An aerial photograph of a large dam and reservoir, likely the Grand Coulee Dam, with water cascading over the spillway. The surrounding landscape is hilly and forested.

Fish and Wildlife Program Mainstem Amendments

September 11, 2002
Spokane, Washington

Northwest Power Planning Council

Mainstem Alternatives

- Montana Amendment – August 2002
- Idaho Amendment – August 2002
- Washington Scenario – August 2002
- Oregon – Recommendations to be reviewed further and presented at a later date

Approximate Reservoir Volumes (Kaf)

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

Montana Amendment

- October-April
 - Continue to provide flows for Chum
 - Continue to fill to flood control elevations by April 10
- April-June
 - Remove flow objectives
 - Limit bypass spill to 115% gas level
 - Fill reservoirs by end of June
 - Revised flows for sturgeon in May and June

Montana Amendment (cont'd)

- July-September
 - Remove flow objectives
 - Limit bypass spill to 115% gas level
 - Release flow augmentation water at Libby and Horse to level outflows
 - Release flow augmentation water at Coulee and Dworshak evenly over this period

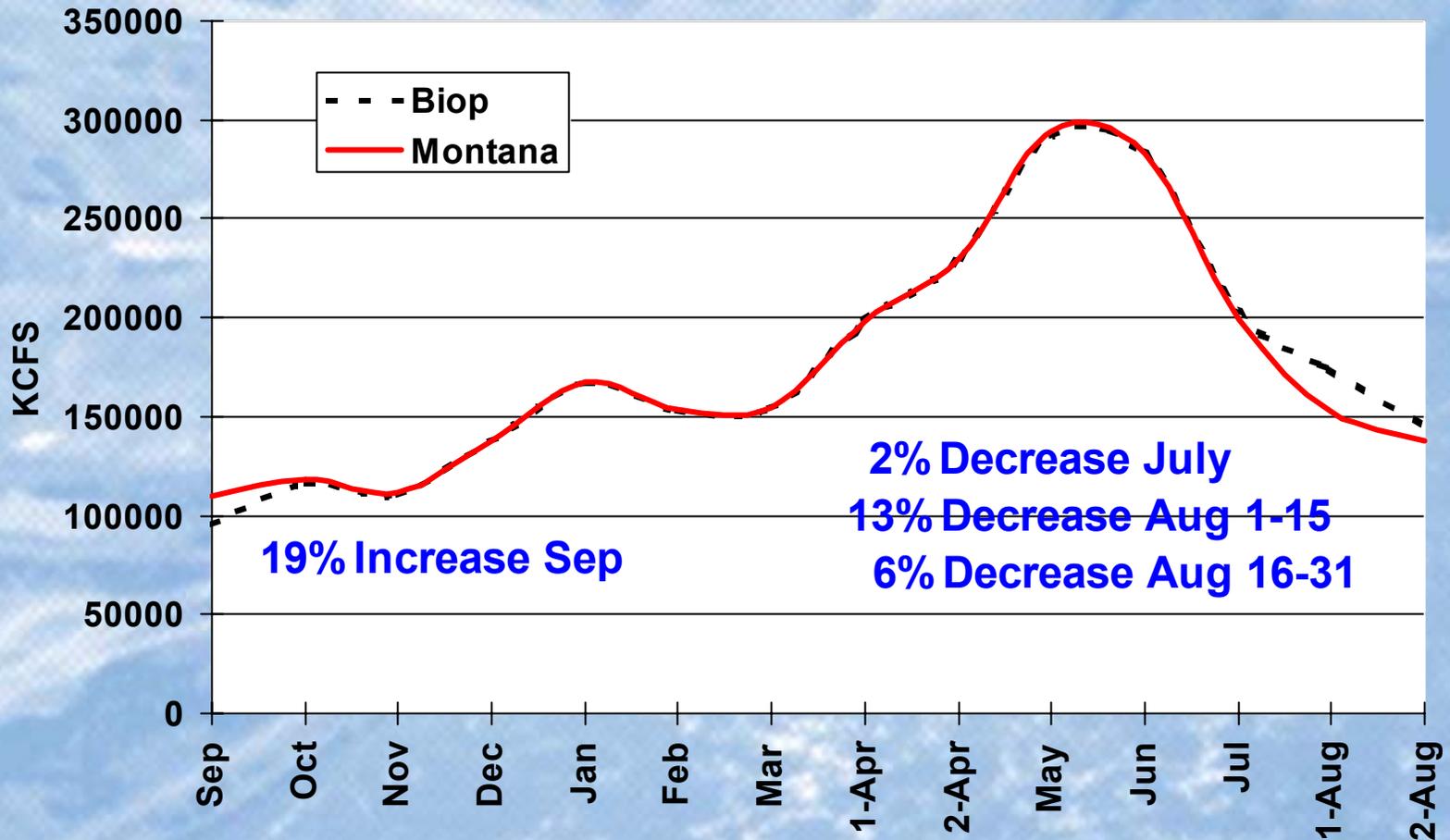
Montana Amendment (cont'd)

- End of September
 - Max draft at Libby is 2449' (10' from full)
 - Libby can draft to 2439' in 20% driest years
 - Max draft at Horse is 3550' (10' from full)
 - Horse can draft to 3540' in 20% driest years
 - Max draft at Coulee is 1280' (10' from full)
 - Max draft at Dworshak is 1520' (80' down)

Change in Approach to Flow Augmentation Montana and Idaho Amendments

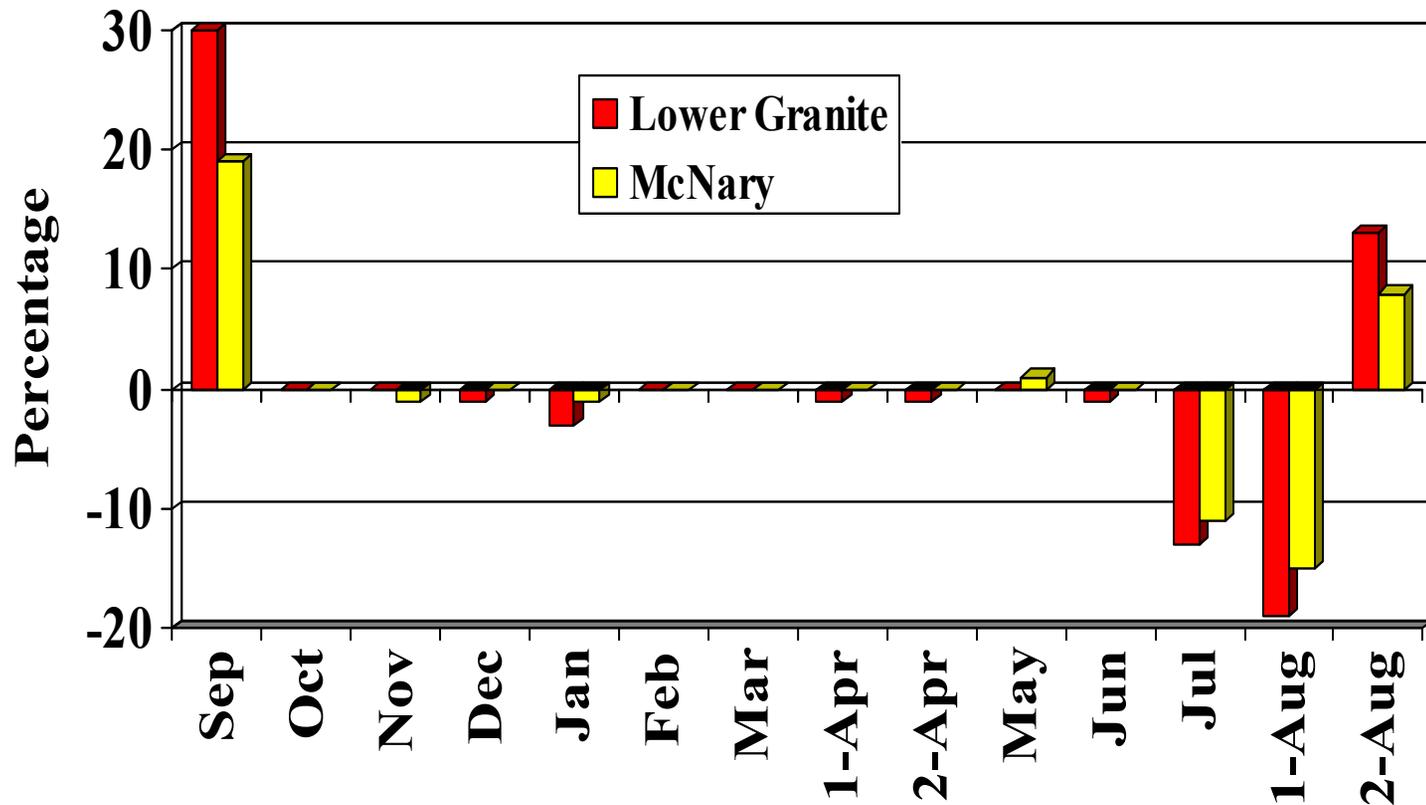
- Release of flow augmentation water is controlled directly (as opposed to using a downstream flow objective)
- Affects the timing of water releases in summer months
- Can integrate Montana, Idaho and Washington operations because they take the same approach

Flows at McNary (50-Year Average)

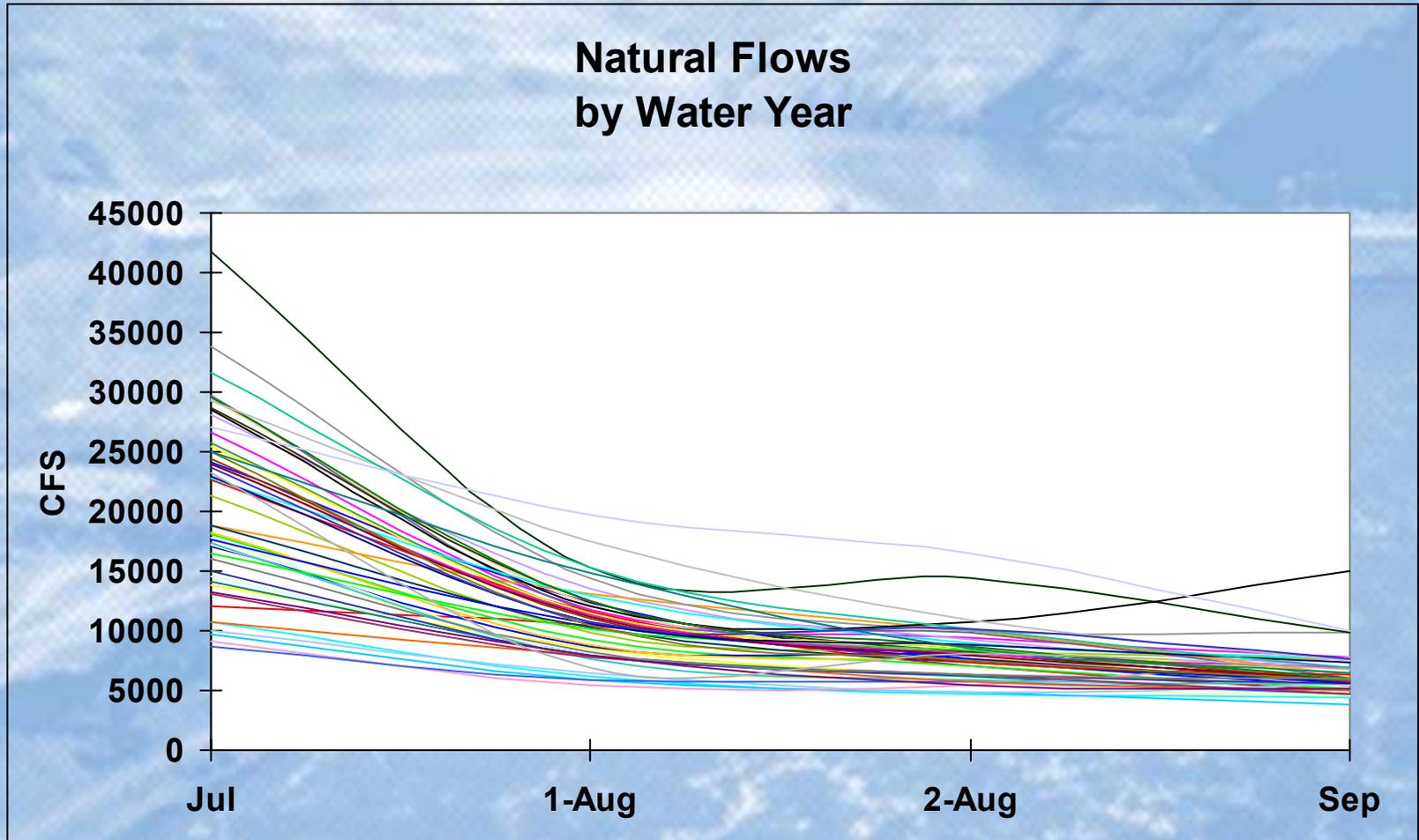


Change in River Flows (20% Driest Years)

