

# ***Yellowtail Flood Pool Reallocation Study***

***Douglas J. Clemetson  
Chief, Hydrology Section  
U.S. Army Corps of Engineers  
Omaha, Nebraska***

***Big Horn River System  
Long-Term Issues Group  
January 17, 2008***



US Army Corps  
of Engineers  
Omaha District

# Purpose

- Evaluate Change in Flood Reduction Benefits due to Reallocation of Flood Control Storage to Joint Use Storage for Yellowtail Dam and Bighorn Lake





# BIGHORN LAKE STORAGE ALLOCATION

US Army Corps  
of Engineers  
Omaha District

Dam Crest  
Elev. 3660.0

3657 (1,328,360 AF)

Surcharge - 52,829 Acre-Feet

**Exclusive Flood Control - 258,331 Acre - Feet**

3640 (1,070,029 Acre - Feet)

**Joint Use - 240,342 Acre - Feet**

3614 (829,687 Acre - Feet)

Active Conservation - 336,103 Acre - Feet



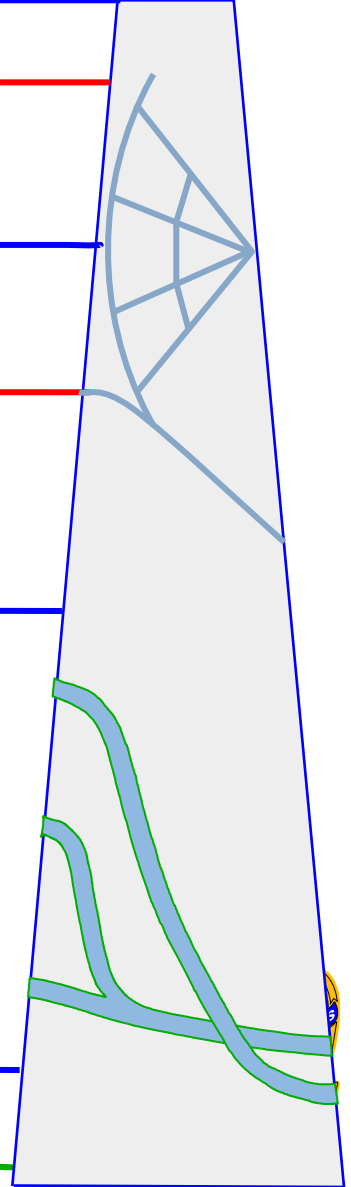
Top of Conservation Elev. 3547.00 (493,584 Acre - Feet)

Inactive Conservation - 477,576 Acre - Feet



Top of Dead Elev. 3296.50 (16,008 Acre - Feet)

Dead - 16,008 Acre - Feet





US Army Corps  
of Engineers  
Omaha District

# PROPOSED STORAGE ALLOCATION

Dam Crest  
Elev. 3660.0

3657 (1,328,360 AF)

Surcharge - 52,829 Acre-Feet

3645 (1,137,514 Acre - Feet) **Exclusive Flood Control - 190,846 Acre - Feet**

**Joint Use - 307,827 Acre - Feet**

3614 (829,687 Acre - Feet)

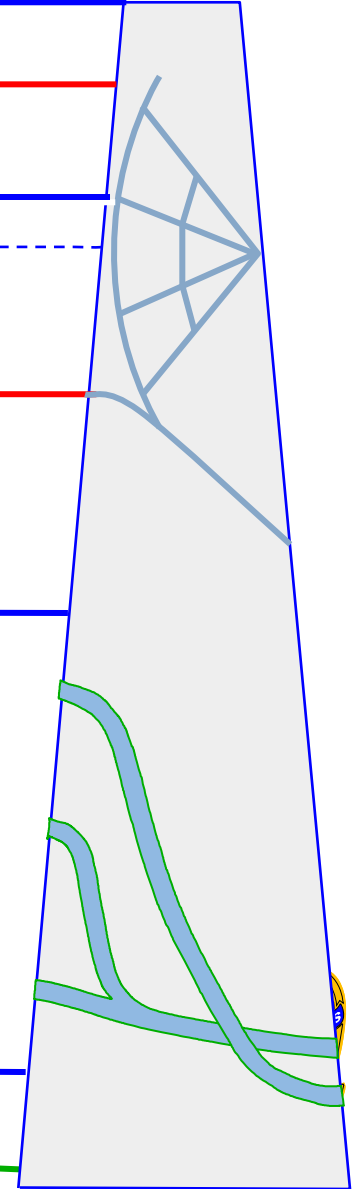
Active Conservation - 336,103 Acre - Feet

