Historical Trends in Stream Discharge at Long-Term Gaging Stations in Idaho

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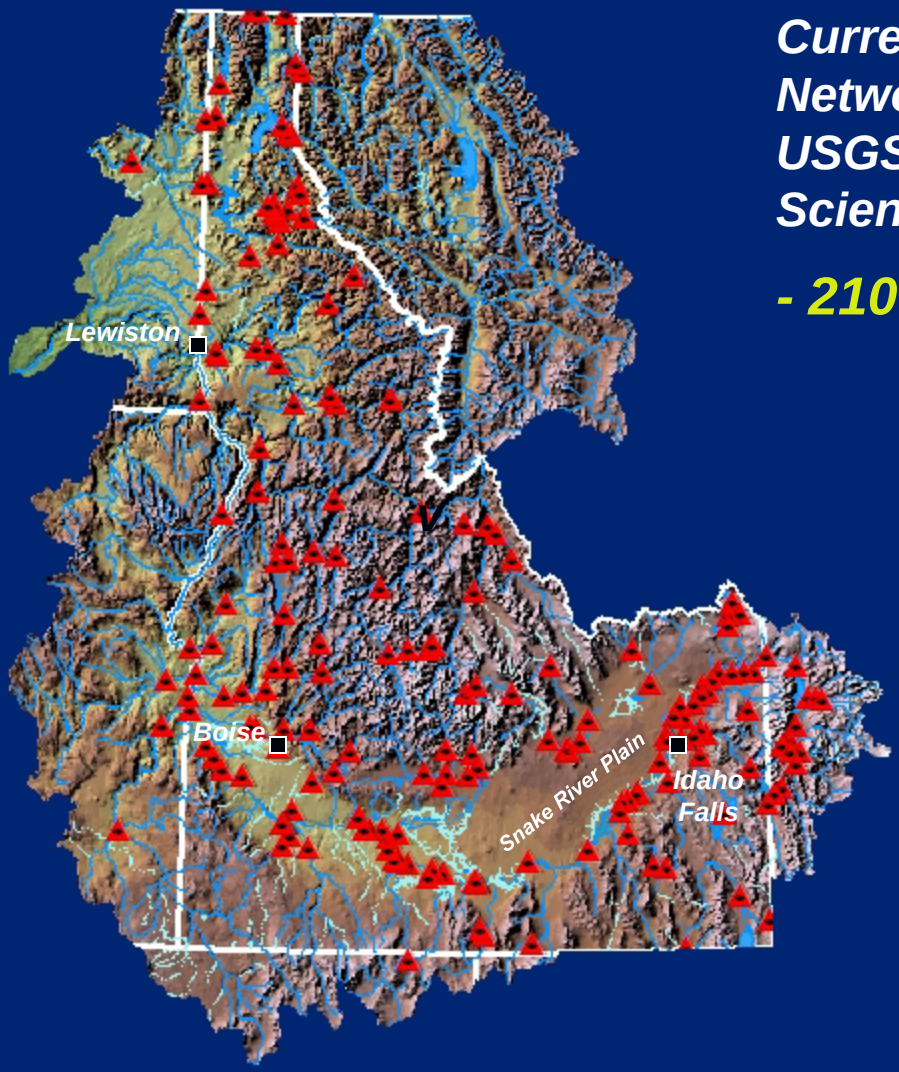