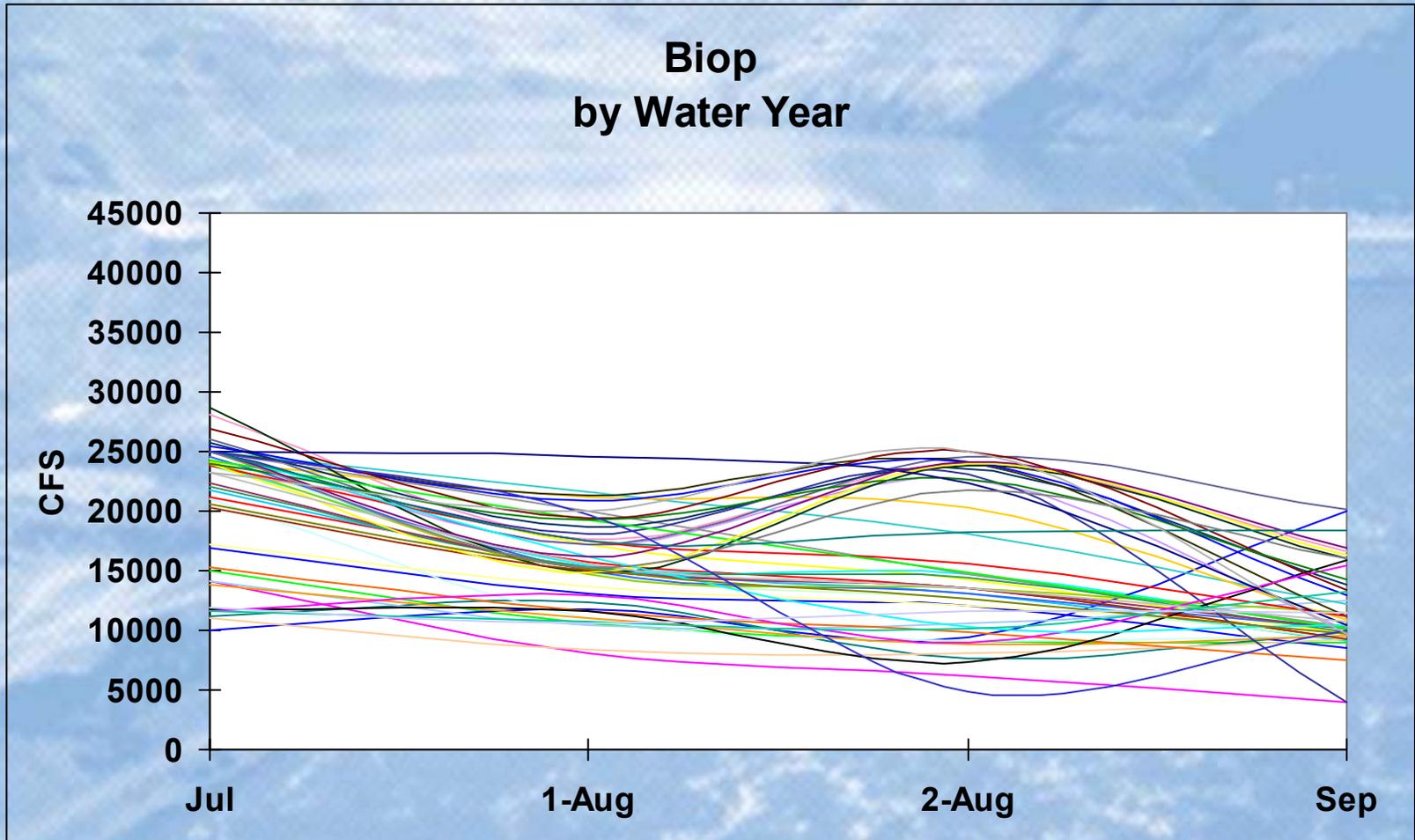
Montana Amendment vs. Biop



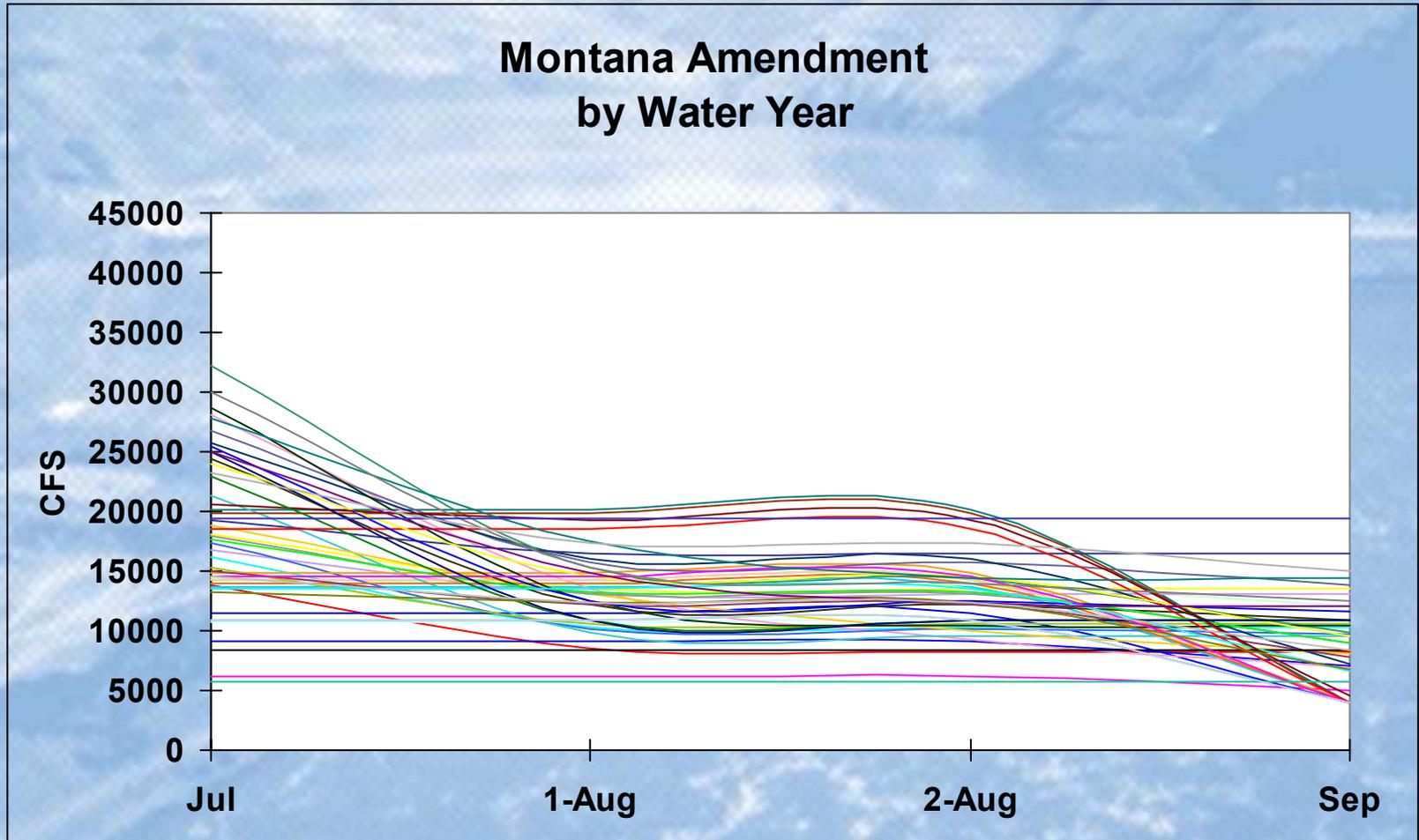
Summer Flows at Libby



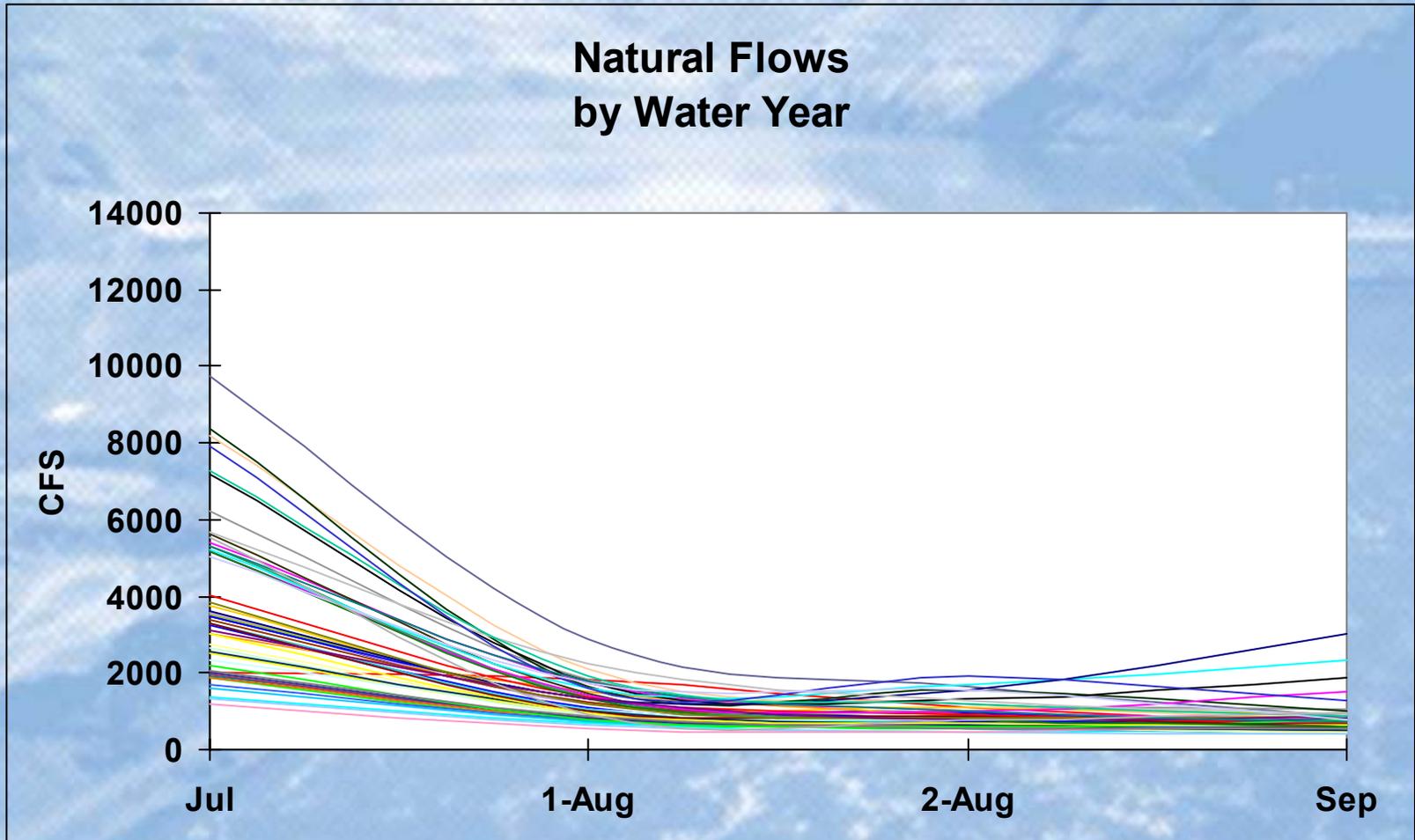
Summer Flows at Libby



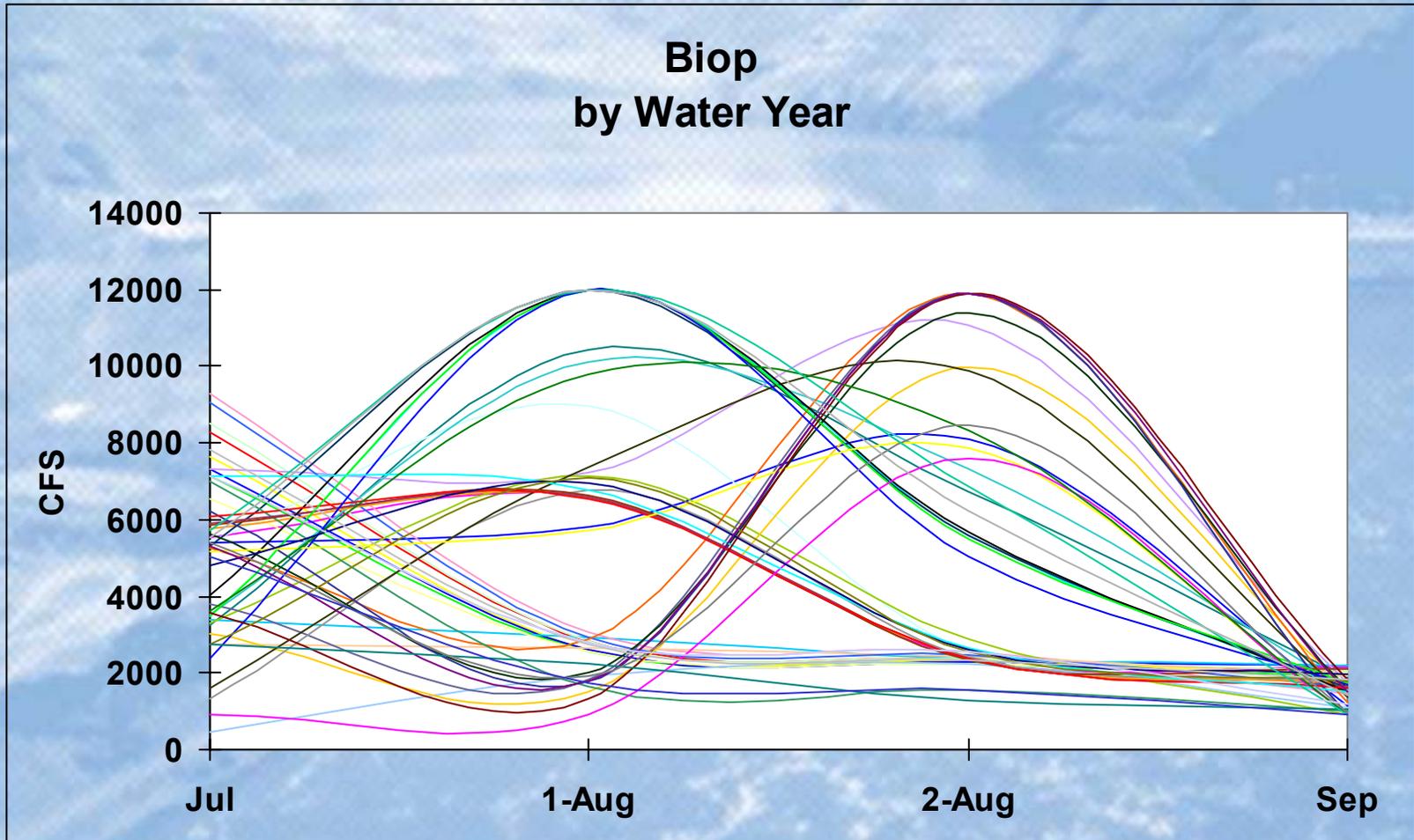
Summer Flows at Libby



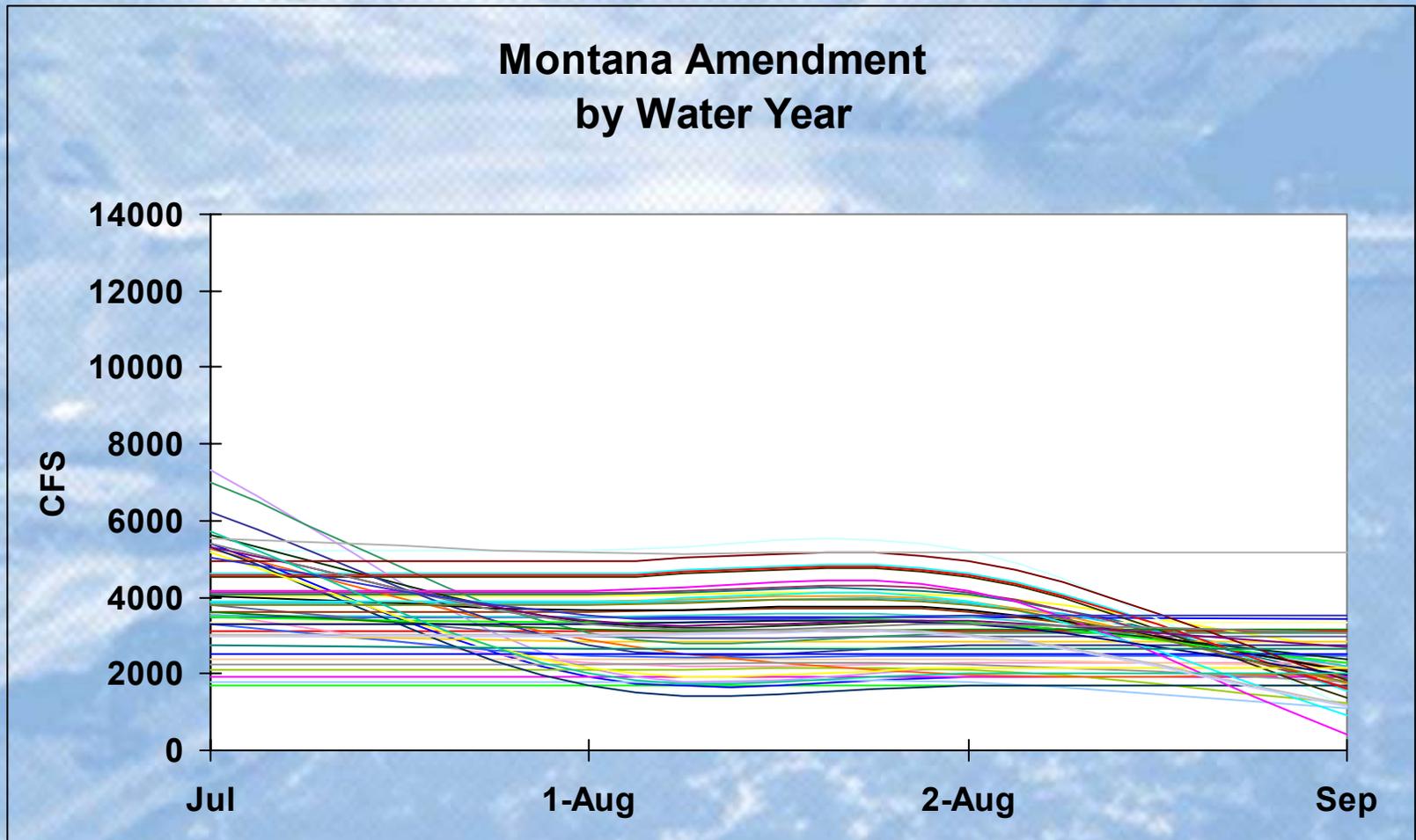
Summer Flows at Horse



Summer Flows at Horse

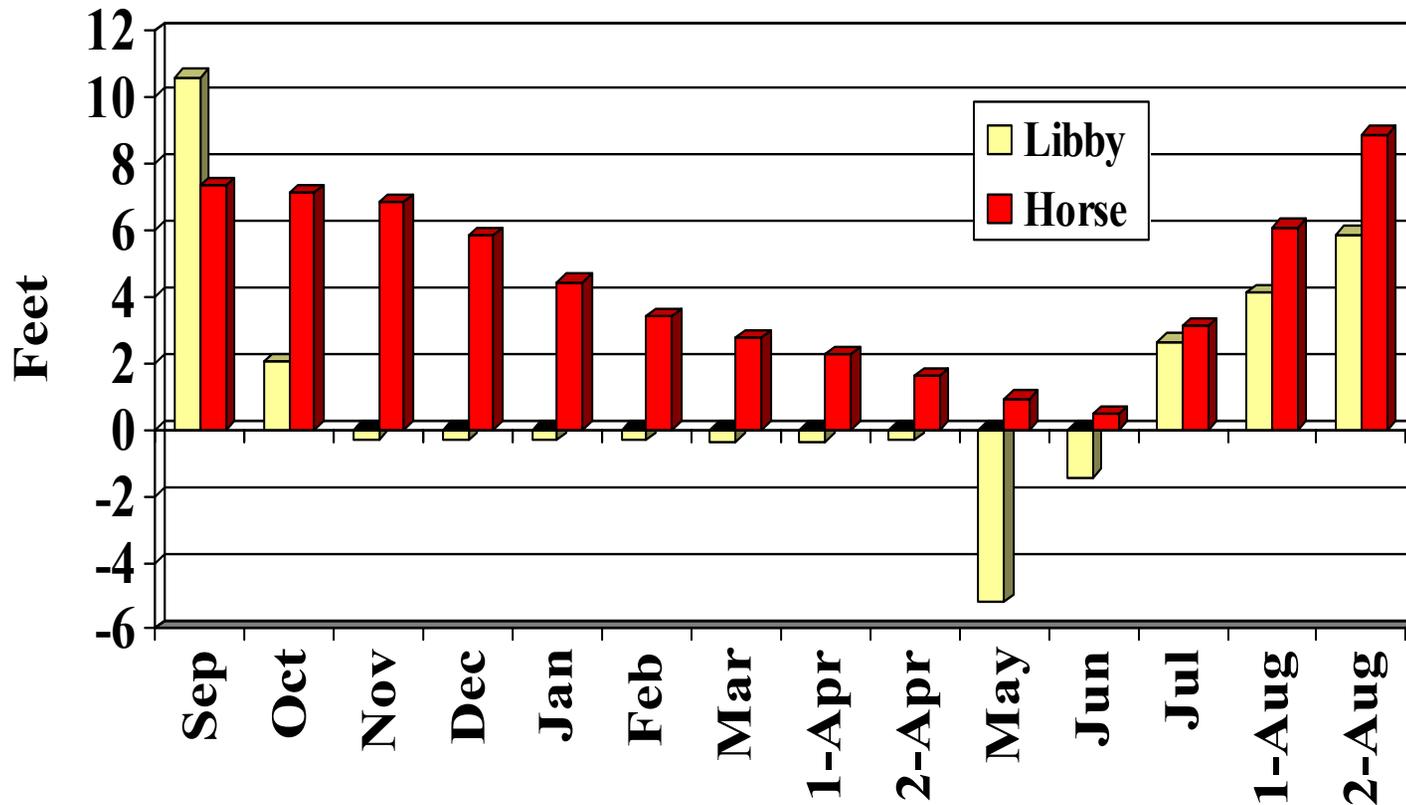


Summer Flows at Horse



Change in Reservoir Elevations (50-Year Average)

Montana Amendment vs. Biop



Flow Augmentation Volume July through September

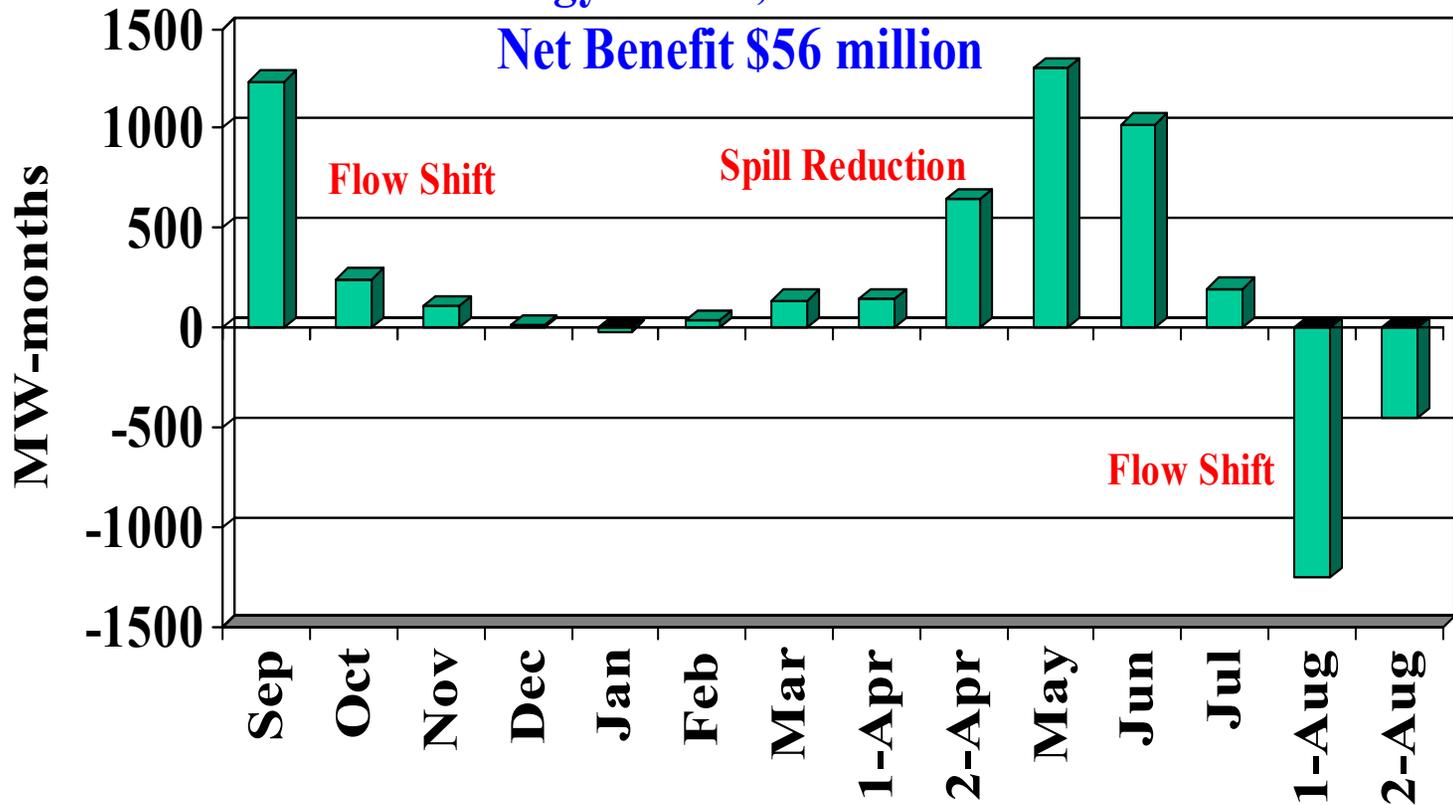