Top of Conservation Elev. 3547.00 (493,584 Acre - Feet)

Inactive Conservation - 477,576 Acre - Feet

Top of Dead Elev. 3296.50 (16,008 Acre - Feet)

Dead - 16,008 Acre - Feet





US Army Corps  
of Engineers  
Omaha District

# HEC-ResSim

(Reservoir Evaluation System-Simulation)

- Single or Multiple Reservoir Systems
- Flood Control
- Hydropower
- Water Supply (M&I, Irrigation, etc)
- Diversions
- Navigation
- Flow Targets (Max & Min)
- POR or Event Simulation





US Army Corps  
of Engineers  
Omaha District

# Data Requirements

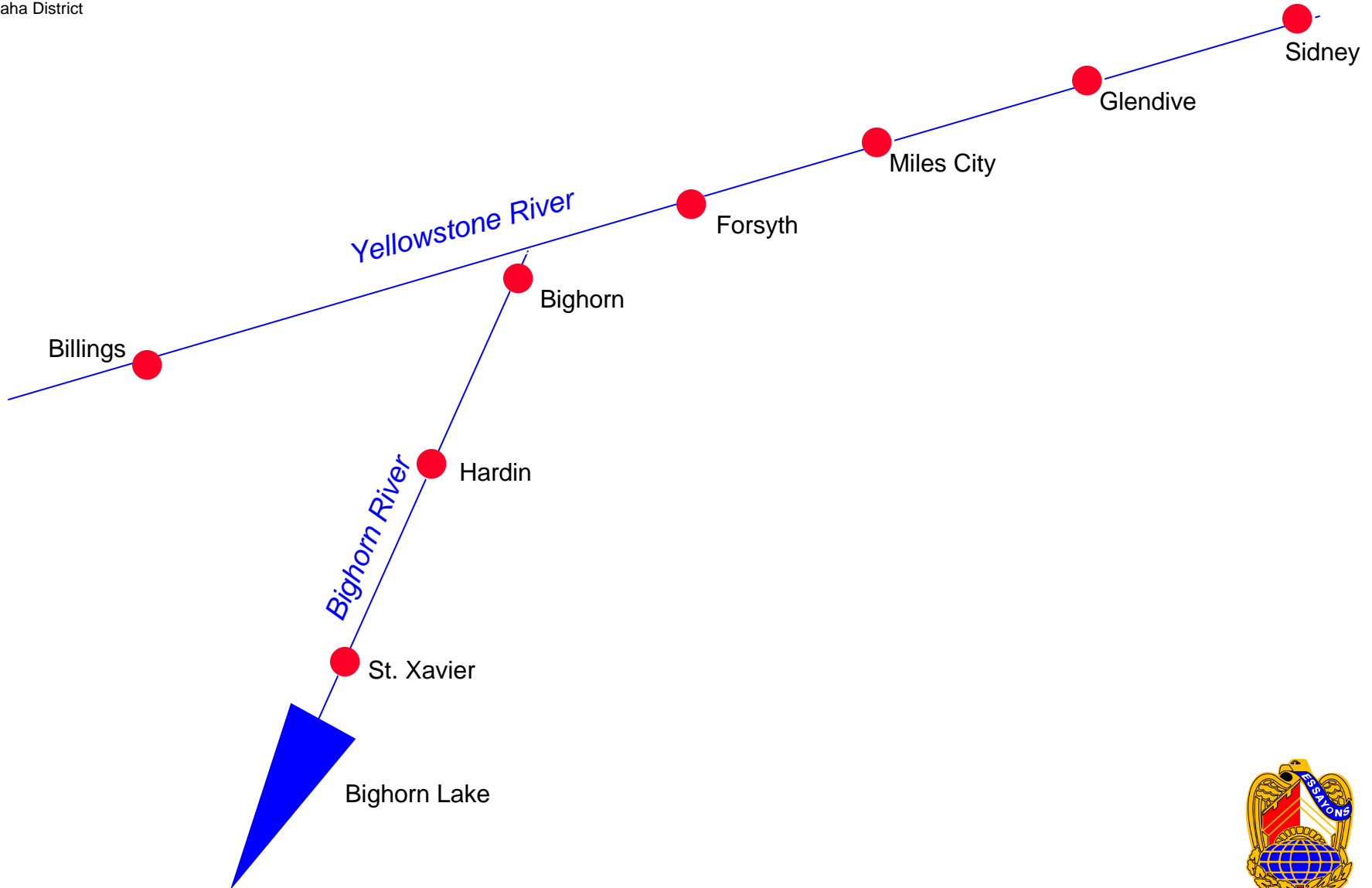
- Daily Streamflow 1967-2007
- Daily Reservoir Inflow, Outflow, Storage
- Daily Precipitation, Evaporation
- Elevation-Area-Capacity Relationships
- Spillway & Outlet Rating Curves
- Downstream Discharge-Damage Functions
- Reservoir Operating Criteria/Storage Zones
- Project Design Floods





