

Zortman: Dealing with Extreme Weather Events

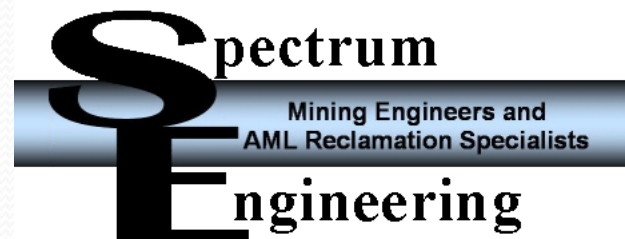


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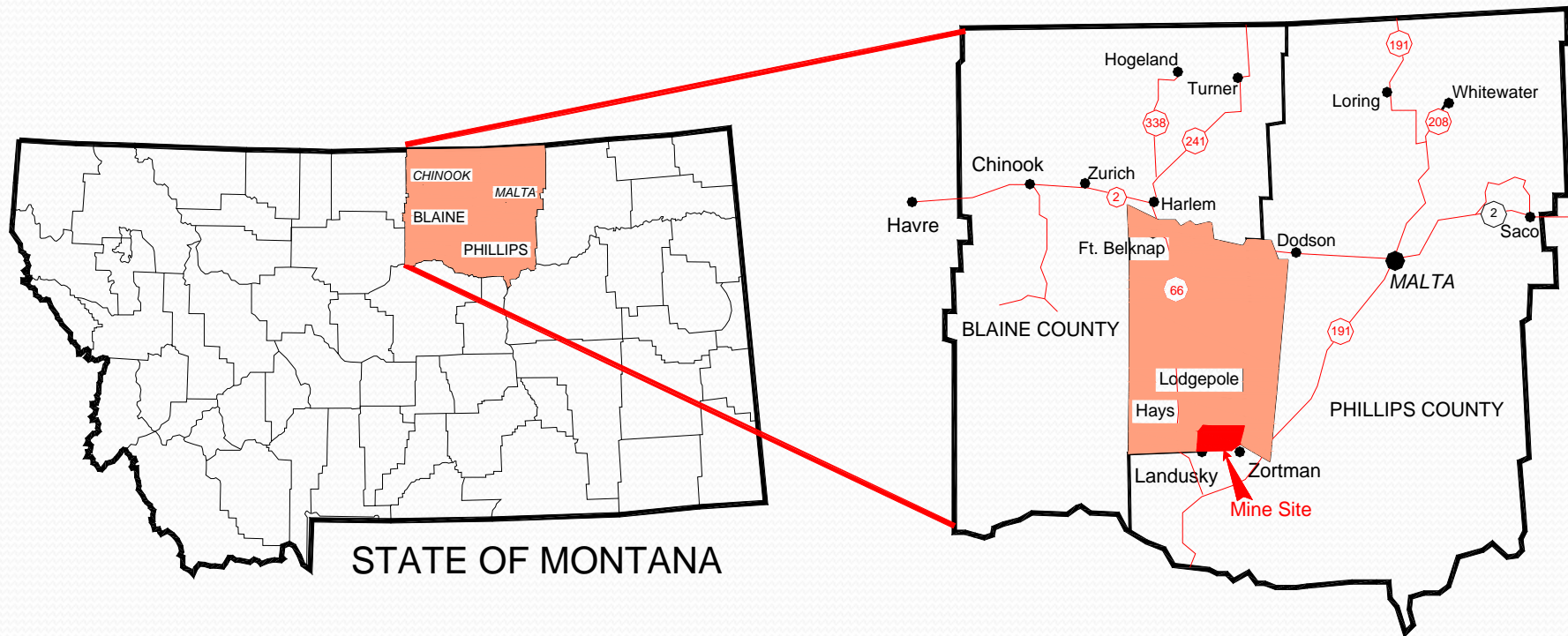
**Warren McCullough &
Wayne Jepson**

