



# Libby and Hungry Horse Operation under the Fish and Wildlife Program

November 9, 2004

Portland, Oregon

# Montana Operation

## ➤ October through June

- 2000 BiOp Operation
- Attempt to fill Libby and Horse by June 30<sup>th</sup>

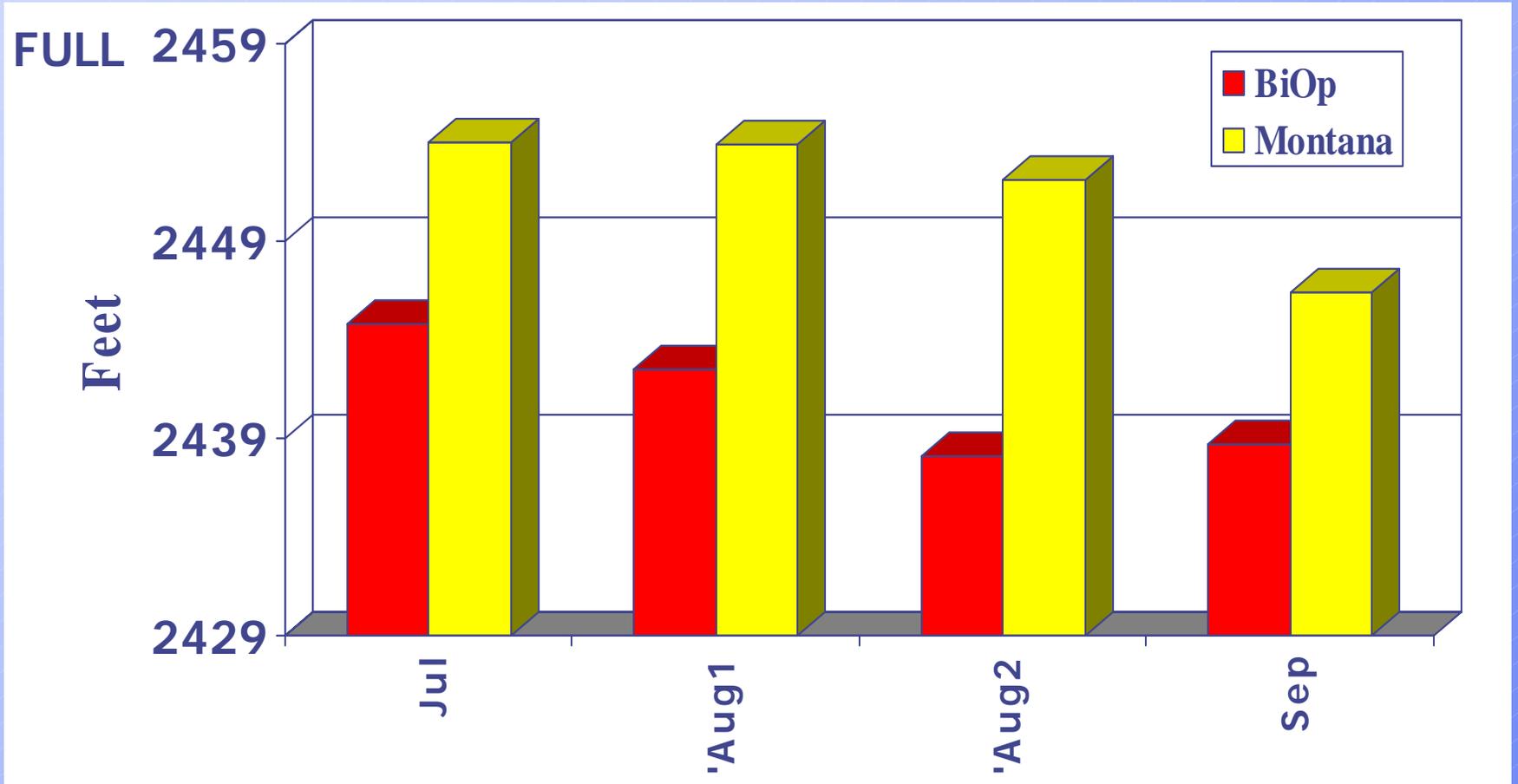
## ➤ July-September

- Draft (or fill) Libby and Horse to provide level or decreasing outflows
- End-of-September target elevation is 10' from full for both Libby and Horse
- End-of-September target elevation is 20' from full in the 20% driest runoff conditions (Jan-Jul volume measured at The Dalles)

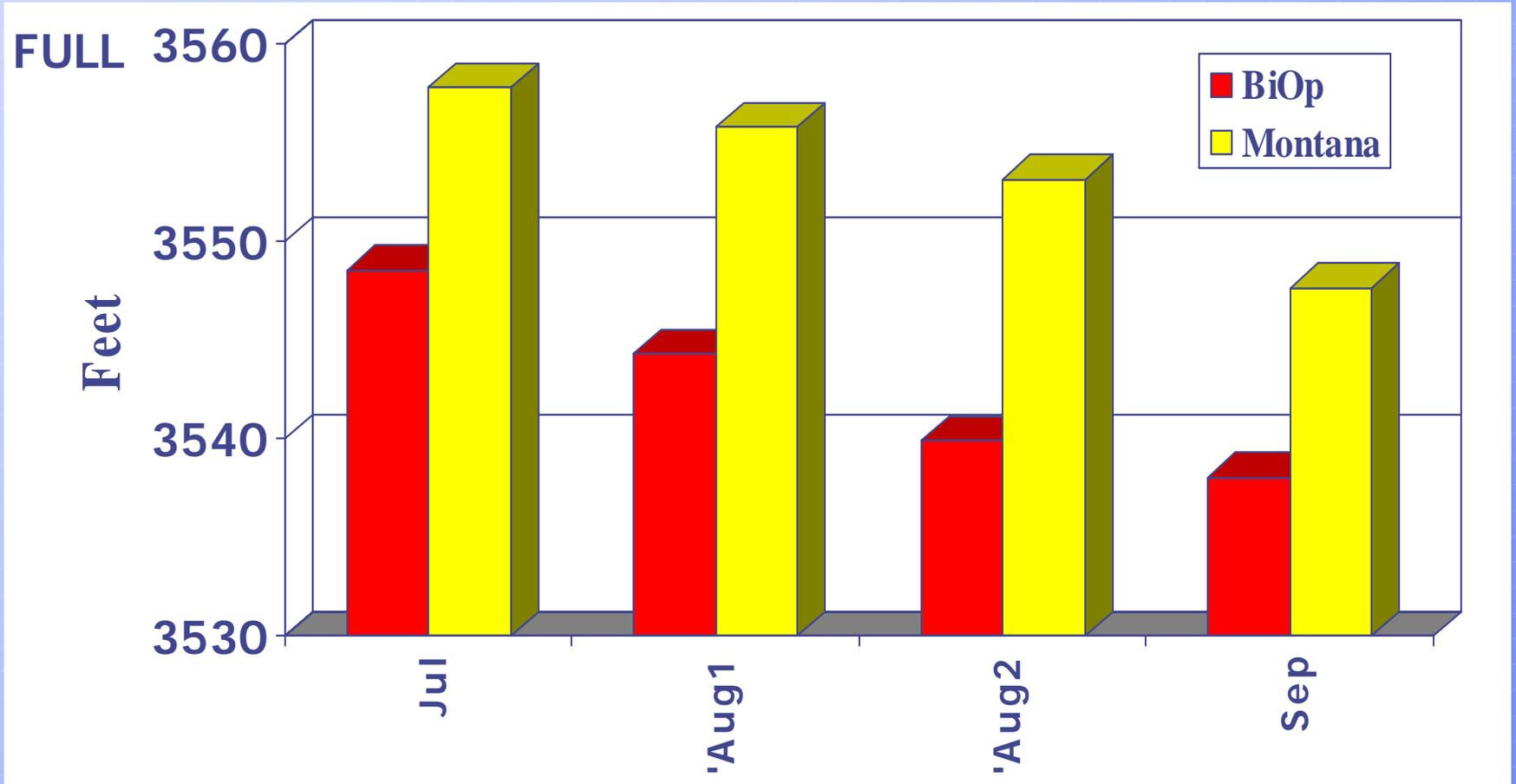
# Caveats

- This is a preliminary analysis
- Used **observed** inflows at Libby and Horse to calculate target flows
  - Results are optimistic
  - Weekly or monthly forecast flows should be used
- Did not change constraints at any other projects