US Army Corps  
of Engineers  
Omaha District

# Schematic of ResSim Control Points





US Army Corps  
of Engineers  
Omaha District

# ResSim Outputs

- Flows at D/S Control Points
- Pool Elevation
- Storage
- Reservoir Releases

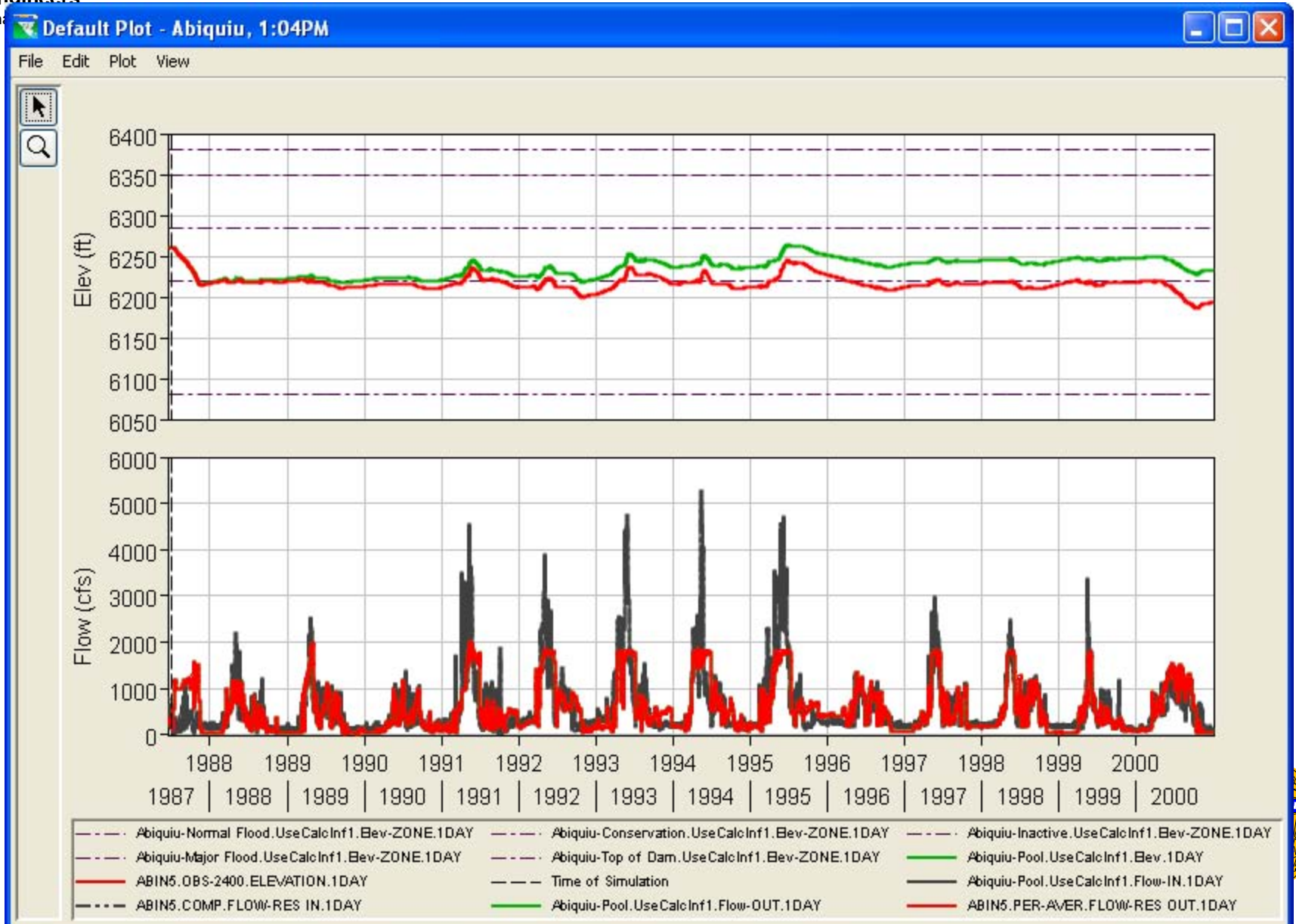






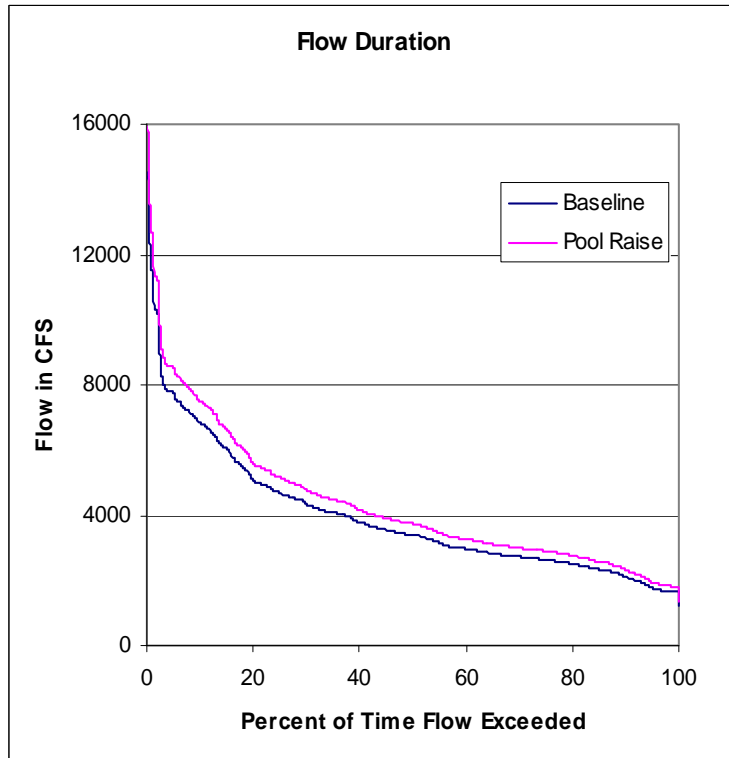
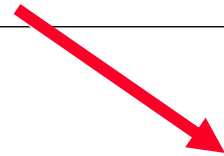
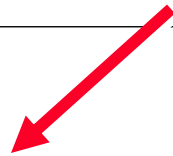
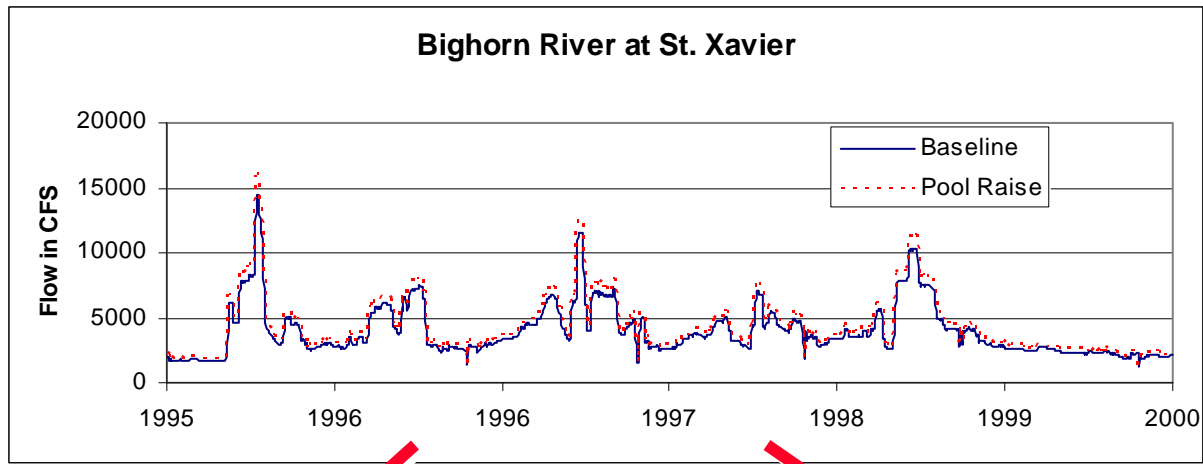
US Army Corps  
of Engineers  
Omaha