Current Gaging Station Network Operated by the USGS - Idaho Water Science Center

- 210 stations

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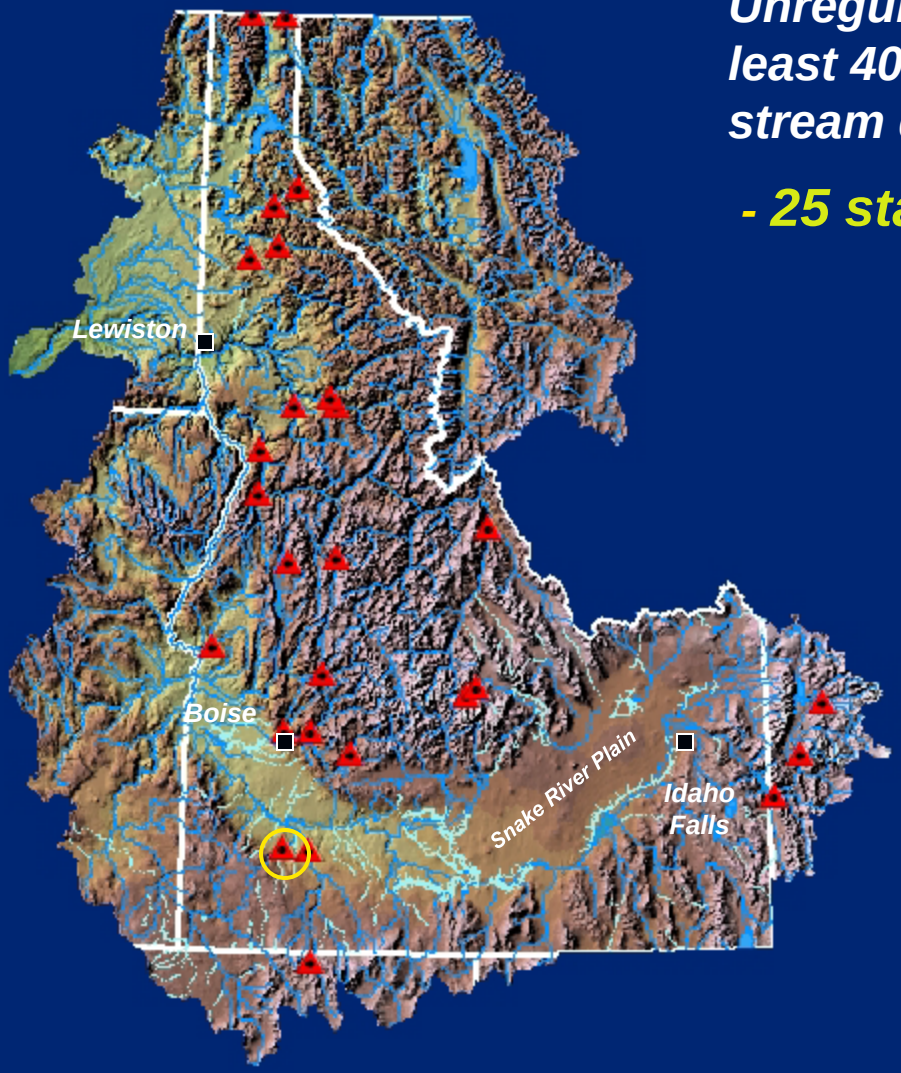

Unregulated streams with at least 40 years of continuous stream discharge information

- 25 stations (as of FY06)

Source of Funding

IDWR/USGS COOP – 9
Corp of Engineers – 6
USGS NSIP – 4
Bonneville Power – 2
Water District 1 – 2
Other Funding – 2
Discontinued in FY05 – 1