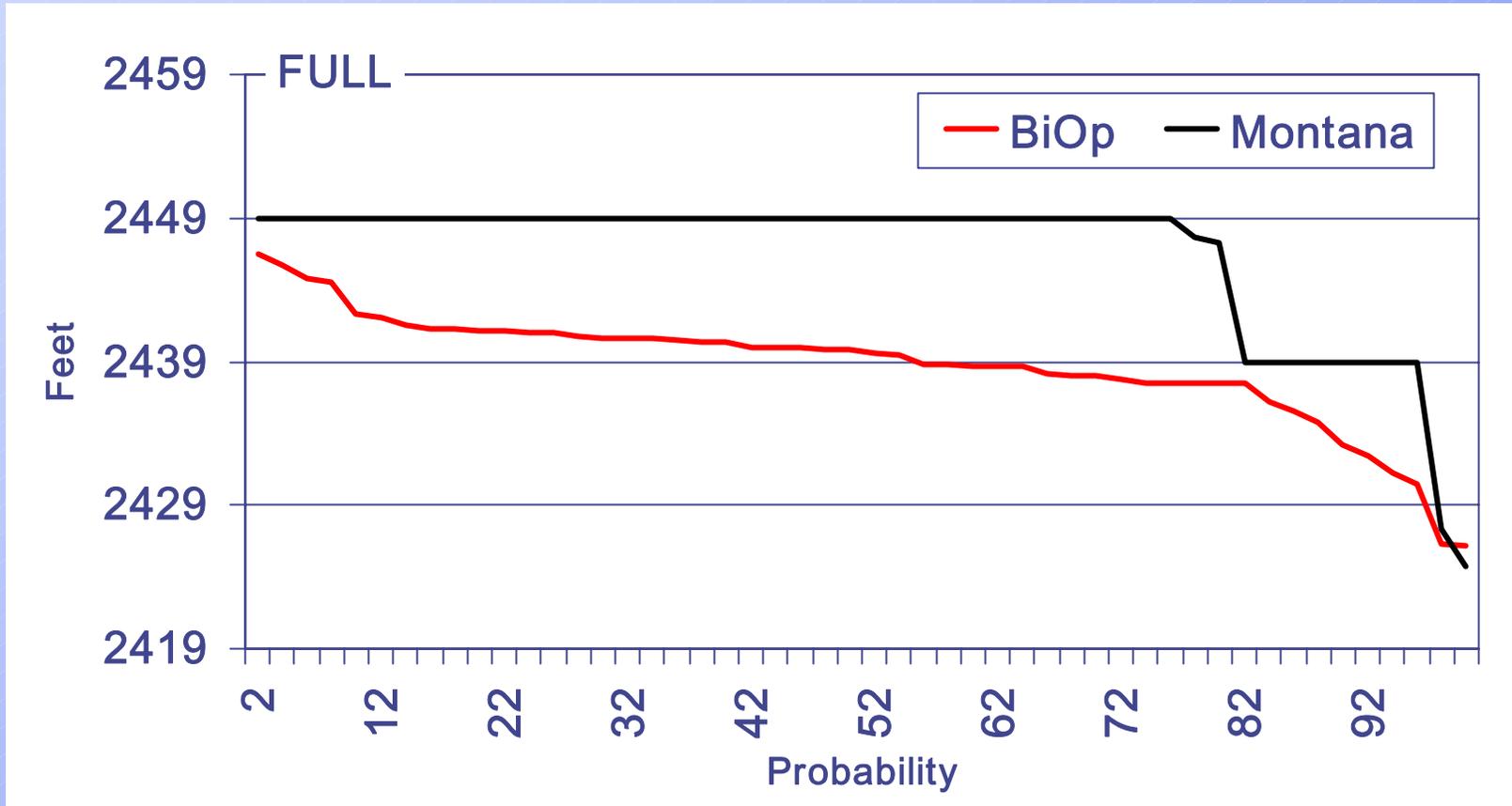
# Average End-of-Month Elevation @Libby



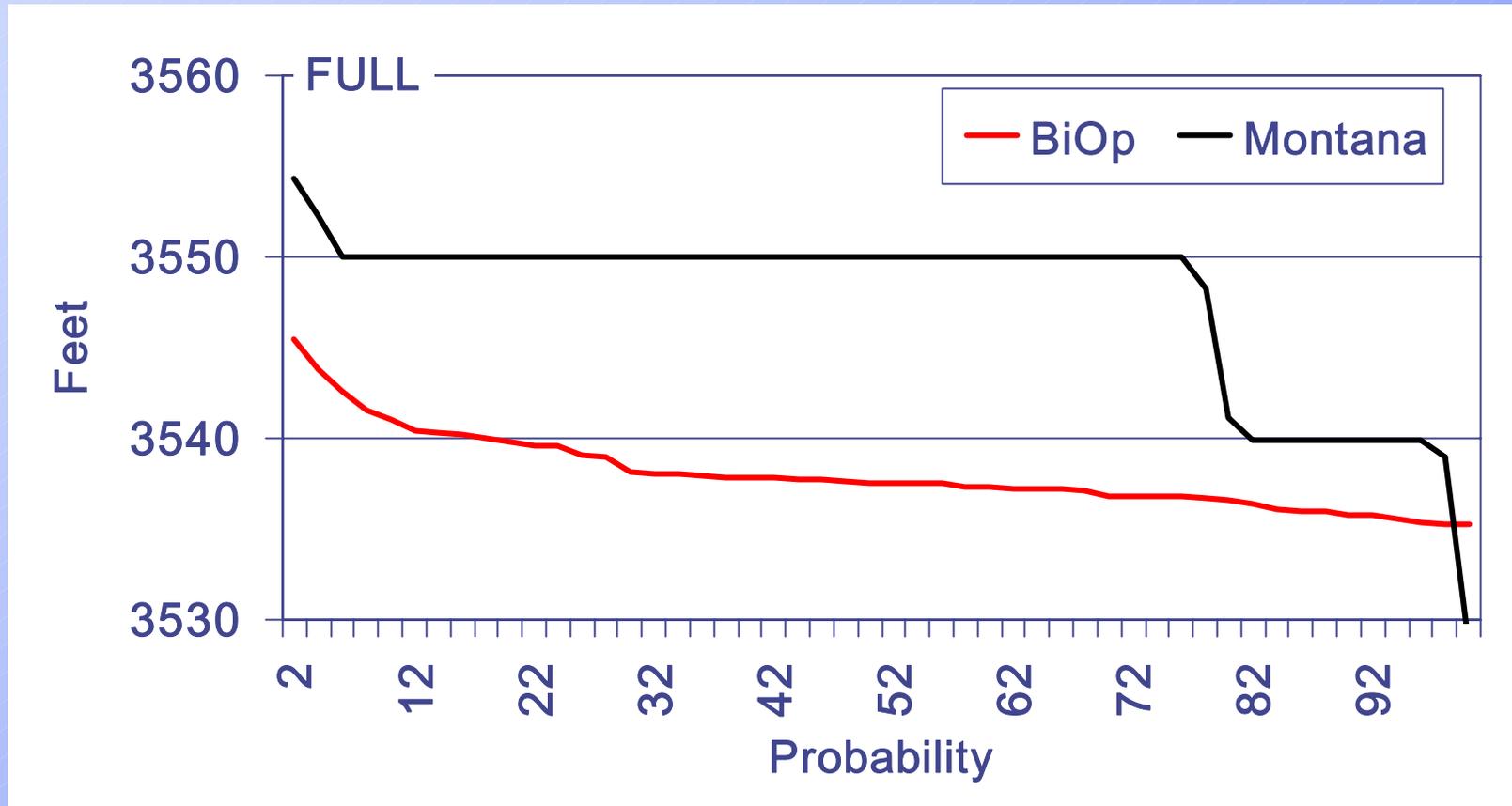
