 1960s. The reservoir, at full pool, impounds approximately 1.32 million acre-feet of water, covers approximately 17,200 acres, and is approximately 71 miles long. The reservoir is operated as a multi-use facility for the purposes of flood control, hydro power, recreation, and water supply. Approximately half of the basin is controlled by the Boysen, Anchor and Buffalo Bill Dams. The contributing portion of the basin is arid, steep and sparsely vegetated, which tends to yield relatively large amounts of sediment. Yellowtail Dam is operated to fill during the spring runoff period which is also the highest sediment producing period. Since dam closure, sediments have accumulated within the pool area and are impacting lake resources.

In April 2007, Reclamation initiated the Bighorn River System Long Term Issues Working Group to begin a collaborative process with parties across Montana and Wyoming to address public concerns and develop long term proposals and procedures to improve all of the benefits of the Yellowtail Unit. One of the specific concerns was the deposition of sediment in Bighorn Lake and how deposits are affecting the Bighorn Canyon National Recreation Area.

The primary recreational opportunities are located in the southern portion of the reservoir before the lake enters the reservoir canyon areas. The Groups particular area of sedimentation concern is at Horseshoe Bend (HSB), which is located immediately upstream of the canyon entrance. HSB is a remnant oxbow of the natural river, which provides an overly wide flood plain. Due to the narrow canyon downstream of HSB, public access at this location is an important recreation feature. The HSB area acts as an efficient stilling basin that traps sediments before it can enter the canyon. Deposition at HSB has exceeded 50 feet in several areas and can prevent access to the reservoir when the pool falls below the safe boat launch elevation identified by the National Park Service.

Previous Study

The *Bighorn Lake Sediment Management Study* (Reclamation, 2009) was an initial assessment conducted to evaluate several sediment management alternatives. The technical focus study used existing cross section, hydrologic, and sediment data for the reservoir as input to a one-dimensional sediment transport model. The sediment model was used to assess alternative scenario sediment

Thank You !