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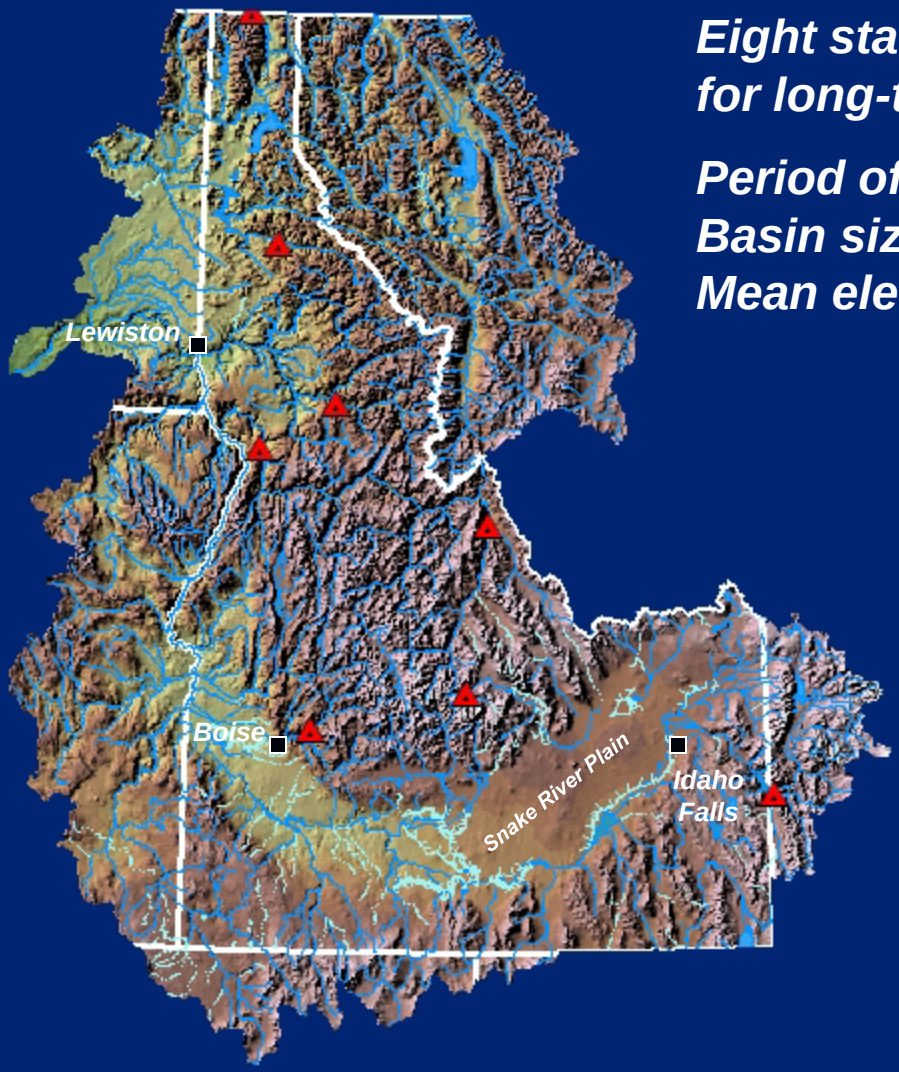

Eight stations examined in detail for long-term trends in discharge