# Average End-of-Month Elevation @Horse



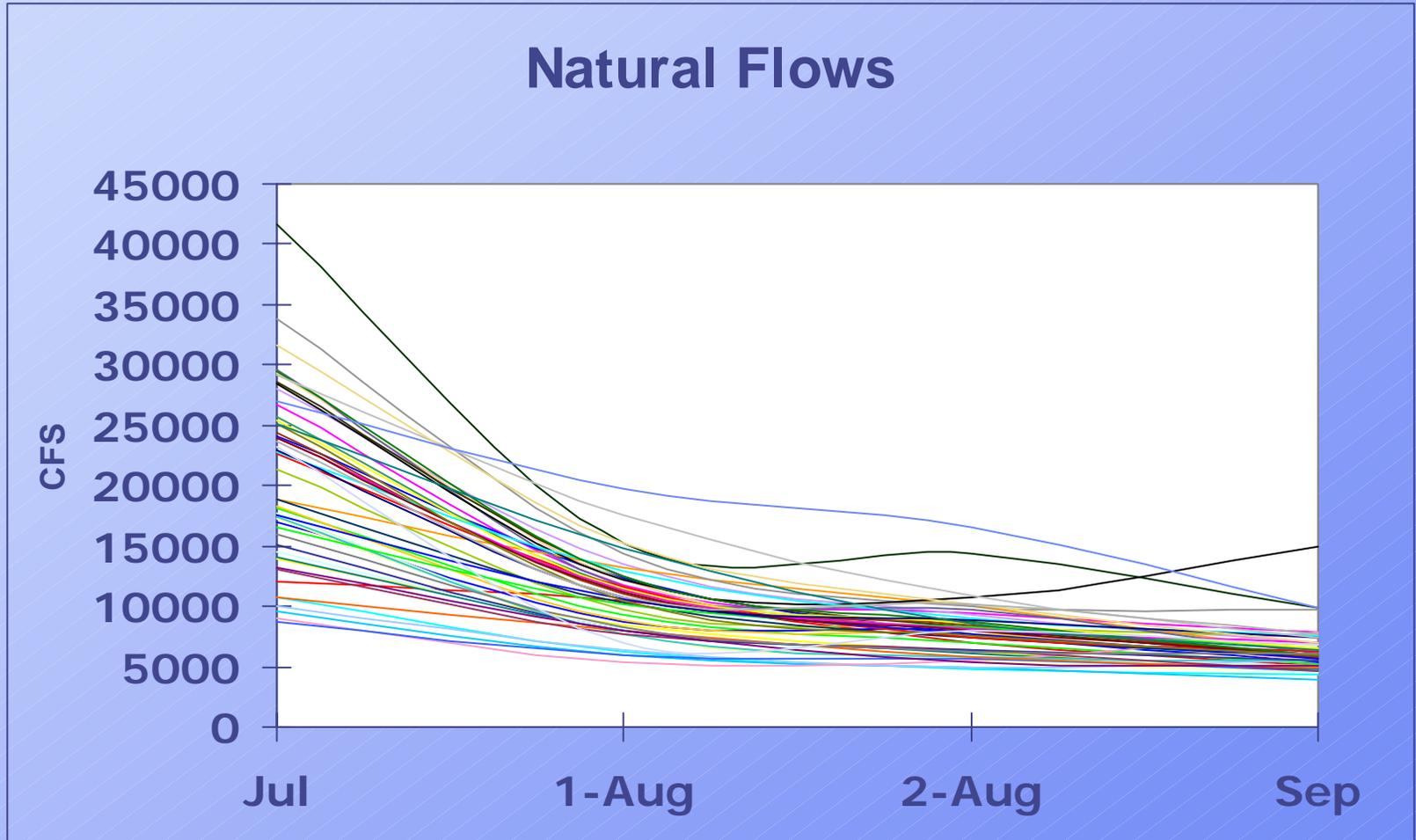
# End-of-September Elevation Distribution @Libby