(Kaf)	Biop	Montana	Montana 20' Draft Limit Sept
Libby	730	210	475
Horse	380	220	360

Change in Hydro Energy

Montana Amendment vs. Biop

Net Energy Gain 3,800 MW-Months

Net Benefit \$56 million



Spill Level vs. Energy & Cost

Montana Amendment Sensitivity Analysis

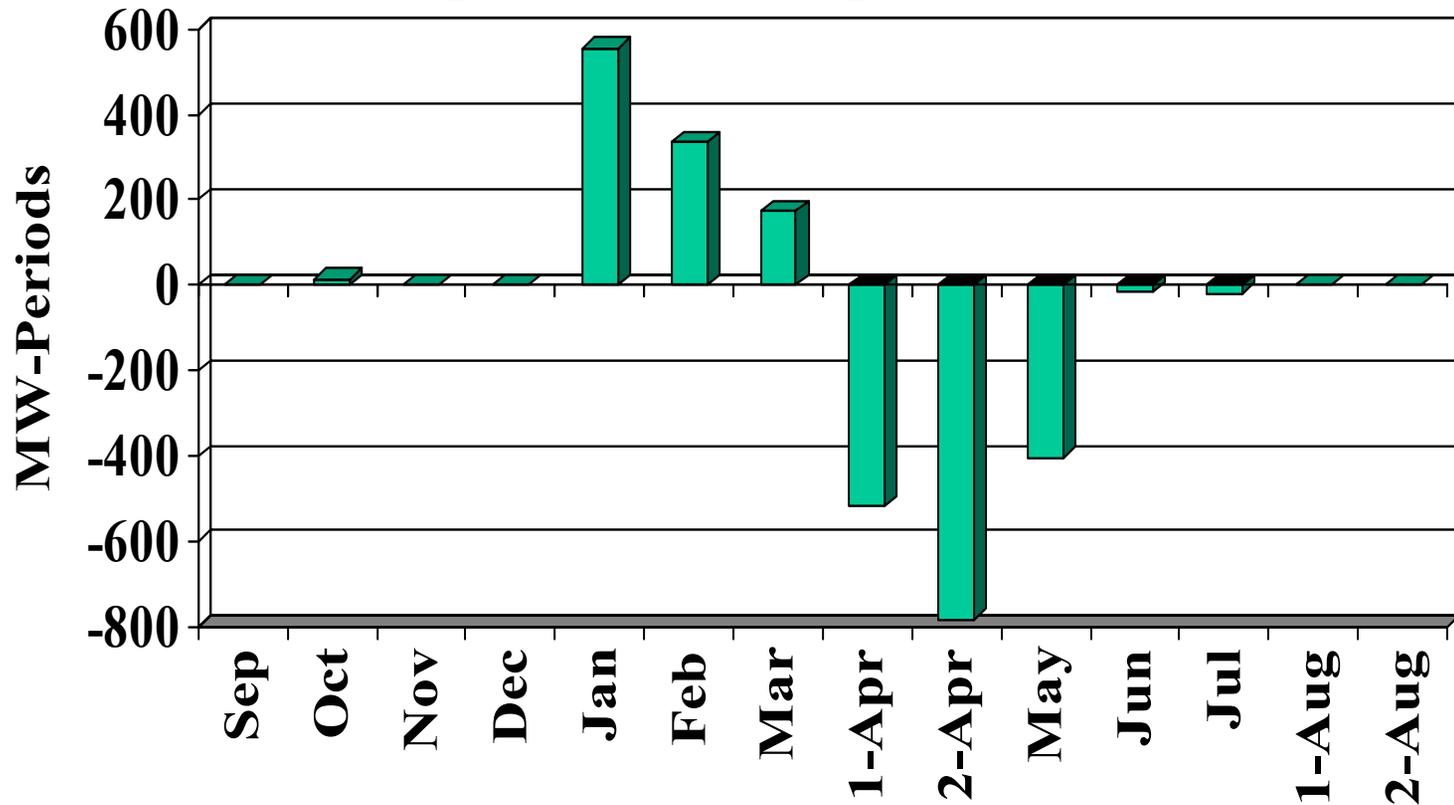
Gas Cap Limit	Volume Spilled (Maf)	Energy Savings (MW-months)	Net Benefit (millions)
110%	29	6030	\$ 97
115%	49	3800	\$ 56
120%	84	510	\$ 4

Change in Generation

(50-Year Average)

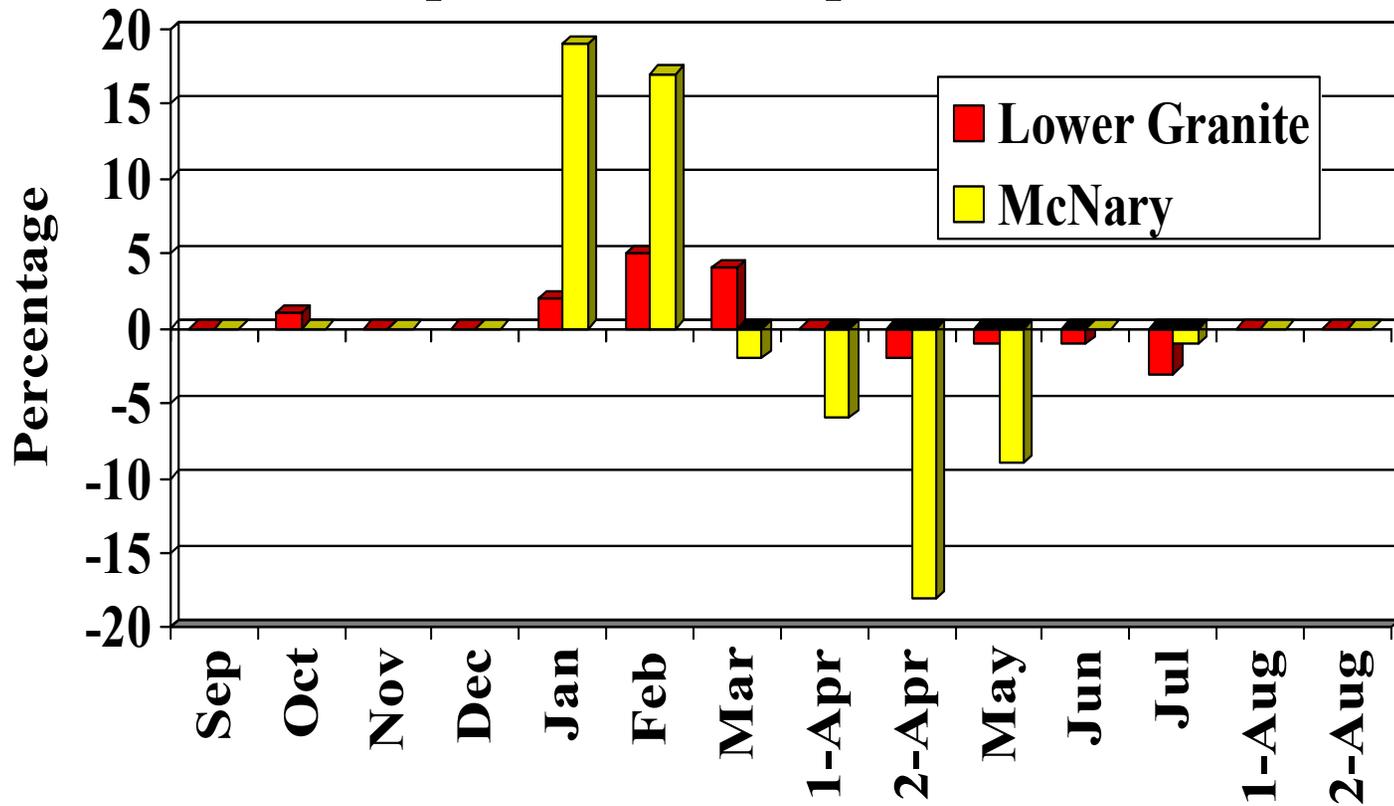
Montana Amendment

April Fill vs. No April Fill



Change in McNary Flow (20% Driest Years)