# Sample ResSim Graphical Output

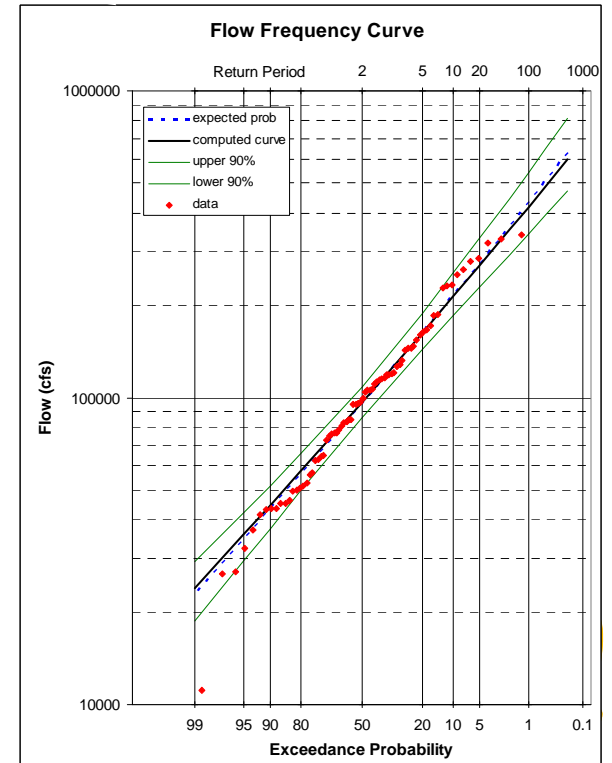




US Army Corps  
of Engineers  