# End-of-September Elevation Distribution @Hungry Horse

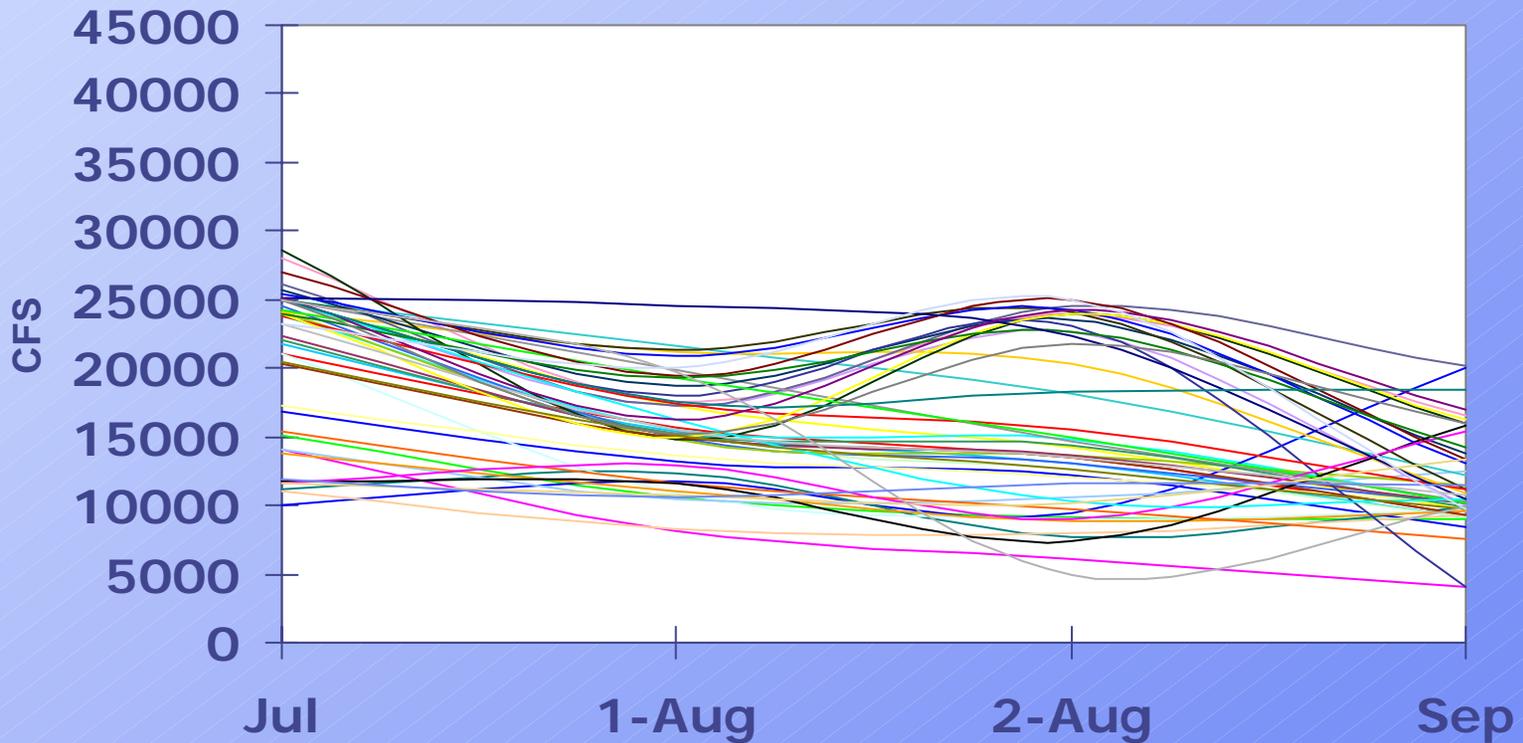


# Summer Flows at Libby



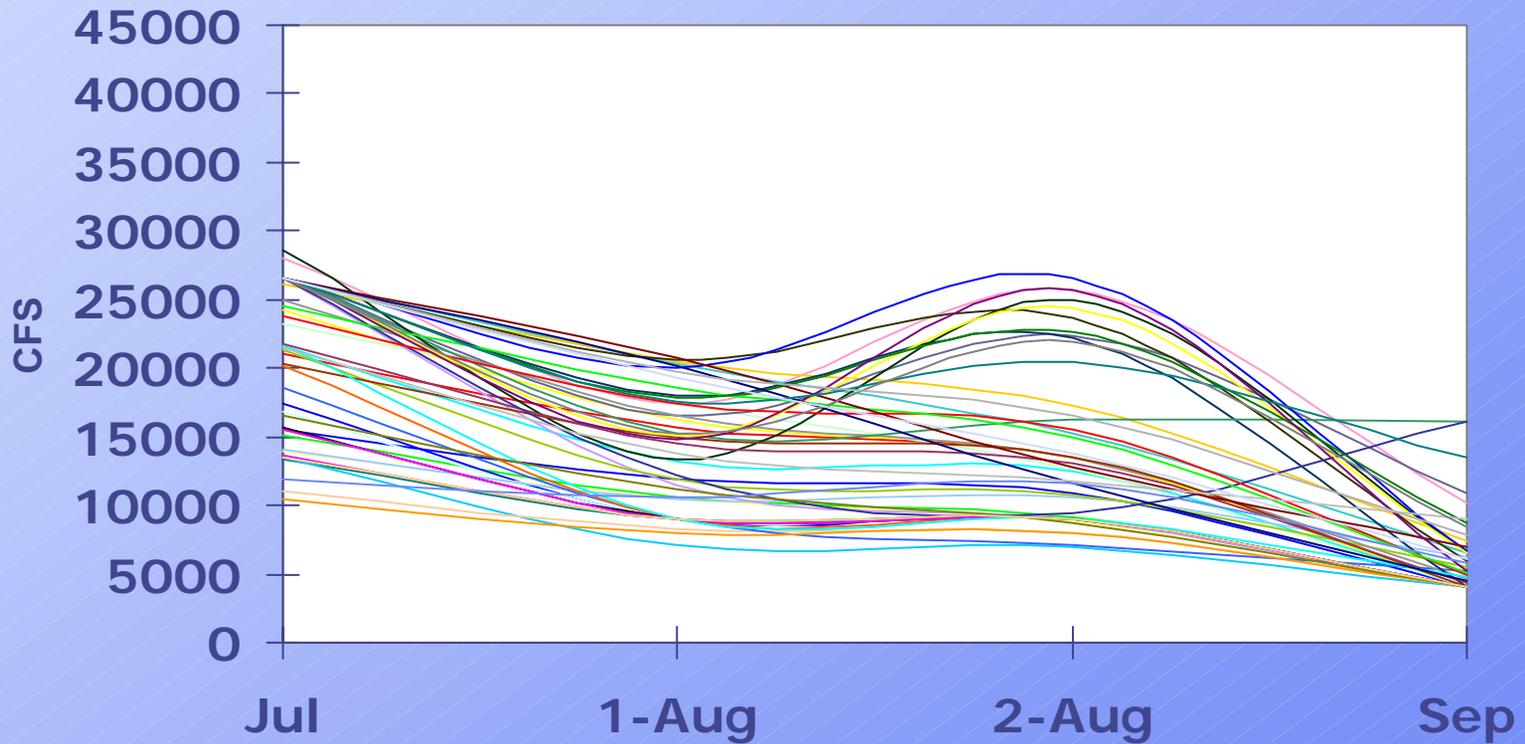
# Summer Flows at Libby

2002 Version of the BiOp