Montana Amendment
April Fill vs. No April Fill



No April Refill vs. April Refill

Montana Amendment Sensitivity Analysis

- No change to June refill probability
- 1,060 MW-months energy gain Jan-Mar
- \$7.2 million Net benefit
- No reliability benefit
- 11% spring (April-May) flow reduction at McNary in the driest 20% of years

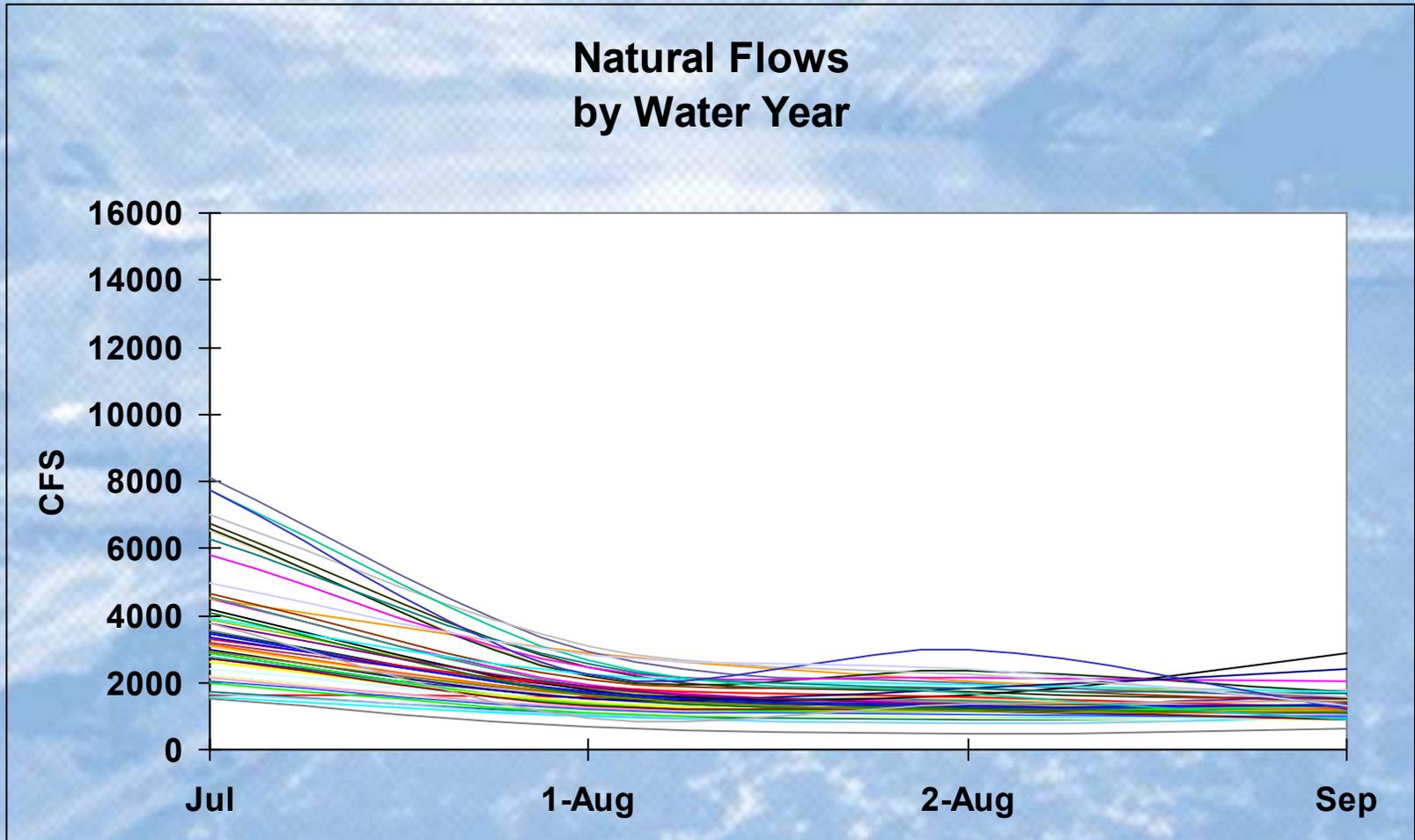
Idaho Amendment

- October-April
 - Continue to provide flows for Chum
 - Continue to fill to flood control elevations by April 10
- April-June
 - Limit Lower Granite flow objective to 85 Kcfs
 - Fill reservoirs by end of June

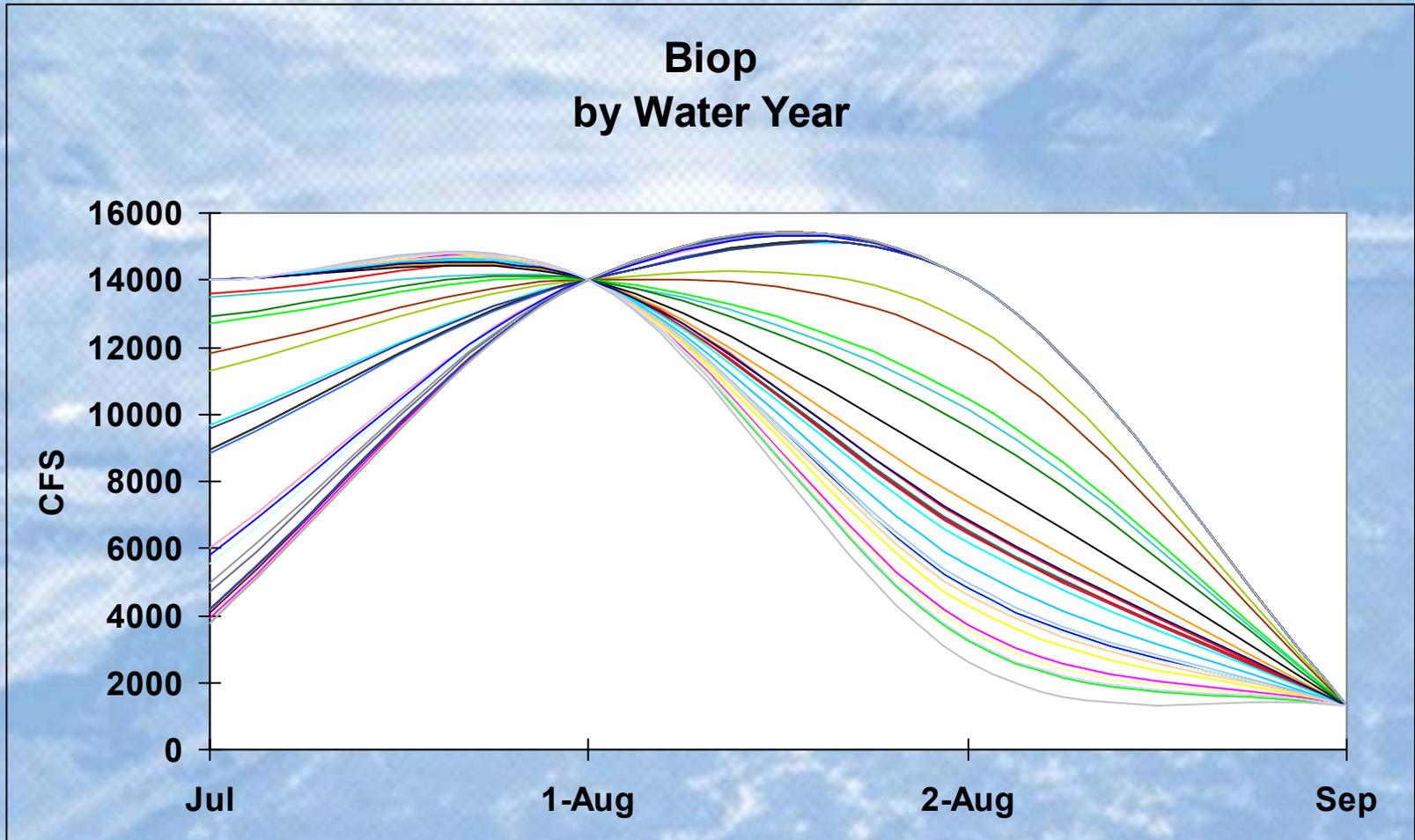
Idaho Amendment (cont'd)

- July-September
 - Keep biological opinion flow objectives
 - Libby and Horse on IRC operation
 - Coulee on retention time operation
 - Dworshak elevation targets
 - 1584' by July 31st
 - 1562.5' by August 15th
 - 1538' by August 31st
 - 1520' by September 30th

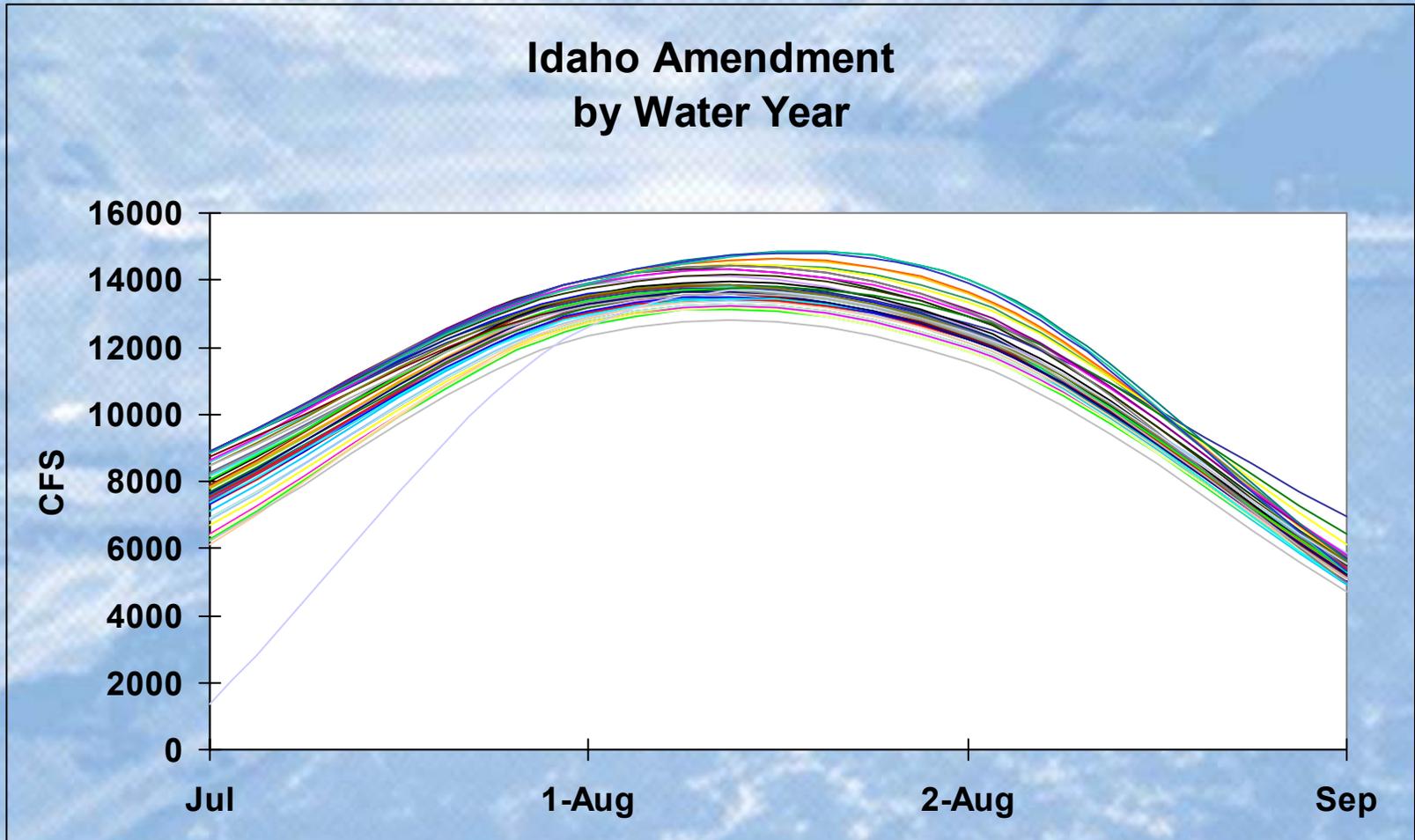
Summer Flows at Dworshak



Summer Flows at Dworshak

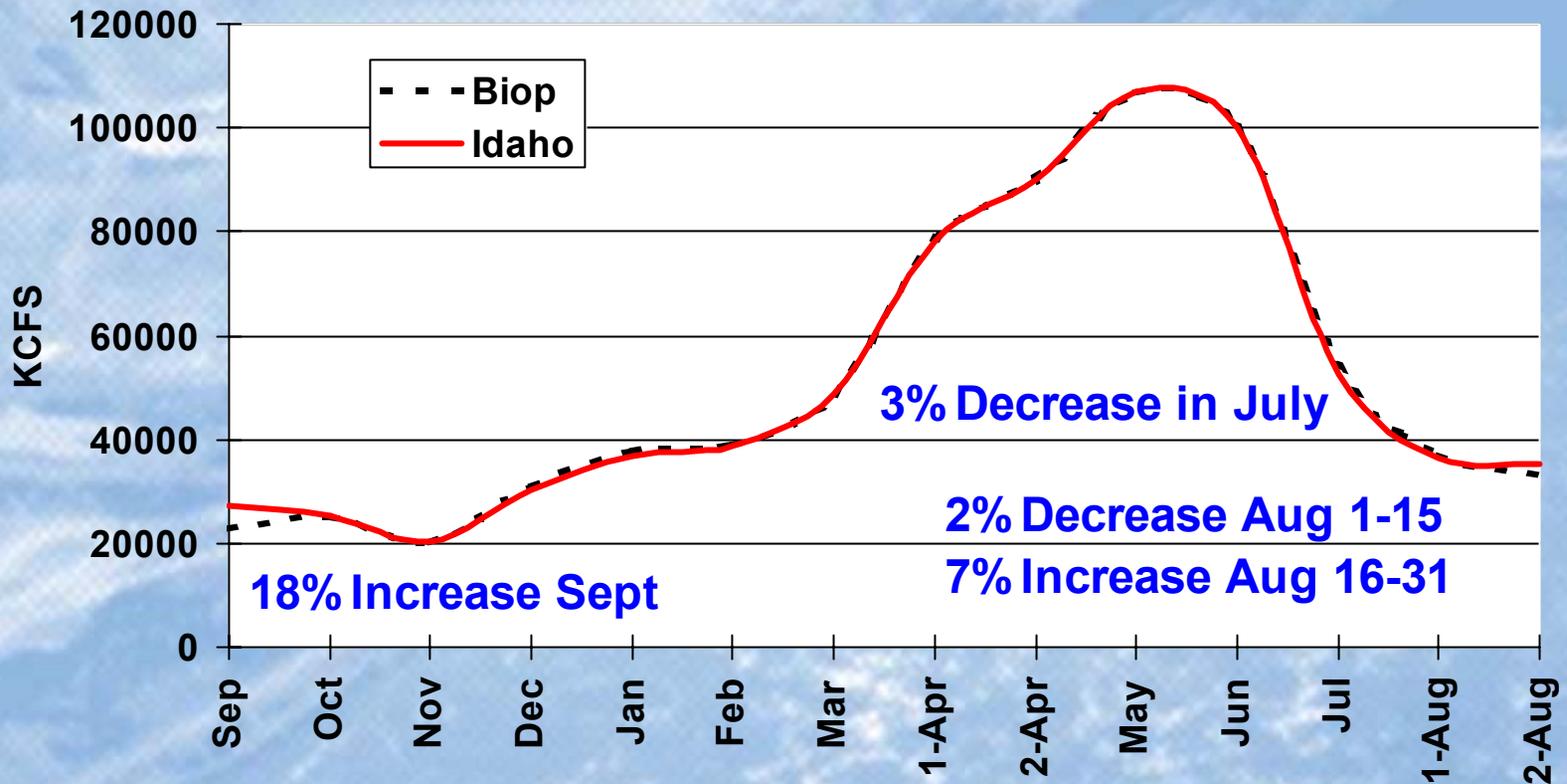


Summer Flows at Dworshak



Flows at Lower Granite (50-Year Average)