Period of record; 52 – 94 years
Basin size; 97 – 13,550 mi^2
Mean elevation; 4,480 – 8,660 ft

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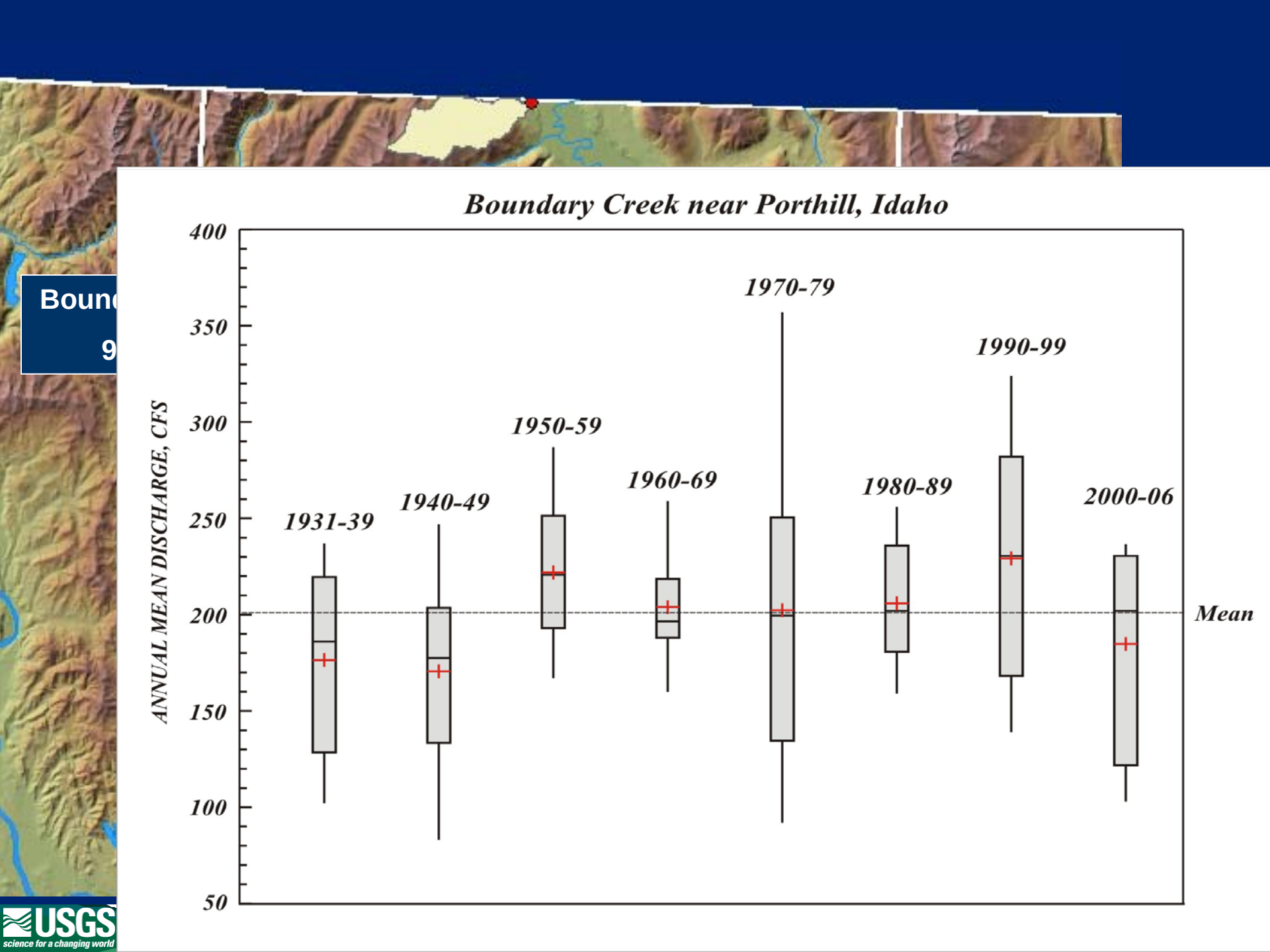