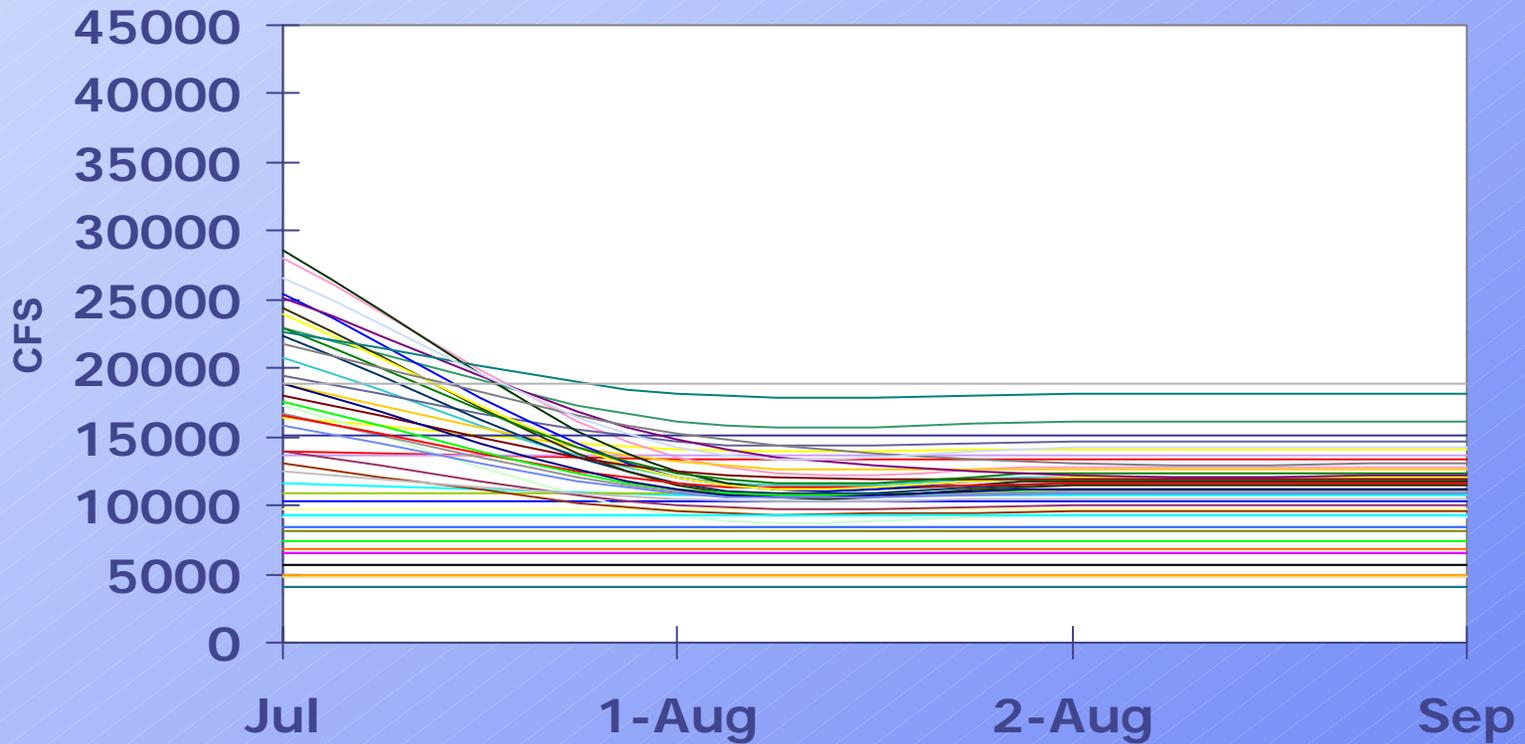
# Summer Flows at Libby

2004 Version of the BiOp

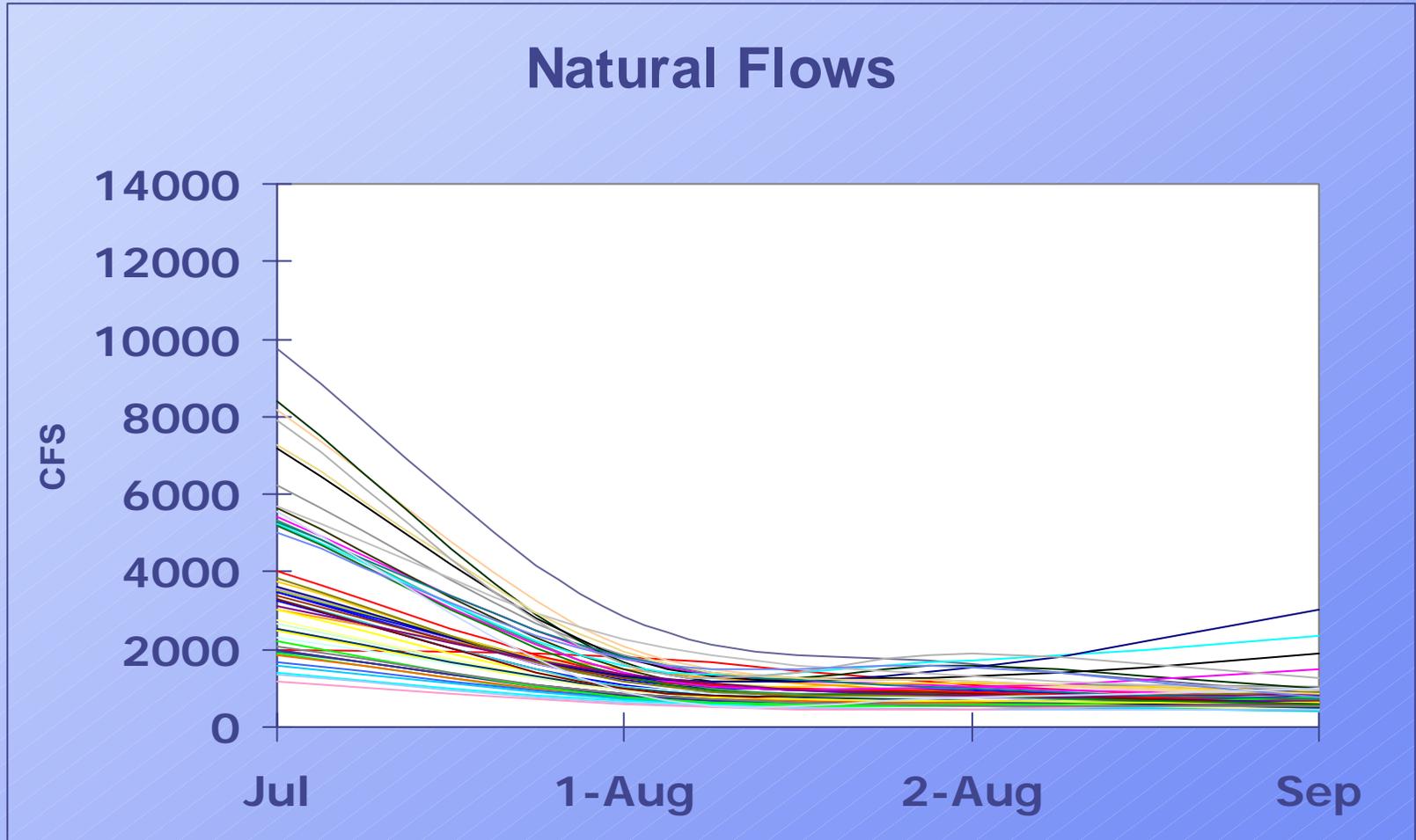


# Summer Flows at Libby

## Montana Operation

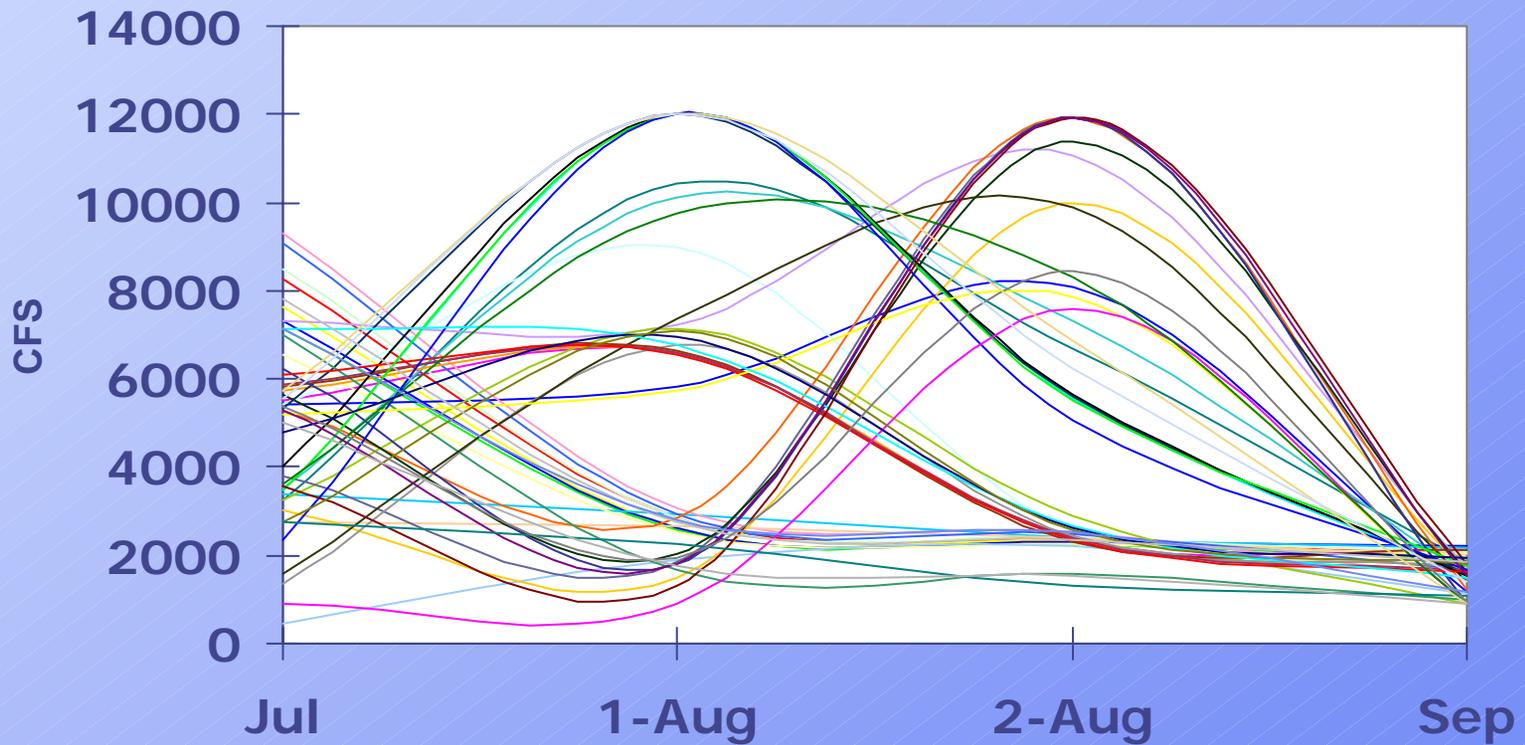