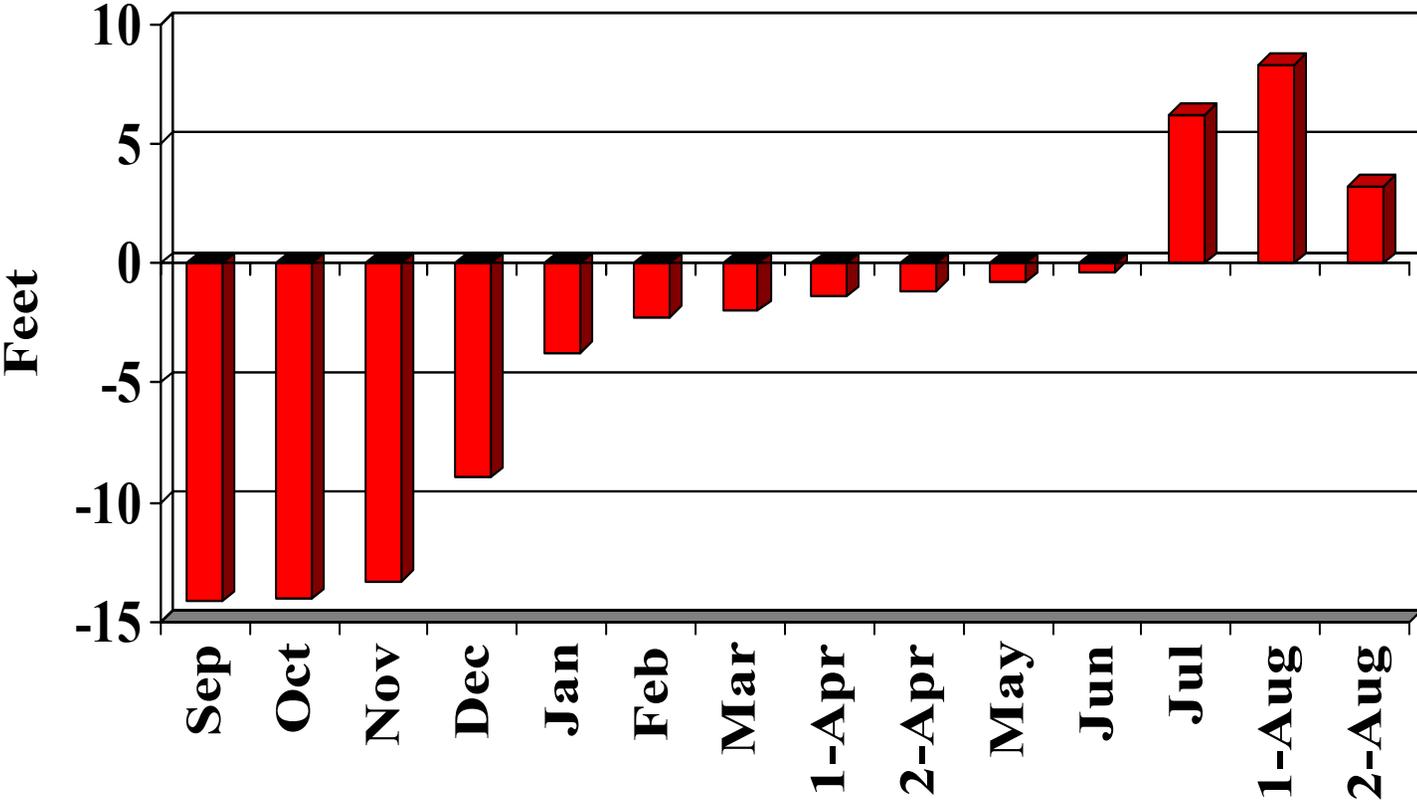
Idaho Amendment



Change in Dworshak Elevation

(50-Year Average)

Idaho Amendment vs. Biop

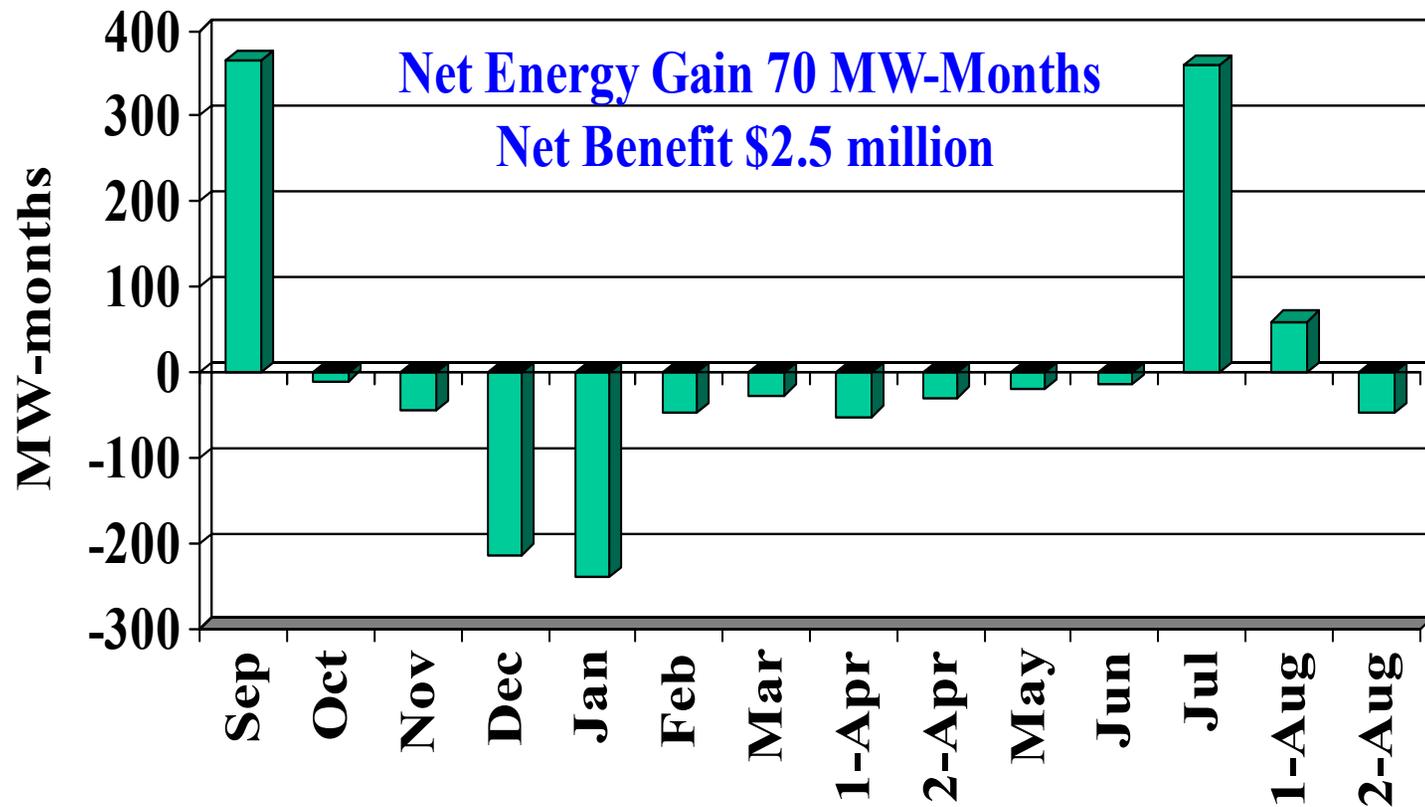


Flow Augmentation Volume July through September

(Kaf)	Biop	Idaho
Dworshak	1,000	1,200
Brownlee	390	390

Change in Hydro Energy

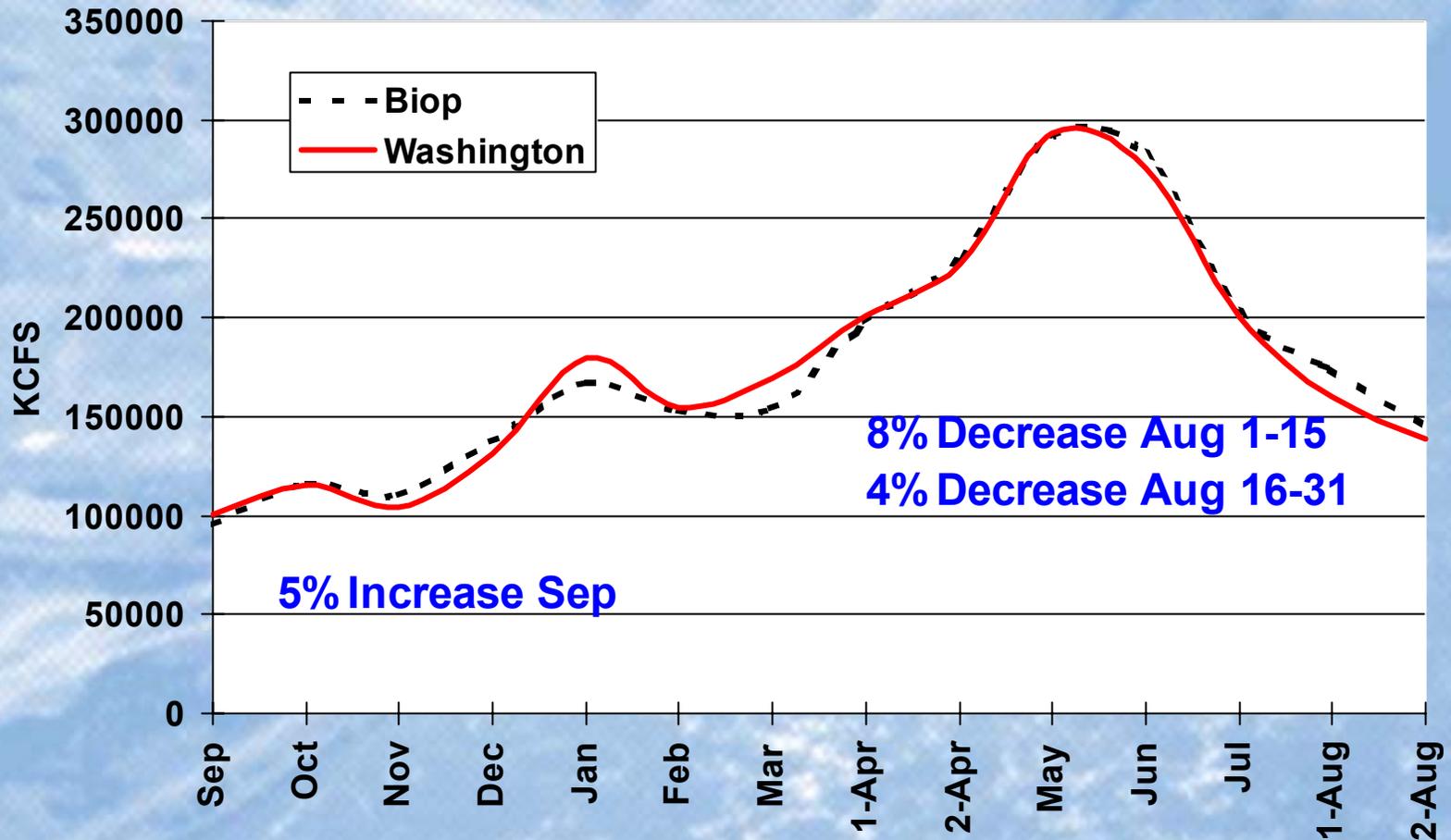
Idaho Amendment vs. Biop



Washington Scenario

- High priority to target elevations at Coulee
 - January 1270 feet
 - February 1260 feet
 - March-April 15 1250 feet
 - April 16-30 1255 feet
 - May 1265 feet
 - June-December 1288 feet

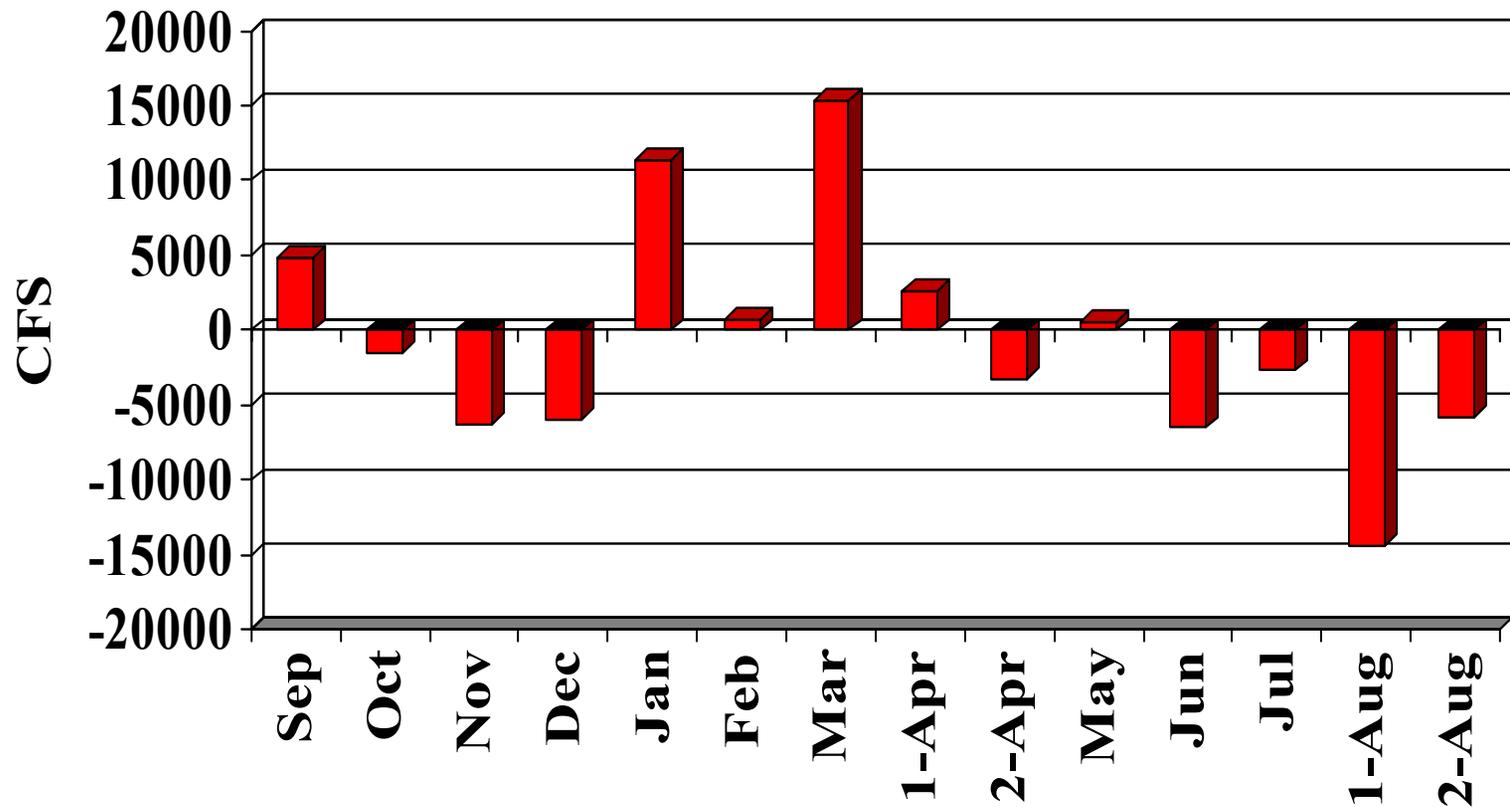
Flows at McNary (50-Year Average)