Bound
9

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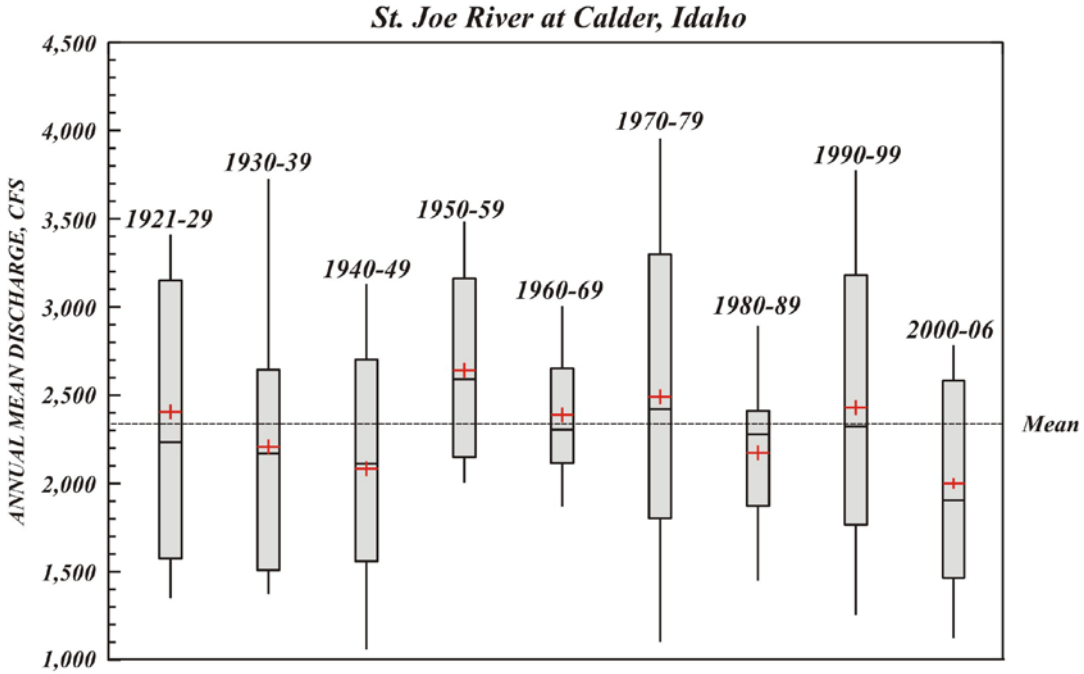
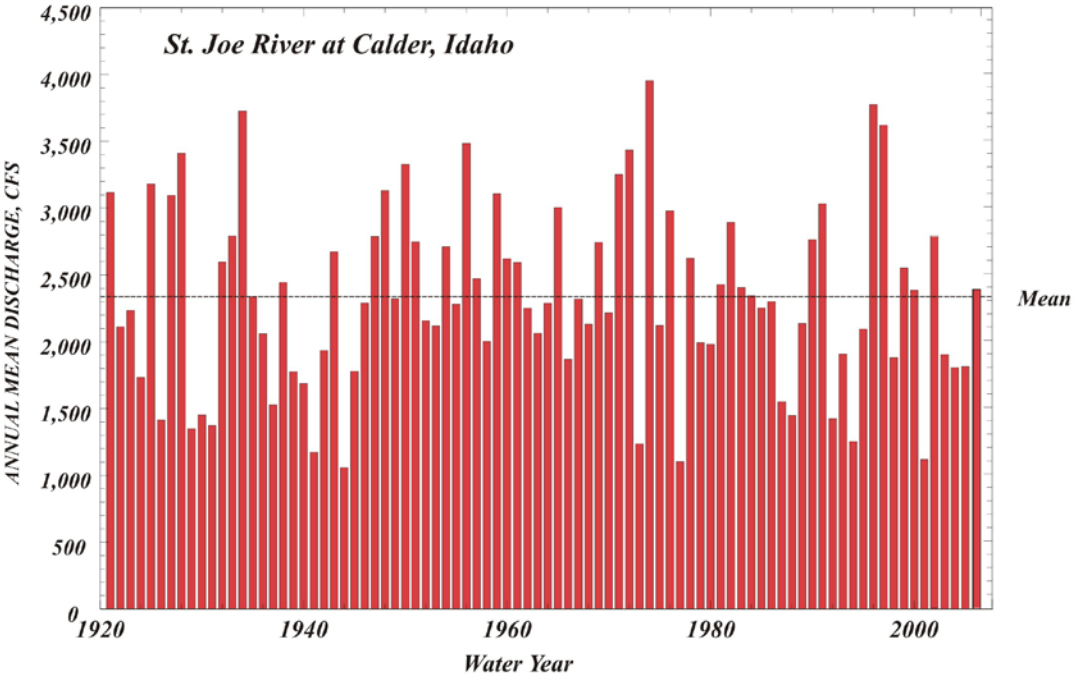
St. Joe River at Calder, ID; 1921-2006