# Summer Flows at Horse

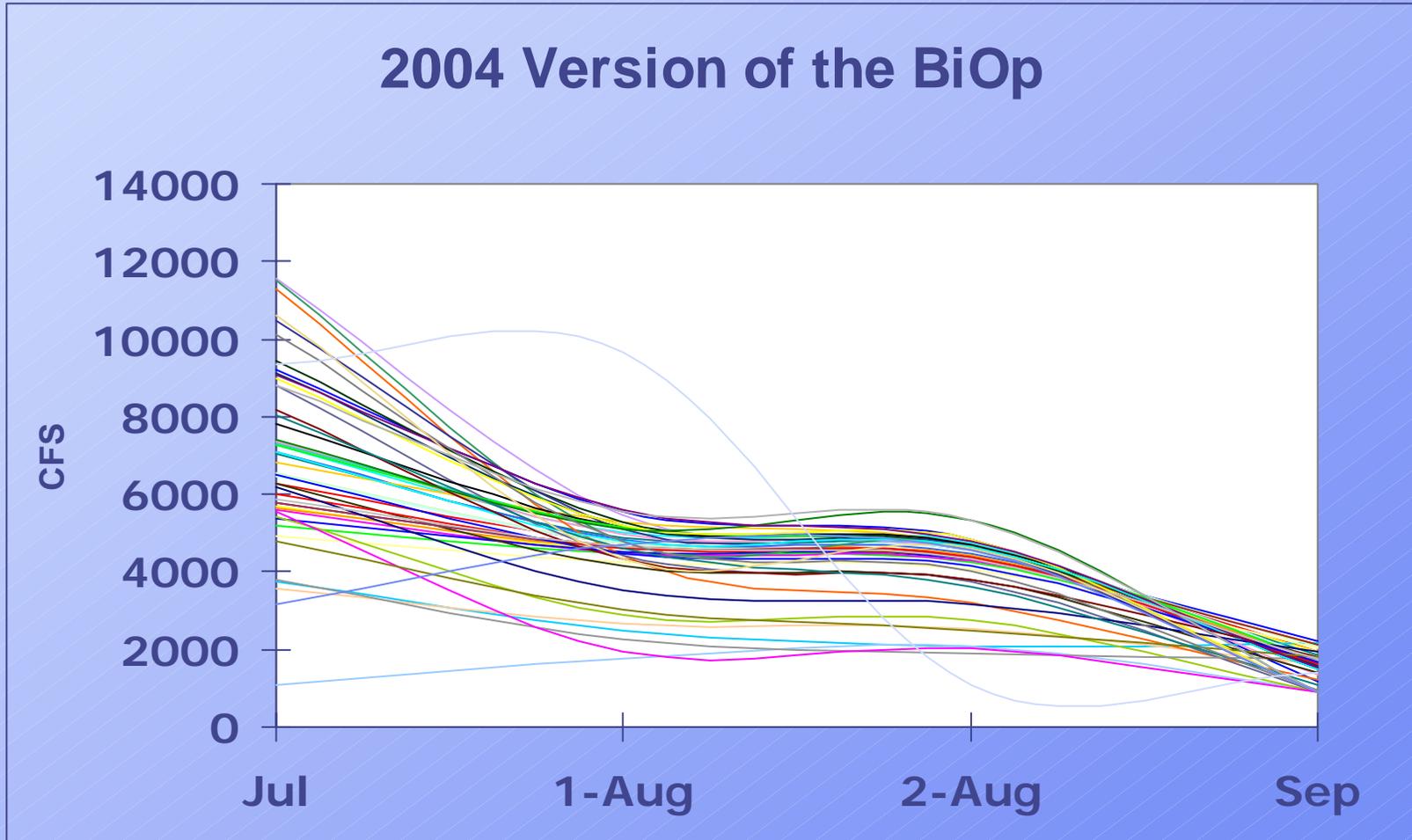


# Summer Flows at Horse

2002 Version of the BiOp

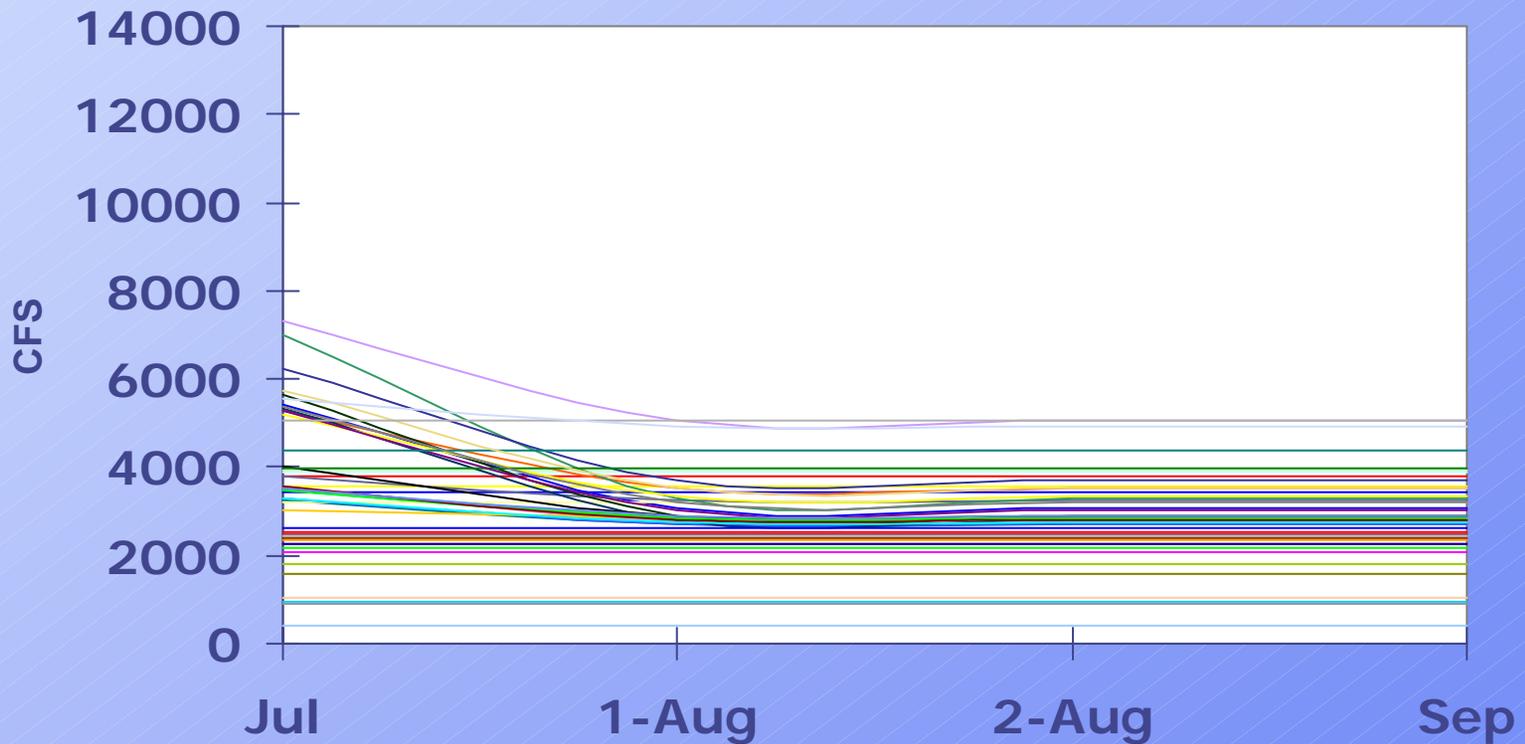


# Summer Flows at Horse

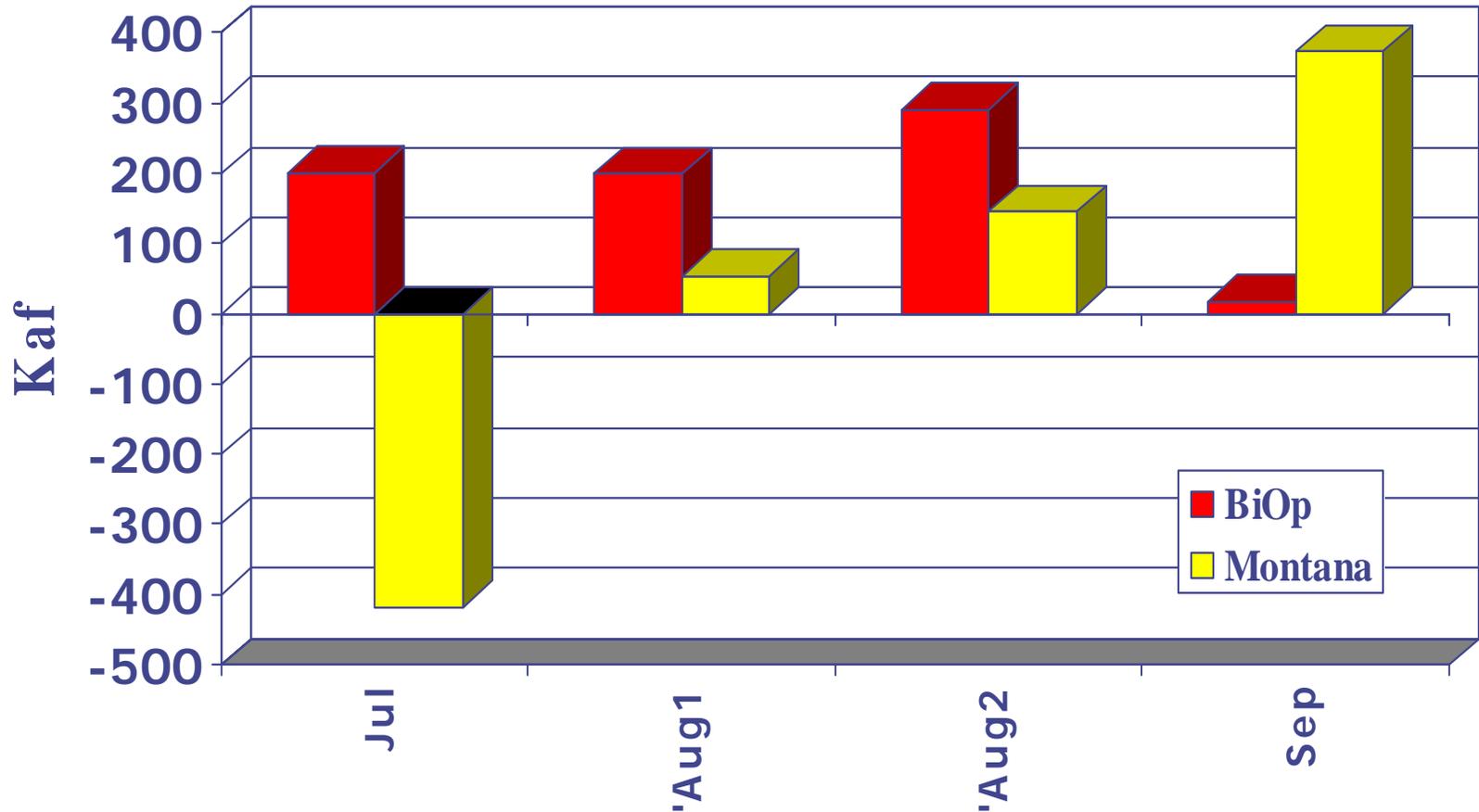