Omaha District

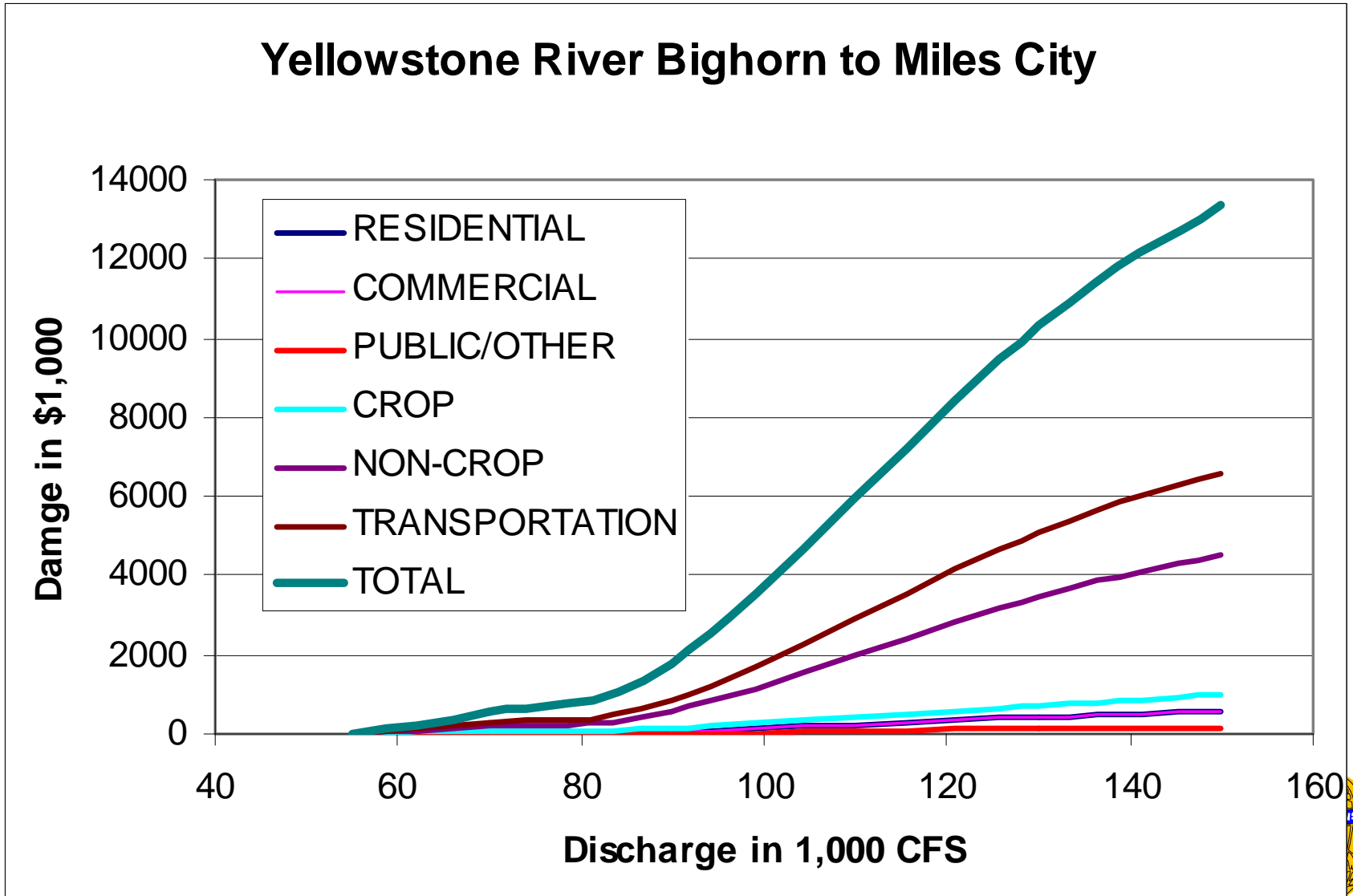


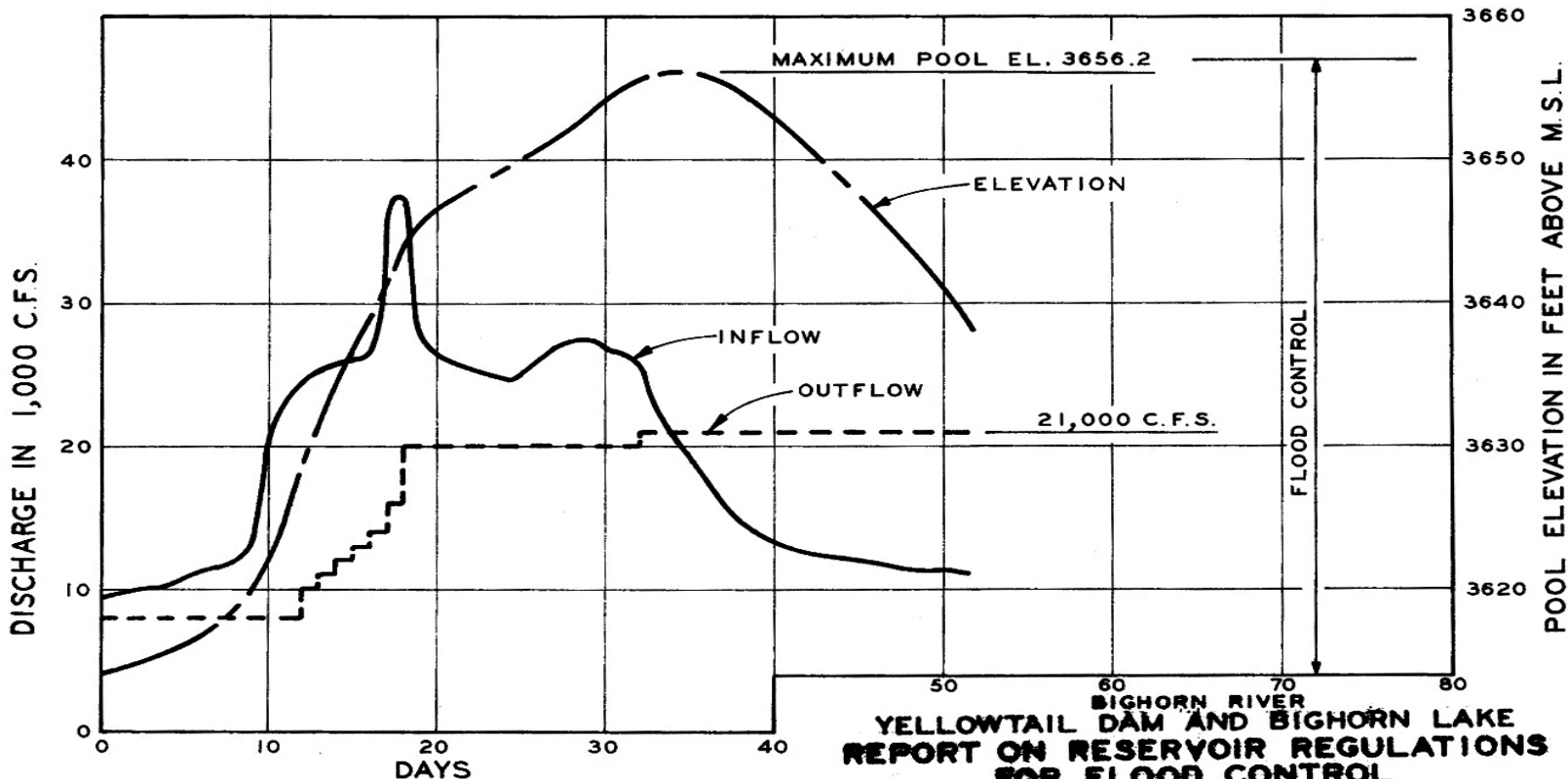
Note: This information is for illustrative purposes only and does not represent study results