And



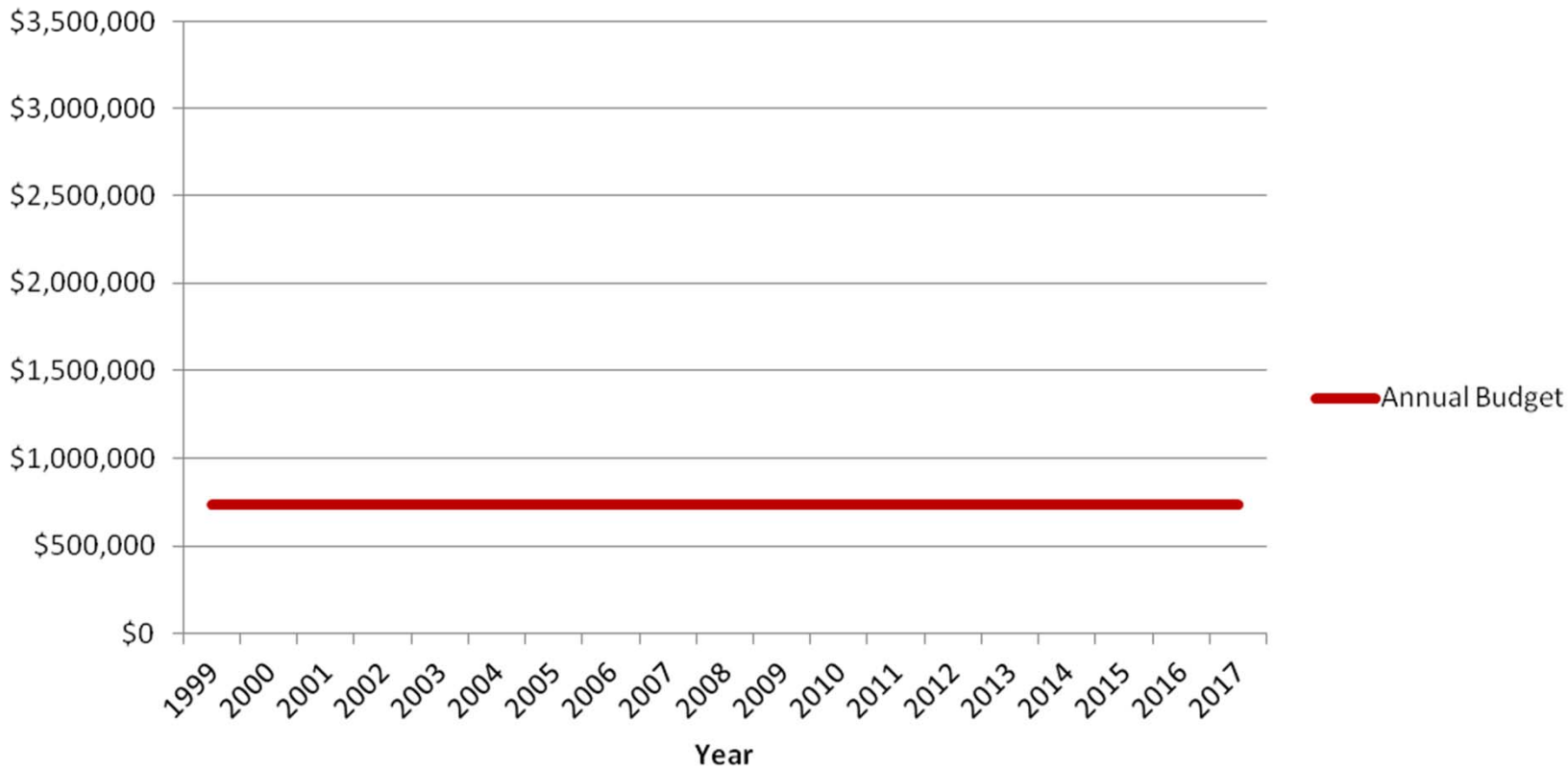
Bill Maehl

ZORTMAN AND LANDUSKY MINE SITES

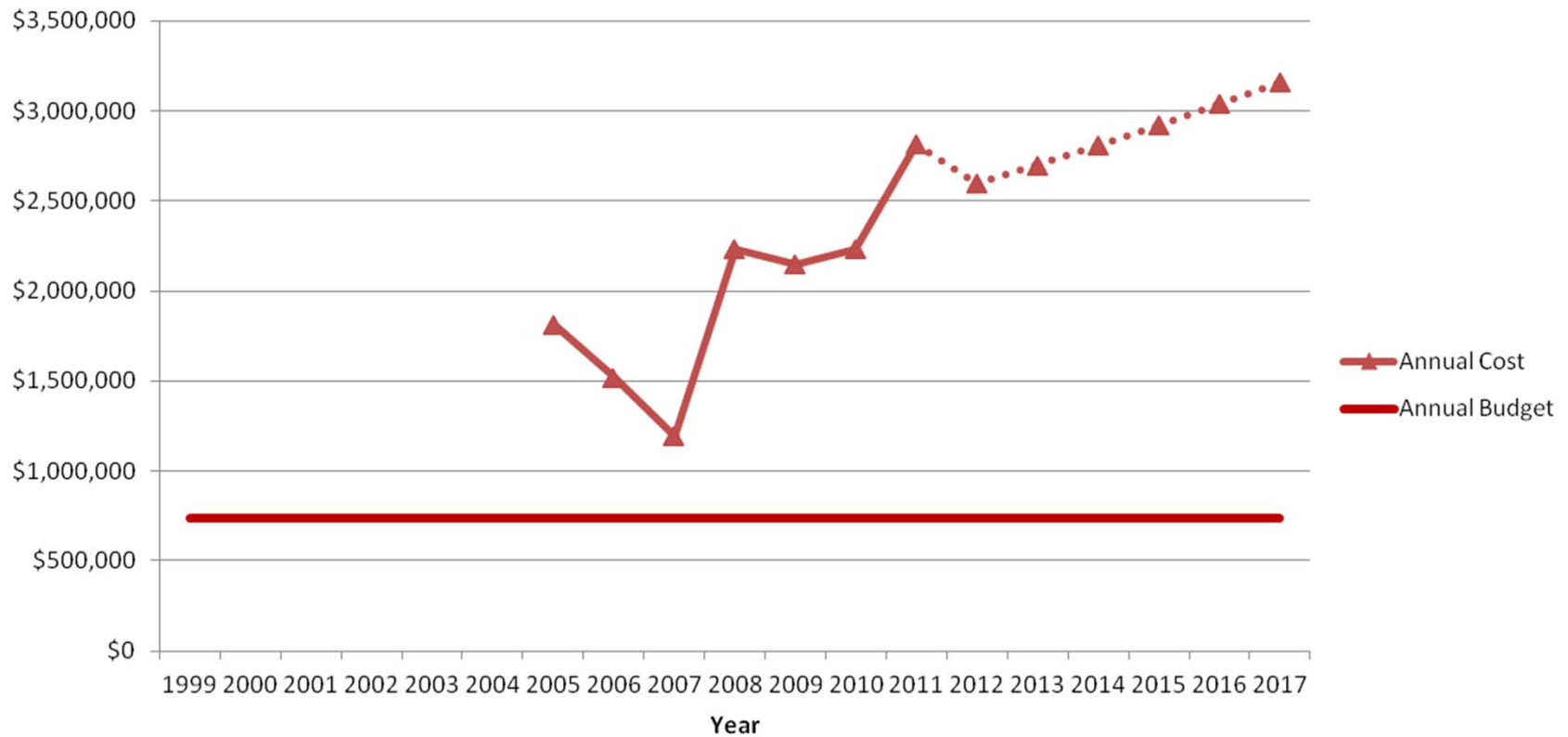




Operation and Maintenance Budget of the Zortman and Landusky Water Treatment Facilities



Zortman and Landusky Water Treatment Costs 1999-2017



MONTANA STATEWIDE FLOODING

STATEWIDE FLOODING IN
MONTANA IS NOT UNCOMMON.