# Summer Flows at Horse

## Montana Operation



# Average Volume Added to Natural Flow at LIB and HHR



This is volume that we can control.

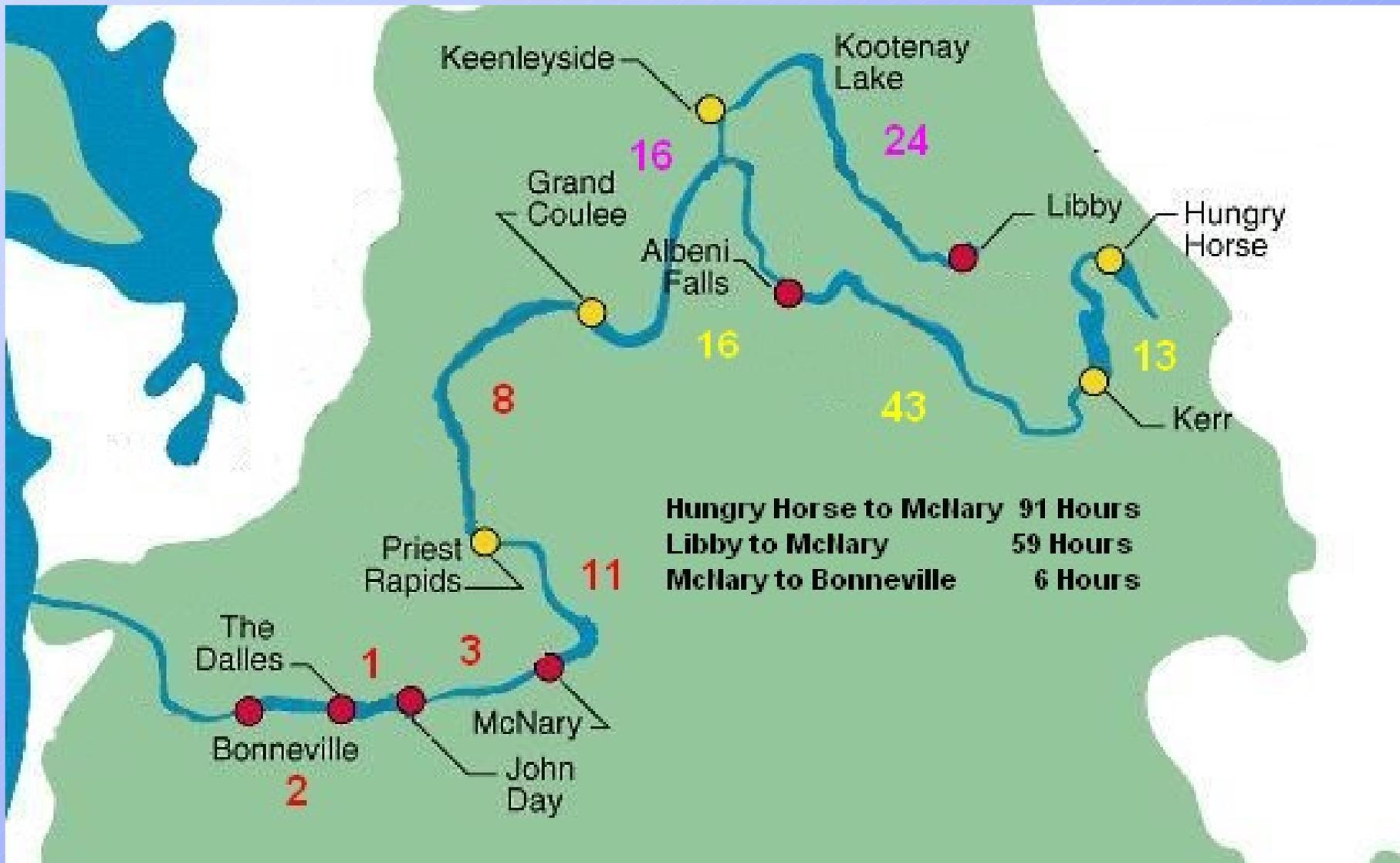
# 50-Year Average Flows @Libby and Horse added together