Change in McNary Flows

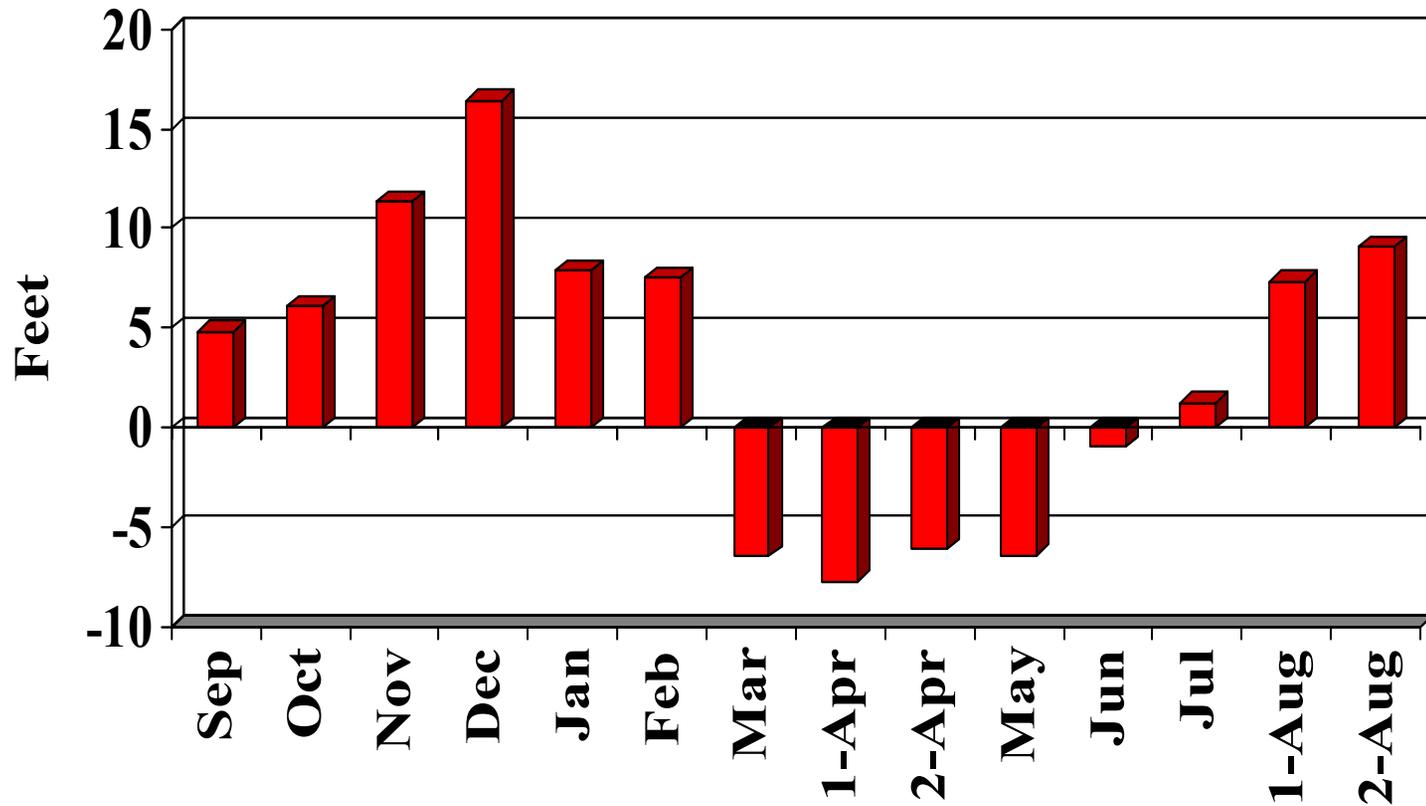
(50-Year Average)

Washington Scenario vs. Biop



Change in Coulee Elevation (50-Year Average)

Washington Amendment vs. Biop



Summer Flow Change McNary/**Lower Granite**

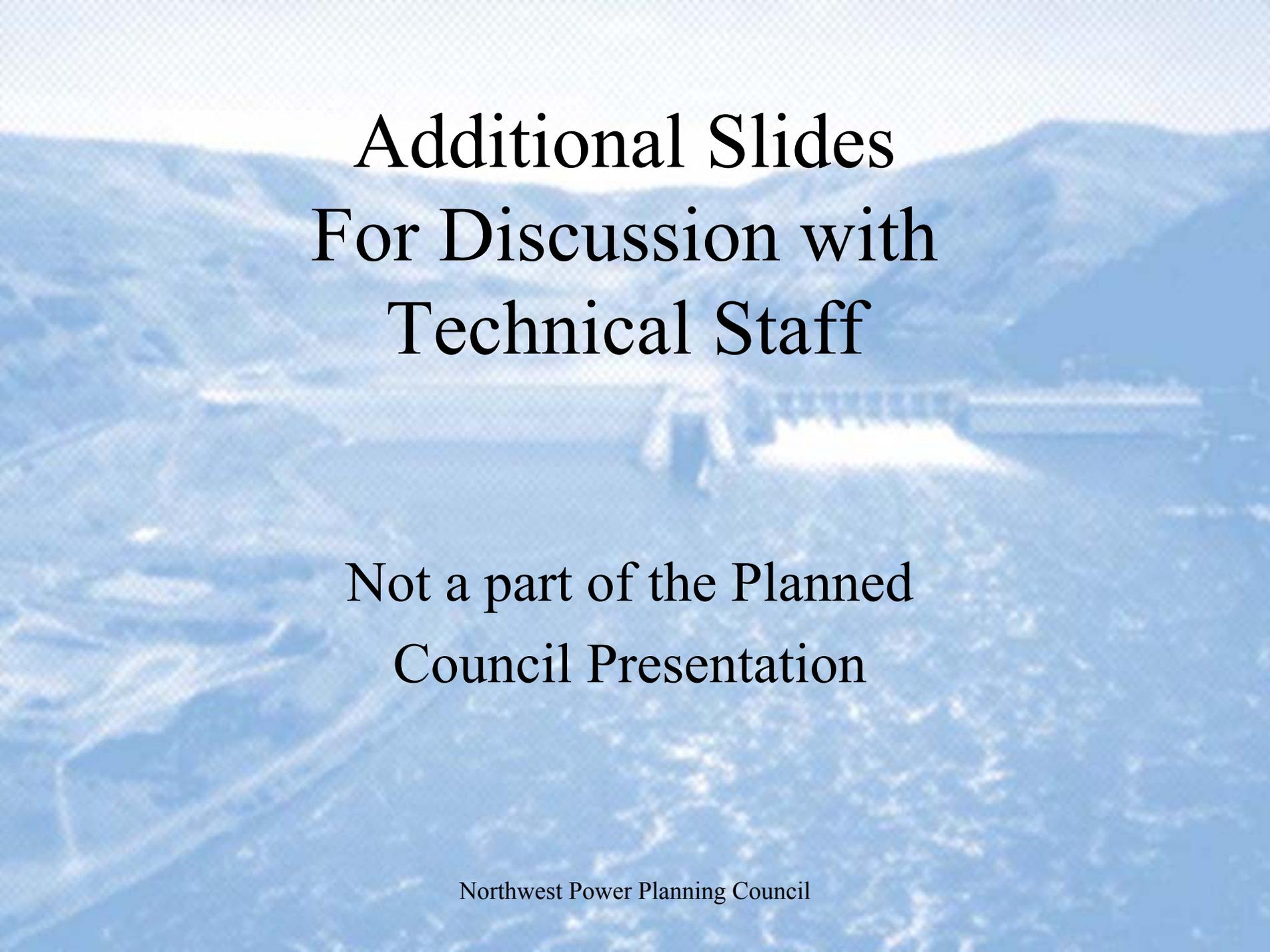
	July	Aug1-15	Aug16-31	Sep
MT	-4,100	-12,300	-7,400	5,400
WA	-2,700	-14,000	-2,500	6,900
MT	440	-5,400	-2,500	6,900
WA	0	0	0	0

Retention Time Change @Coulee

(days)	July	Aug1-15	Aug16-31	Sep
Min	40	40	40	40
Biop	36.5	36.9	43.0	67.4
WA	37.5	43.1	48.9	66.7
Diff	+0.8	+6.4	+5.9	-0.7

Flow Augmentation Volume July through September

(Kaf)	Biop	Washington
Coulee	275	-200
Libby+Horse	1,110	1,110

An aerial photograph of a large dam and reservoir. The dam is a long, low structure with water cascading over it. The reservoir is a large body of water in the foreground. In the background, there are rolling hills and mountains under a clear sky. The entire image has a blue color cast.

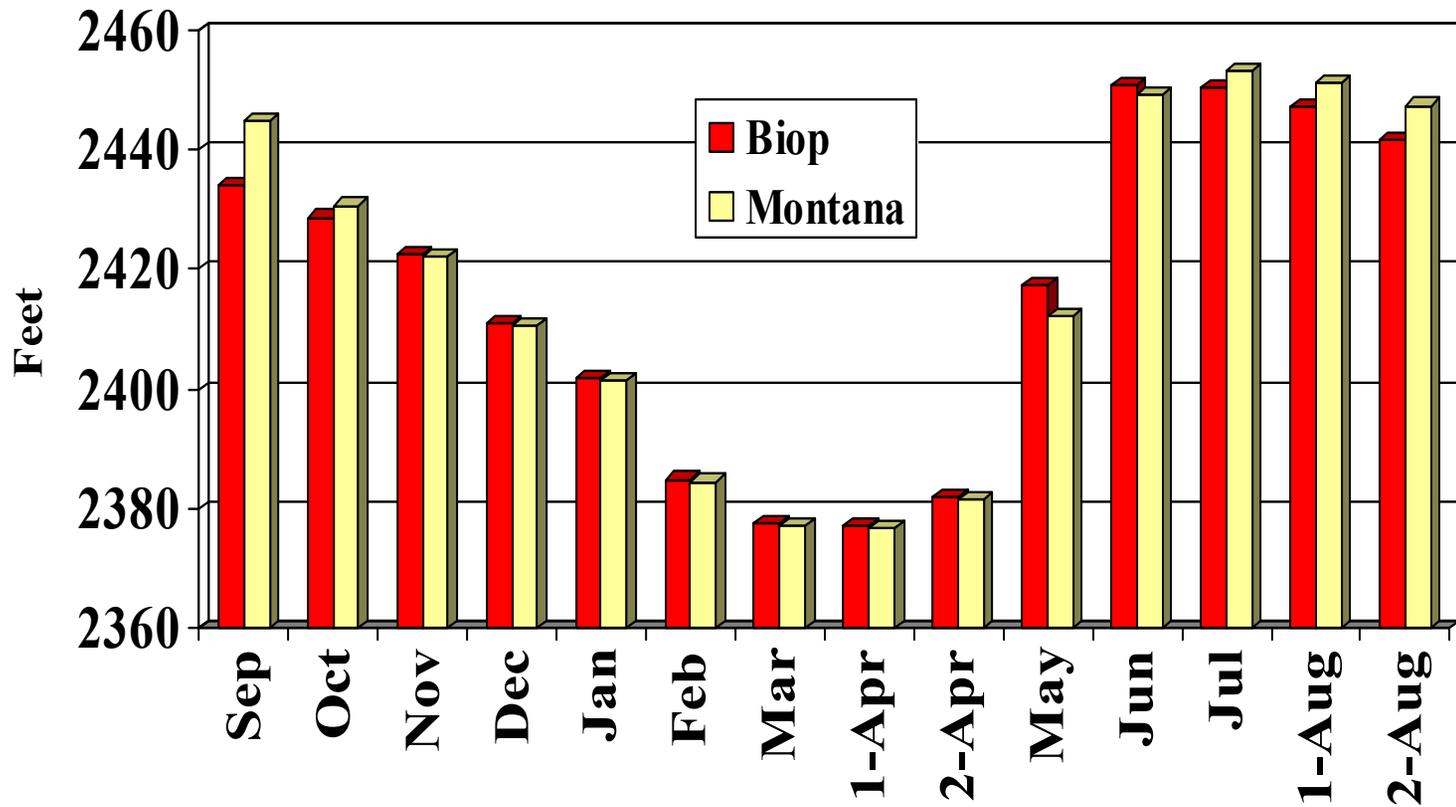
Additional Slides For Discussion with Technical Staff

Not a part of the Planned
Council Presentation

Libby Elevations

(50-Year Average)

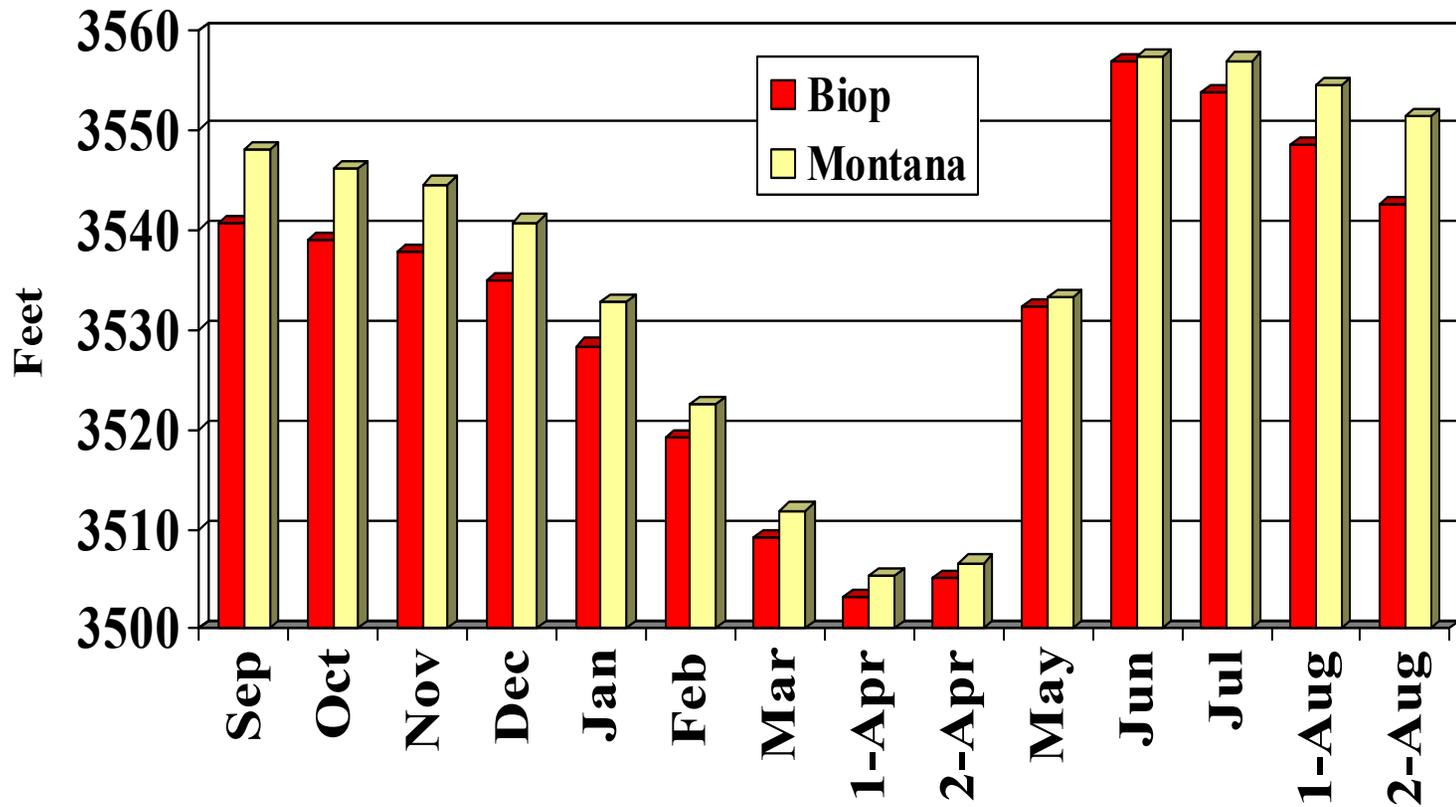
Montana Amendment



Horse Elevations

(50-Year Average)