1,030 mi², mean elevation = 4,550 ft





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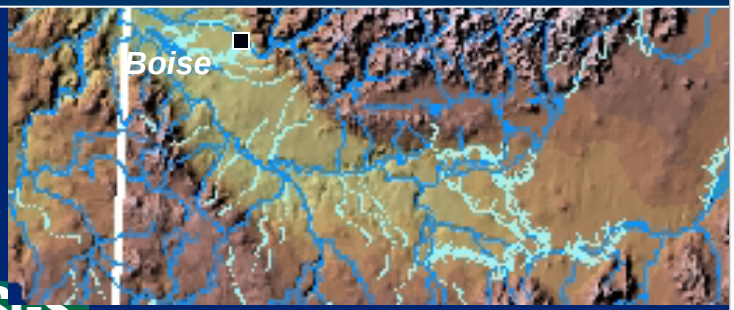
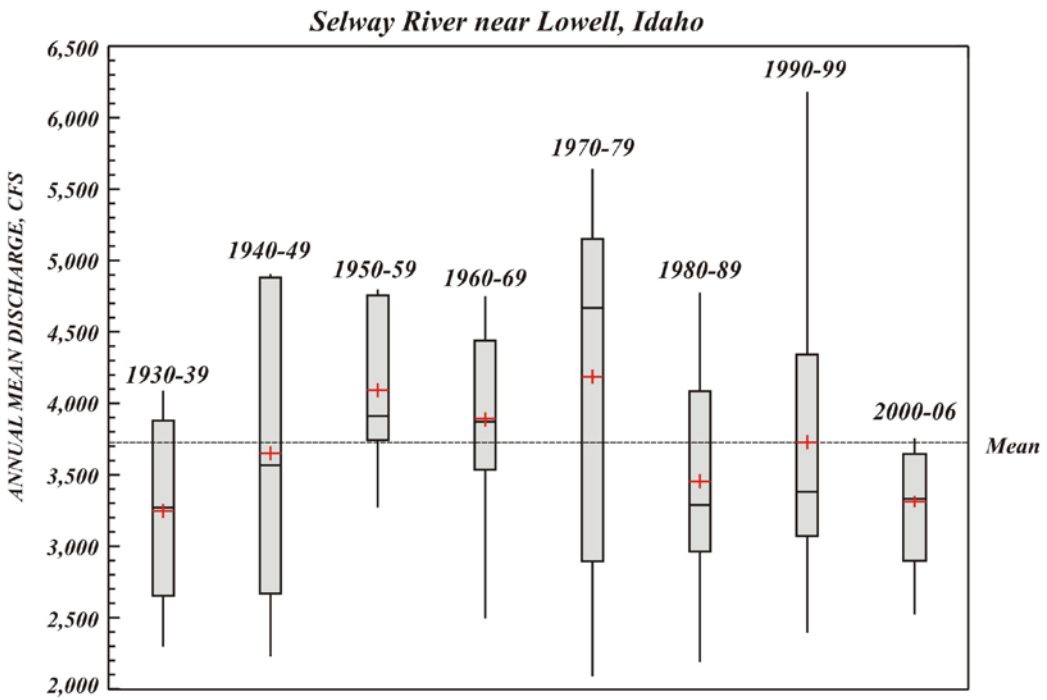
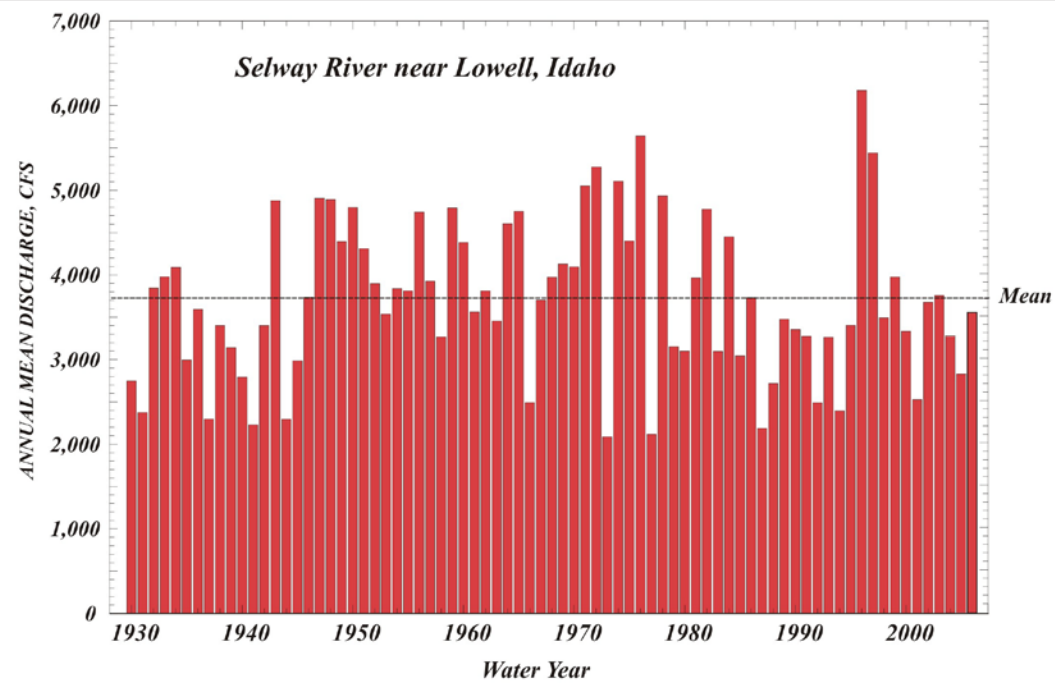
Selway River nr Lowell, ID; 1930-2006