# Example Discharge Damage Curves





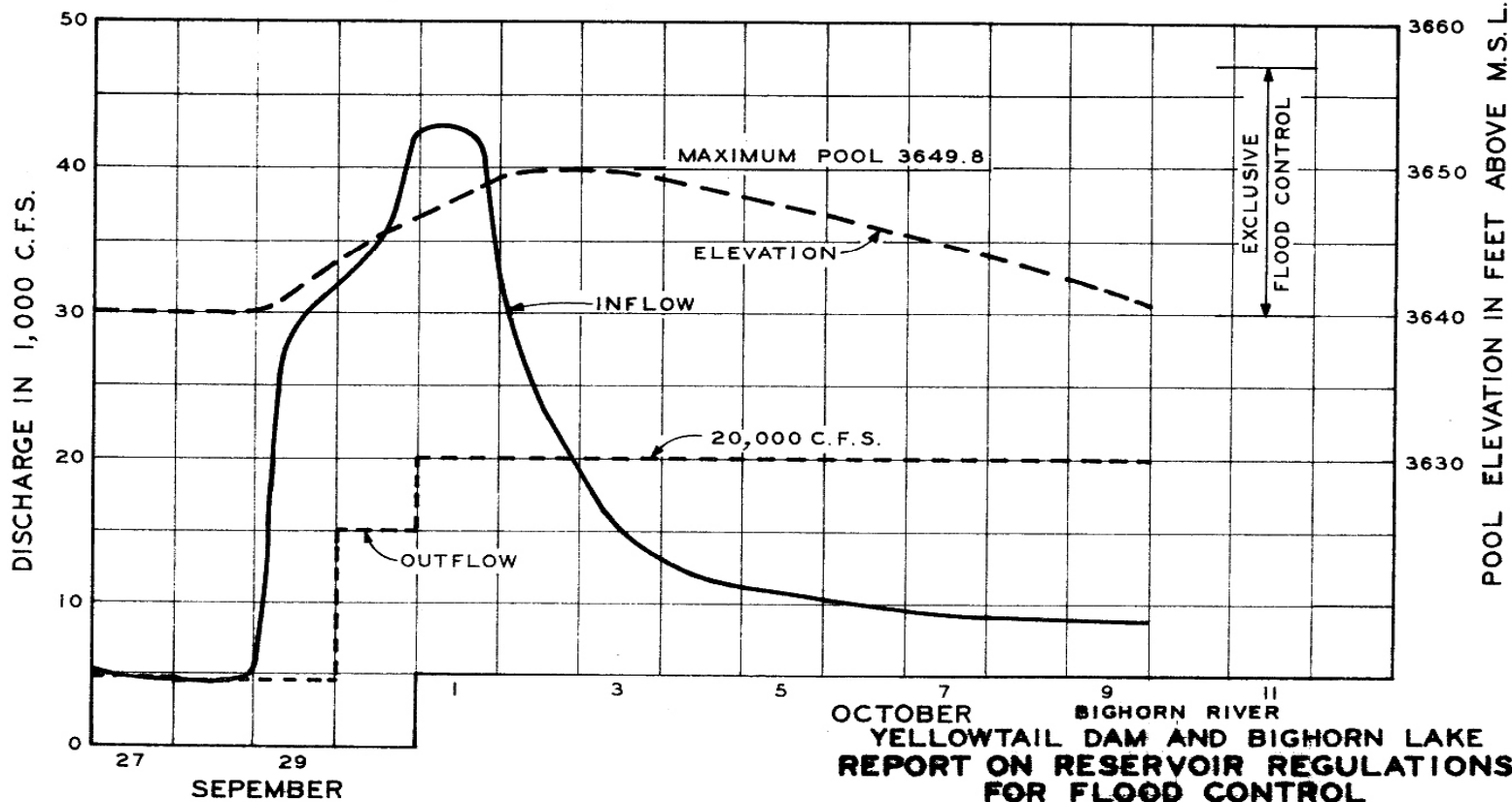
**YELLOWTAIL DAM AND BIGHORN LAKE  
REPORT ON RESERVOIR REGULATIONS  
FOR FLOOD CONTROL**

**ROUTING PROJECT FLOOD HYDROGRAPH  
WITH 50% OF FLOW ENTERING BOYSEN  
USING PLATE 34**

**U. S. ARMY ENGINEER DISTRICT, OMAHA  
CORPS OF ENGINEERS OMAHA, NEBRASKA  
JAN. 1974**

PLATE 36





**BIGHORN RIVER**  
**YELLOWTAIL DAM AND BIGHORN LAKE**  
**REPORT ON RESERVOIR REGULATIONS**  
**FOR FLOOD CONTROL**  
**RAINFALL FLOOD**  
**ROUTING OCTOBER 1923 FLOOD**  
**USING PLATE 34**

U. S. ARMY ENGINEER DISTRICT, OMAHA  
 CORPS OF ENGINEERS OMAHA, NEBRASKA  
 JAN. 1974

PLATE 38





US Army Corps  
of Engineers  
Omaha District

# Schedule

- Jan 08 – Kickoff Meeting
- Jun 08 – Baseline
- Sep 08 – Pool Raise
- Nov 08 – Report





US Army Corps  
of Engineers  
Omaha District

# Questions??