EACH YEAR,
VARIOUS PARTS OF
THE STATE ARE
INUNDATED WITH
TOO MUCH
WATER.



MAY 2011 WAS NO EXCEPTION TO THE MT FLOODING DILEMMA ROUNDUP, MT BUSY BEE CAFÉ



20-MILE STRETCH OF INTERSTATE 90 CLOSED BY CROW AGENCY MAY 26TH, 2011





ZORTMAN MINE

**YEARLY AVERAGE
PRECIPITATION FROM
1999 THROUGH 2009
WAS 18.81 INCHES
(11 YEAR AVERAGE)**



ZORTMAN MINE

**YEARLY
PRECIPITATION
FOR 2010 WAS 30.05
INCHES**



ZORTMAN MINE

**YEARLY
PRECIPITATION
FOR 2011 WAS 36.30
INCHES
AND 17.49 INCHES
MORE THAN THE 11
YEAR AVERAGE**



**WATER, WATER,
EVERYWHERE.**

**NOR ANY DROP
TO DRINK.**

Zortman Ruby Gulch Pump House buried by tailings after August 2002 thunderstorm



Zortman mine, 2006, view from south



Zortman Carter Gulch waste dump failure, May 2011



Remnants of Carter Gulch Seepage Capture System



Zortman Mine, 2005



Debris flow in Ruby Capture Pond, May 23, 2011



Ruby Capture Pond overflowing, May 23, 2011



Ruby Capture Pond – liner repaired, Nov. 2011



Sediment Control Structure above town of Zortman, near peak of flood event



The day after...



Landusky Mine viewed from south, 2006



Landusky Mine viewed from north; Swift Gulch in foreground



Swift Gulch water treatment plant - under construction in November 2010



Bighorn Creek and access road to Swift WTP



Nine Days Later...



After the Flood...



View upstream from Swift Gulch WTP



Turn-around site for lime delivery trucks adjacent to Swift Gulch WTP, before the flood:



View upstream from Swift WTP, the day after:



Delivery truck turning area adjacent to Swift WTP, after the flood:



Swift Gulch adjacent to WTP, looking downstream – May 22, 2011







**THE ZORTMAN AND LANDUSKY
GOLD MINES IN NORTH-CENTRAL
MONTANA RELEASED ARD WATER
DOWN SEVERAL STREAMS IN 2011.**

**TOTAL WATER UNTREATED IN 2011 –
ZORTMAN - 56,504,400 GALLONS
LANDUSKY - 19,778,400 GALLONS**



FEDERAL EMERGENCY MANAGEMENT AGENCY COST SUMMARY RECORD

CLAIM COST

FORCE ACCOUNT EQUIPMENT	\$14,705.00
MATERIALS - NEUTRALIZE ZORTMAN LEACH PAD WATER (NEW 2011 COST DUE TO FLOODING)	\$218,855.23
MATERIALS - NEUTRALIZE LANDUSKY LEACH PAD WATER (ADDITIONAL 2011 COST OVER 2010 COSTS)	\$39,189.26
MATERIALS - POWER USAGE (ADDITIONAL 2011 COST OVER 2010 COSTS)	\$10,319.32
MATERIALS - SWIFT GULCH REPAIRS (NEW COST DUE TO FLOODING)	\$10,412.88
MATERIALS - RUBY GULCH PUMP REPLACEMENT DUE TO MUD SLIDE	\$10,024.88
TOTAL CATEGORY B COST CLAIM	\$303,506.57



Questions?