1,910 mi², mean elevation = 5,510 ft







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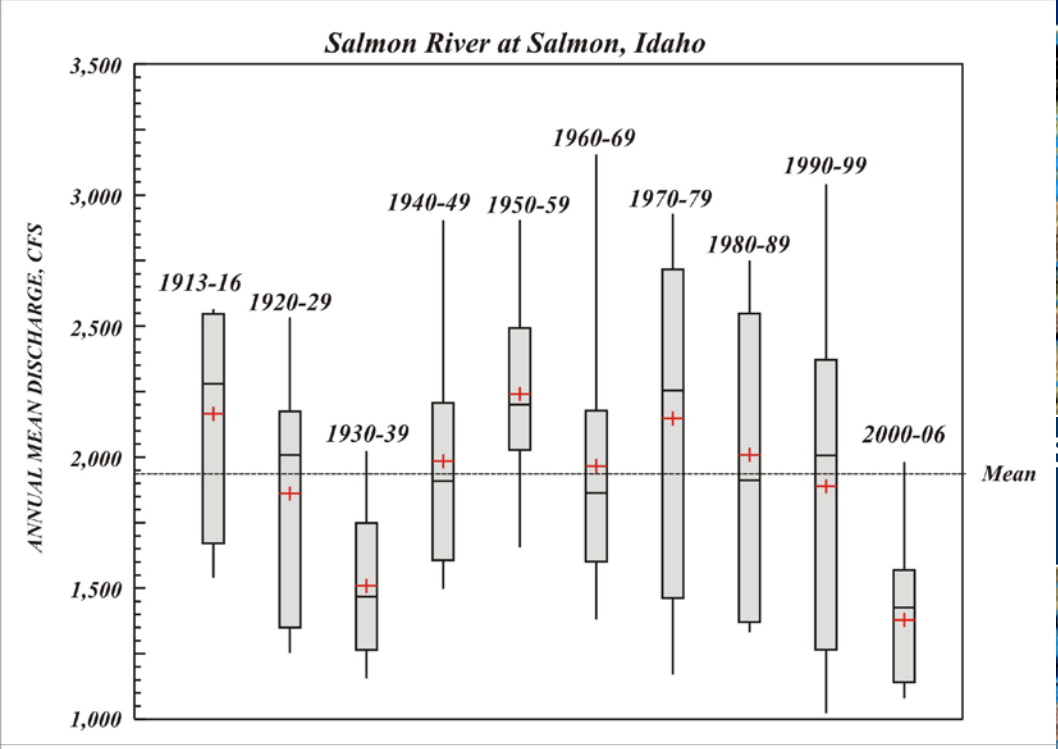