Montana Amendment

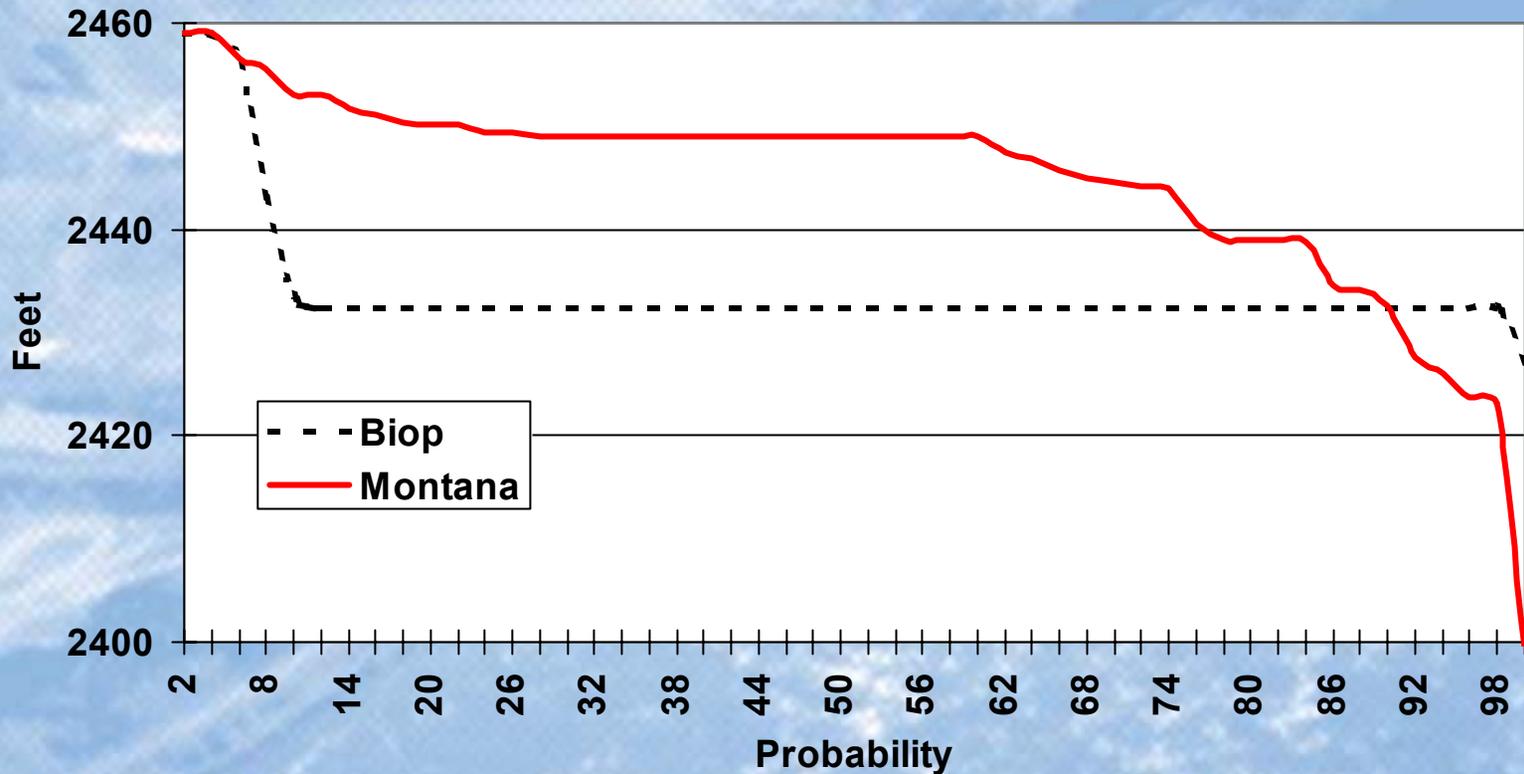


June Refill Probability

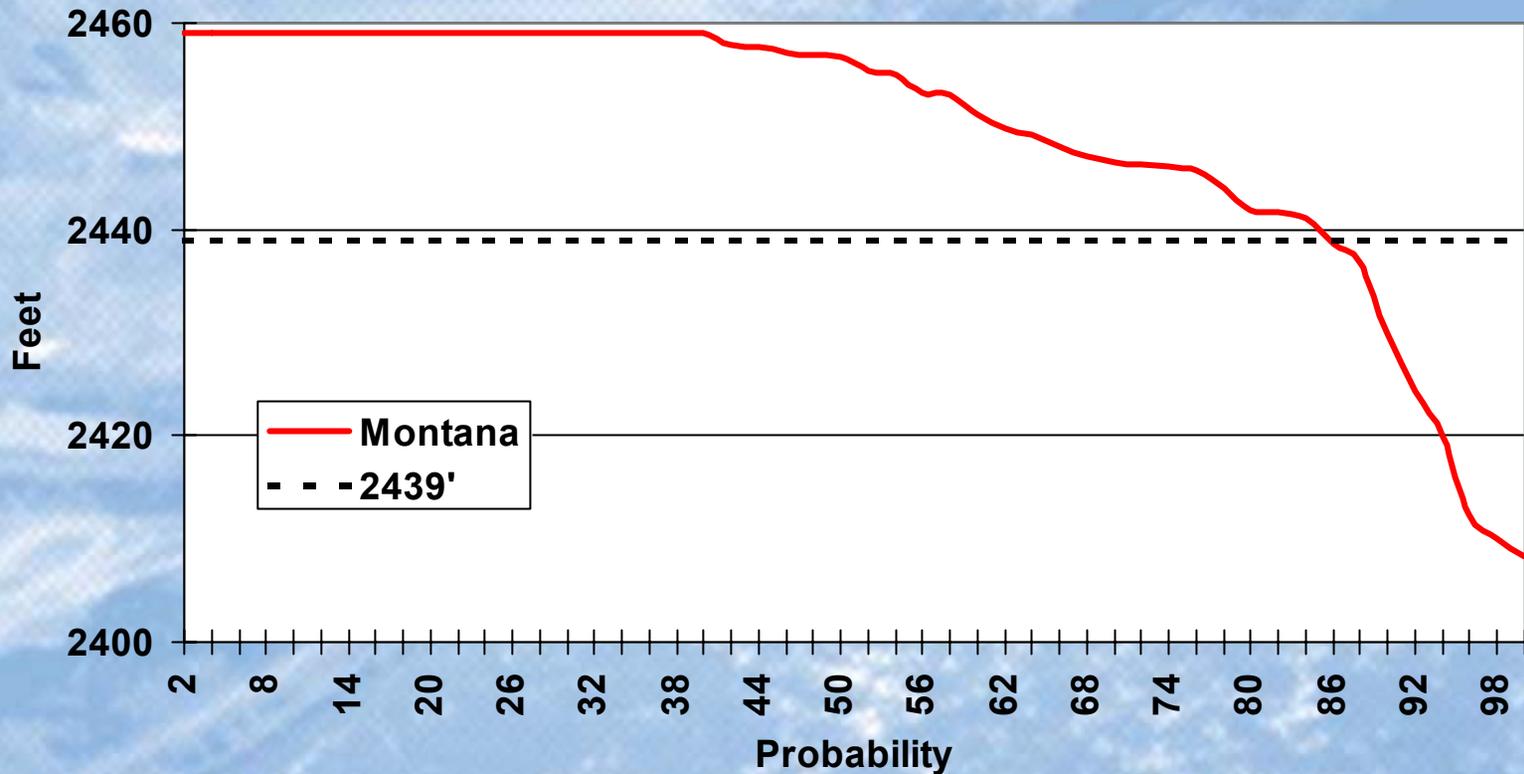
Montana Amendment Sensitivity Analysis

	Biop	Montana April Fill	No April Fill
Libby	64%	50%	50%
Horse	68%	75%	75%
Coulee	100%	100%	100%
Dworshak	100%	98%	94%