(Kcfs)	July	Aug1	Aug2	Sep
Montana Operation	18.4	13.6	13.4	13.4
BiOp	28.5	18.5	18.0	7.5
Change in flow due to MT Oper	-10.1	-4.9	-4.6	5.9

# Major Dams - Columbia River



# Lag time for Reservoir Action (hours)



# 50-Year Average Flow @McNary

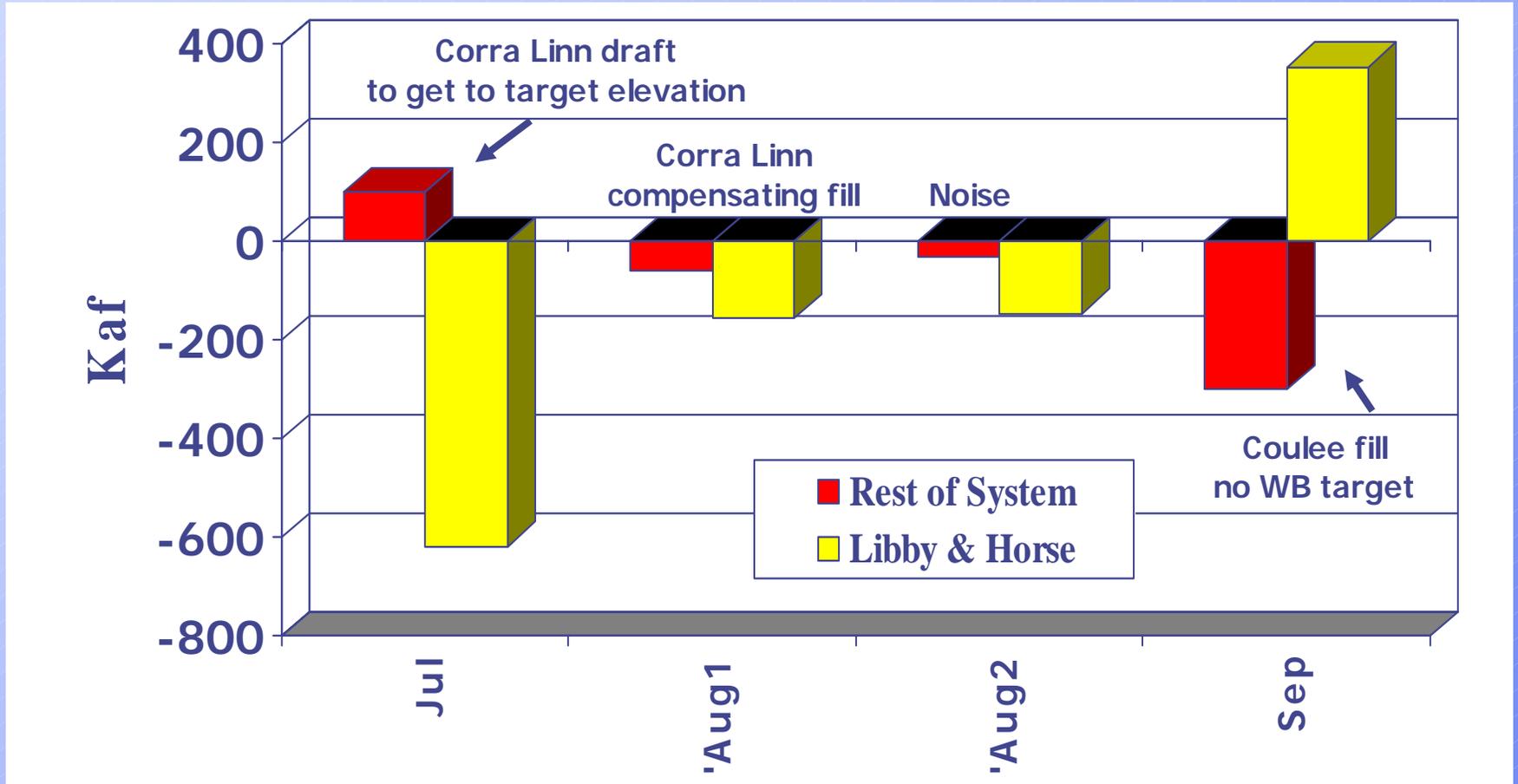
(Kcfs)	July	Aug1	Aug2	Sep
Montana Operation	203.1	170.6	135.3	99.1
BiOp	211.4	177.6	140.9	98.2
Change in flow due to MT Oper	-8.3	-7.0	-5.6	0.9

# Average Change in Flow (Montana operation relative to the BiOp)

(Kcfs)	July	Aug1	Aug2	Sep
@LIB HHR	-10.1	-4.9	-4.6	5.9
@MCN	-8.3	-7.0	-5.6	0.9
System Reaction	1.8 More Flow	2.1 Less Flow	1.0 Less Flow	5.0 Less Flow

# Average Volume Added to BiOp Flows

## from Libby & Horse and the Rest of the System



Positive = Draft, Negative = Fill  
 Combination of actions seen at McNary

# Travel Time From McNary – Volume/Flow Method

	July	Aug1	Aug2	Sep
MCN Avg Flow Montana (Kcfs)	203.1	170.6	135.3	99.1
Travel Time Montana (days)	11.7	13.9	17.6	24.0
MCN Avg Flow BiOp (Kcfs)	211.4	177.6	140.9	98.2
Travel Time BiOp (days)	11.3	13.4	16.9	24.2
Difference (days)	+0.4	+0.5	+0.7	-0.2

Flow in **Kcfs**, Travel Time in **days**

# Fish Travel Time – Pit Tag Information (DART)

From McNary	to Bonneville
Snake Spring Chinook	6.23 days
Mid-Col Fall Chinook	5.69 days
Snake Fall Chinook	6.03 days

# Additional Slides

# Approximate Reservoir Volumes (Kaf)

From Full	Coulee	Libby	Horse	Dworshak
2'	165			
10'	750	460	240	
20'	1,500	900	470	
80'				1,200

# Average End-of-Month Elevation @Coulee