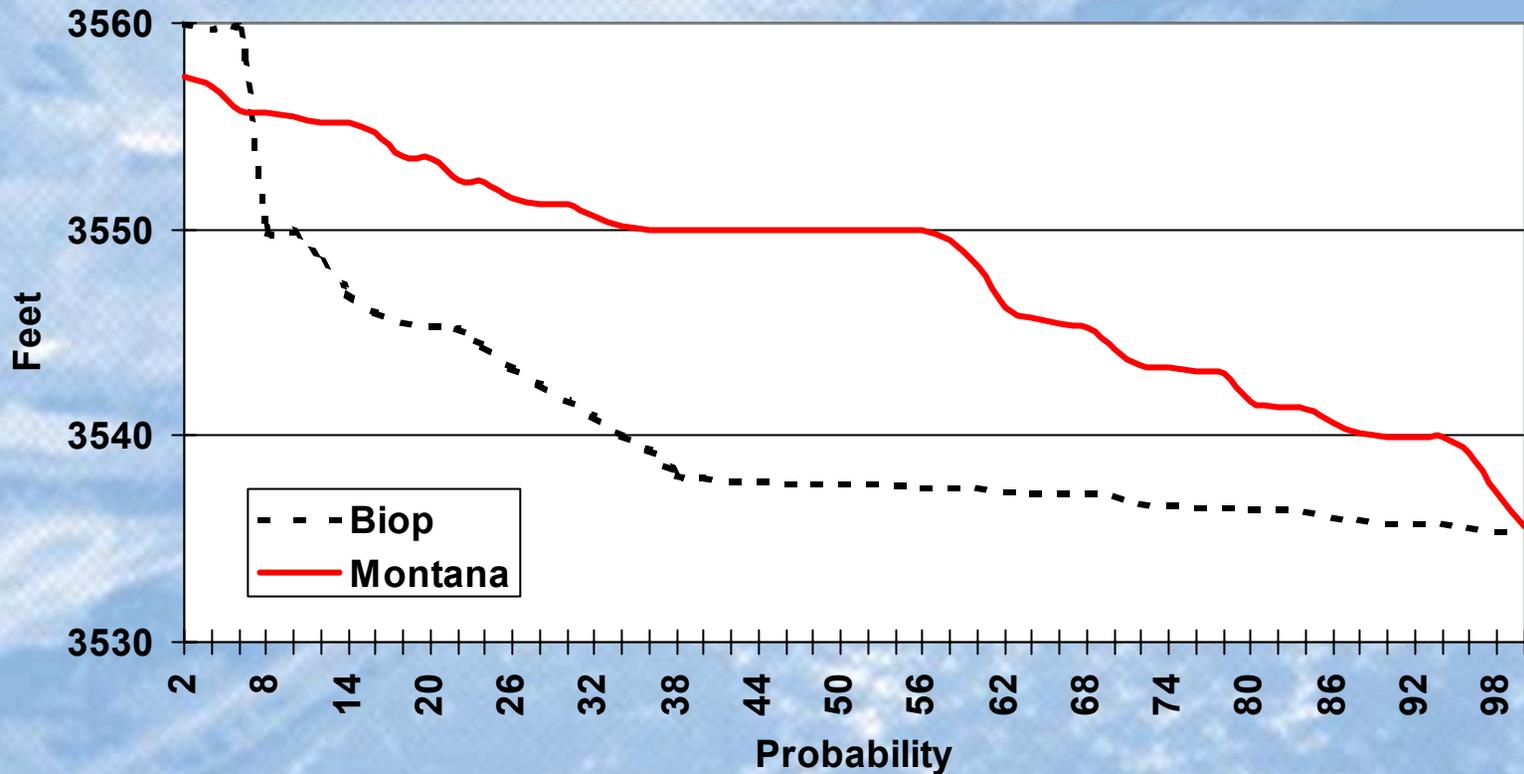
End of September Elevation Libby



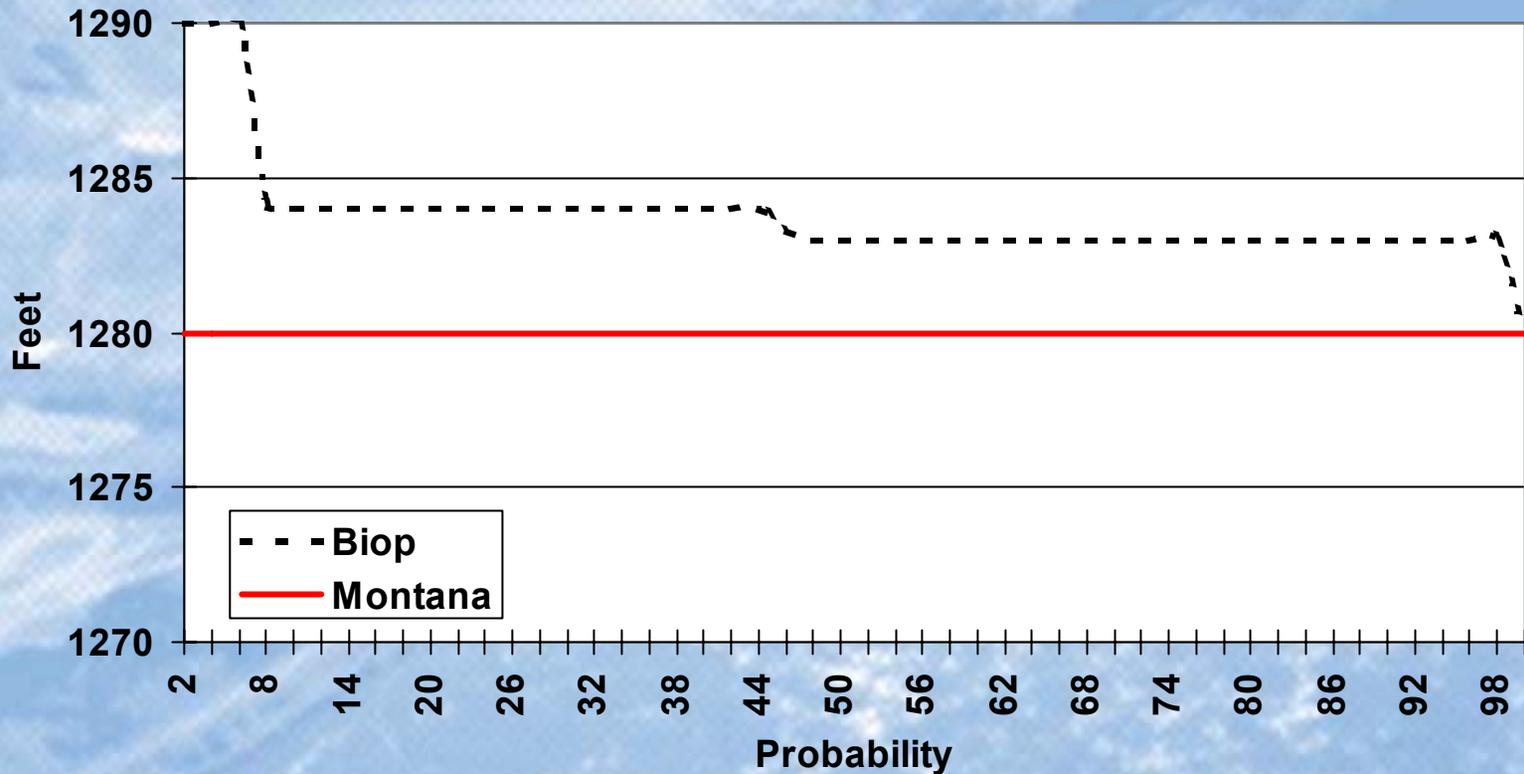
End of June Elevation Libby



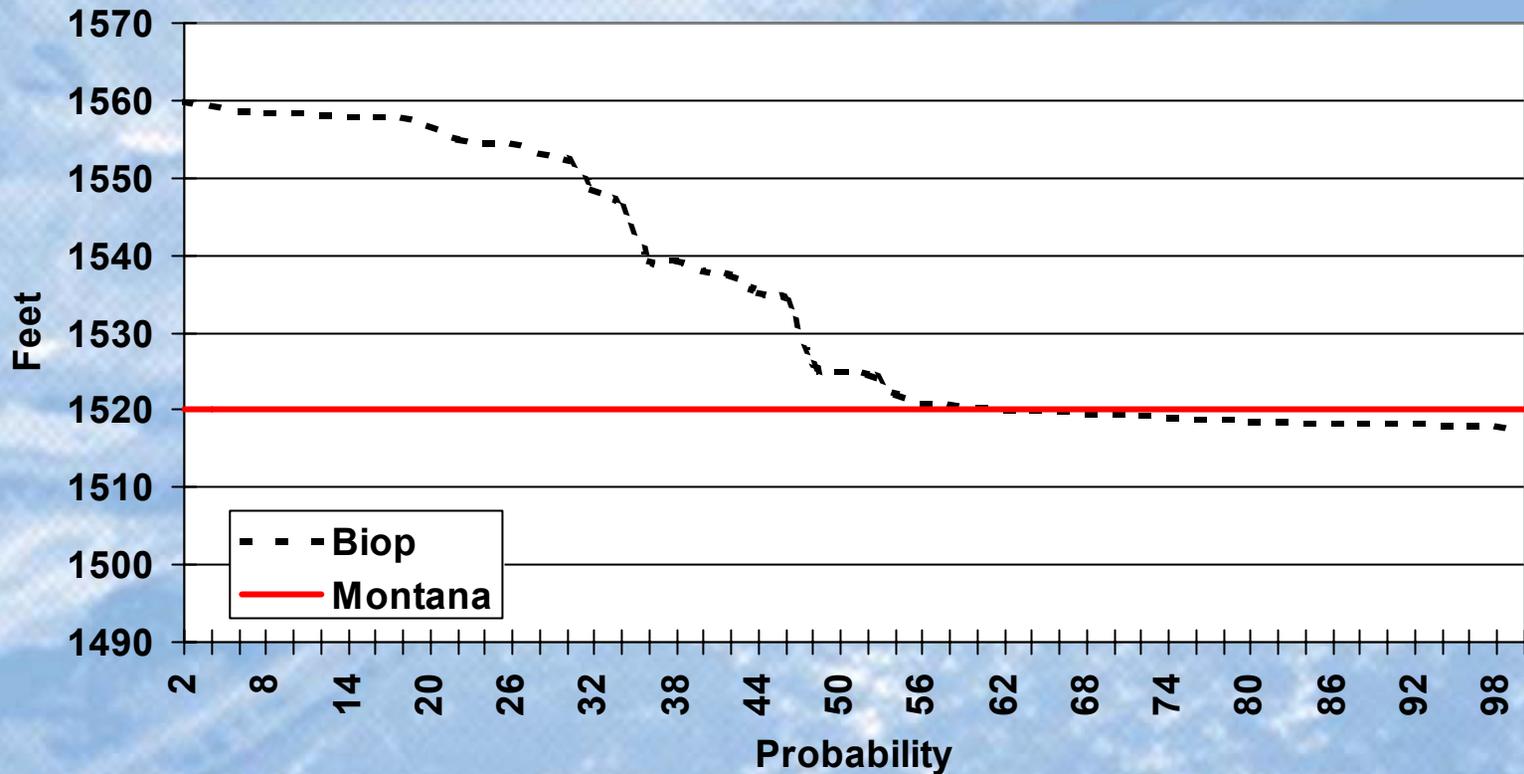
End of September Elevation Horse



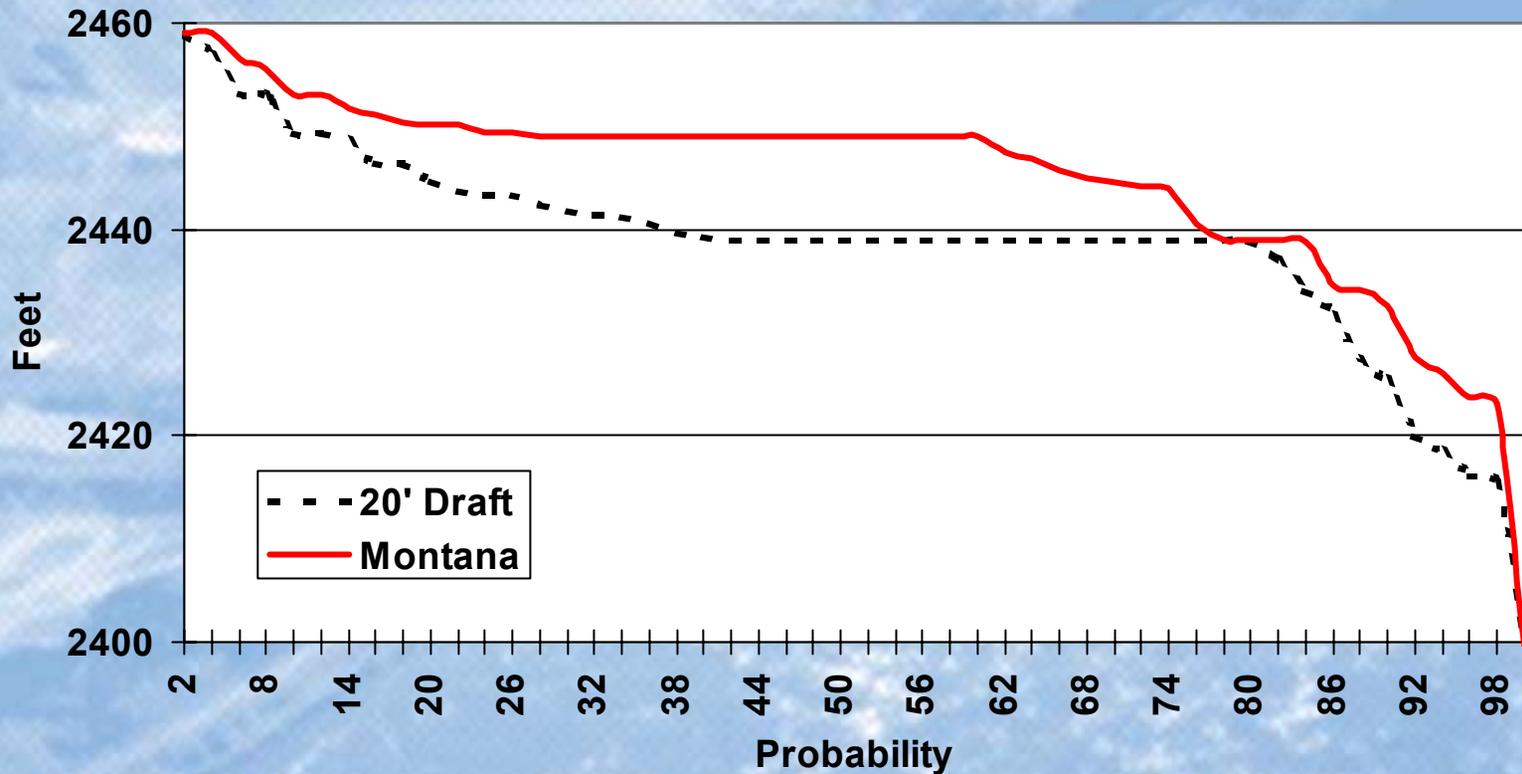
End of September Elevation Coulee



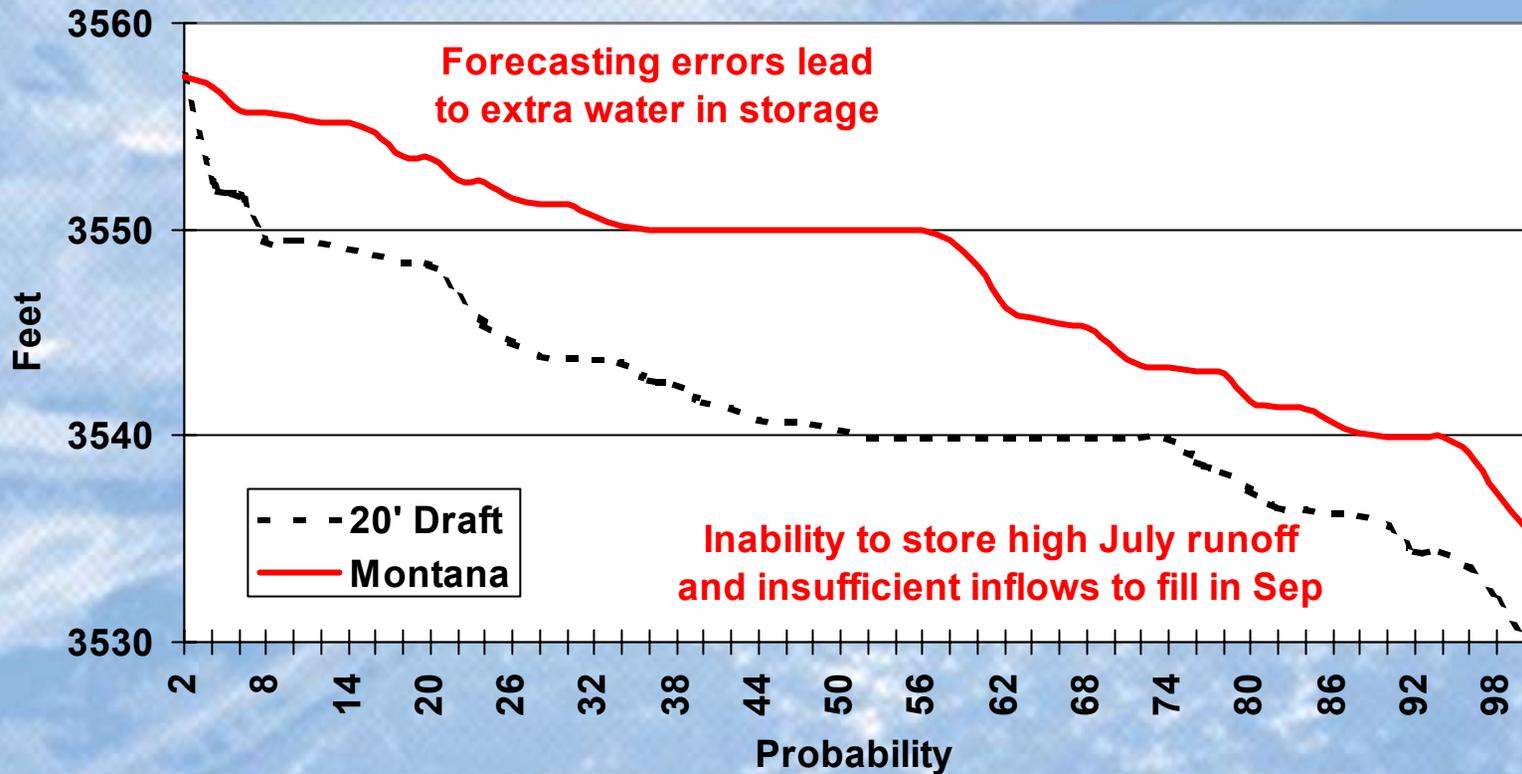
End of September Elevation Dworshak



End of September Elevation Libby

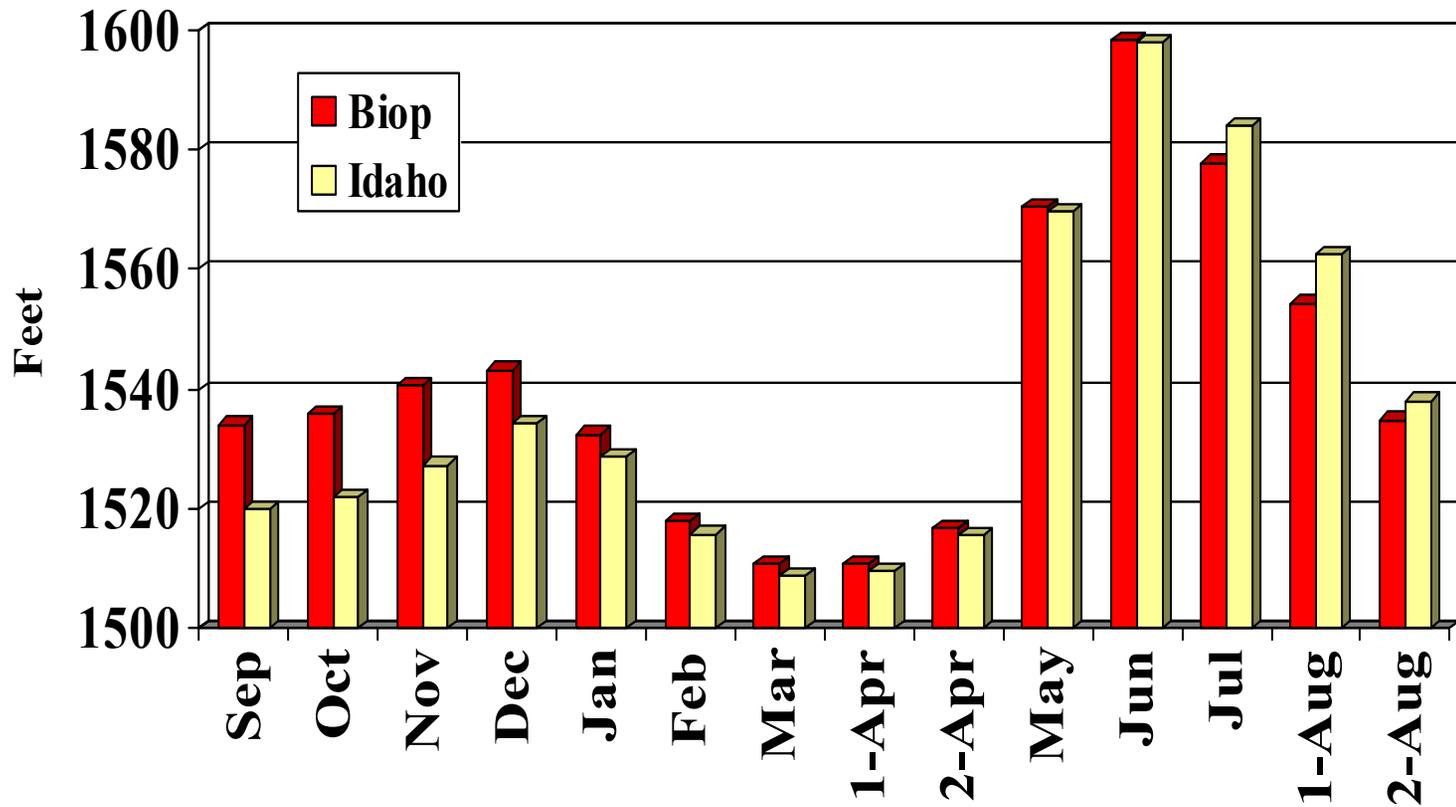


End of September Elevation Horse



Dworshak Elevations (50-Year Average)

Idaho Amendment



Coulee Elevations

(50-Year Average)

Washington Amendment