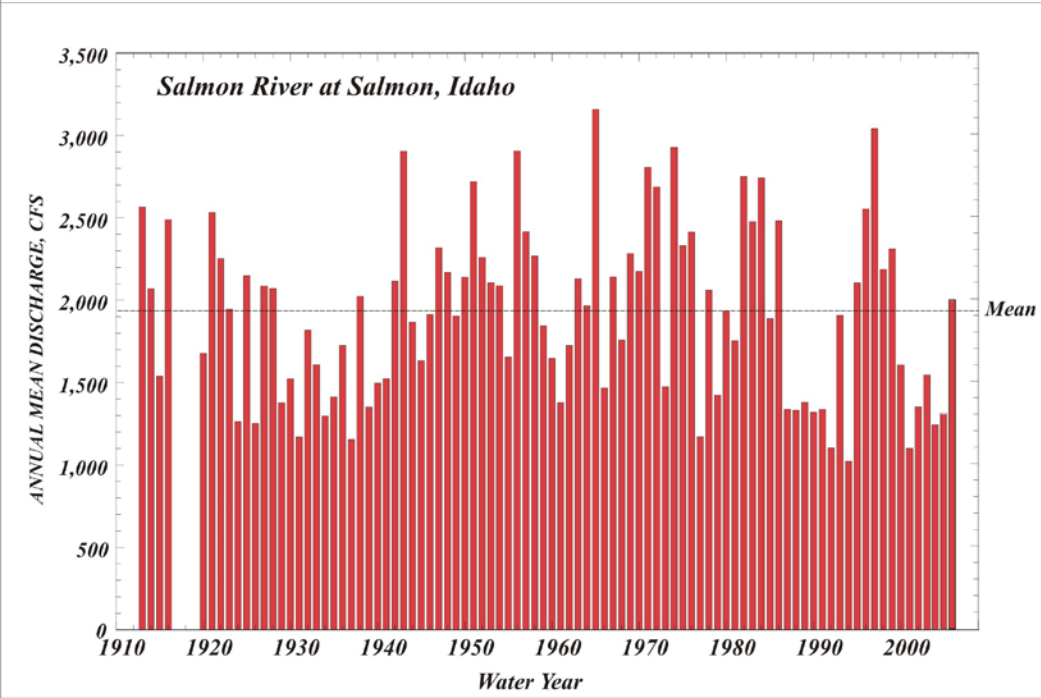
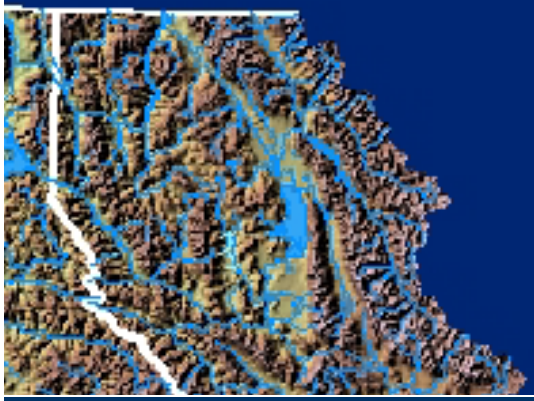
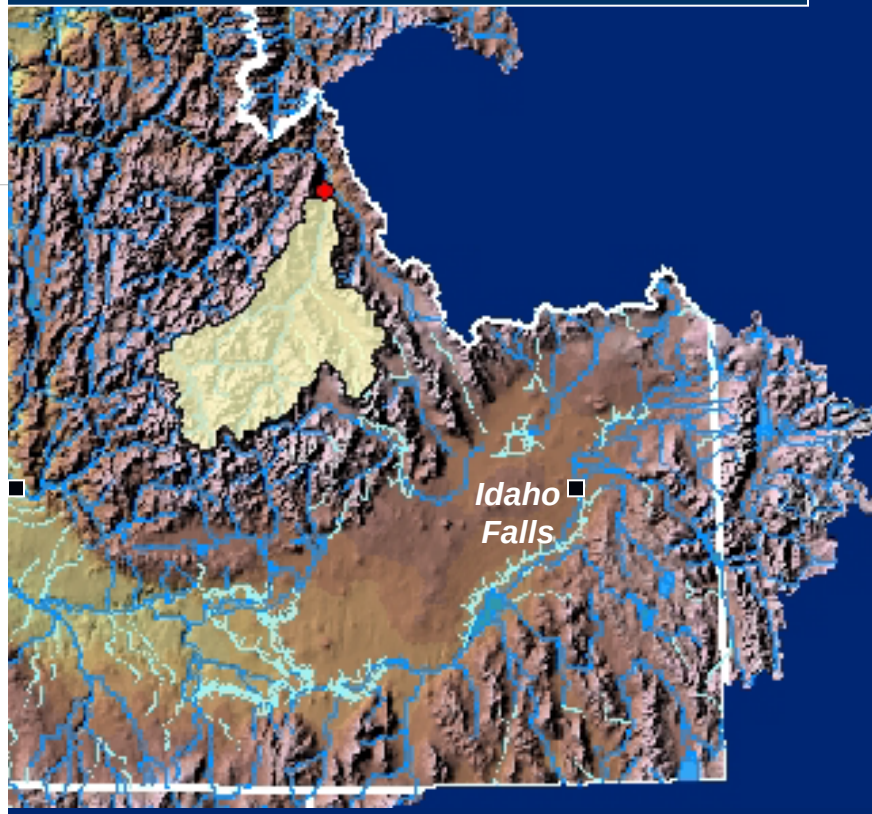






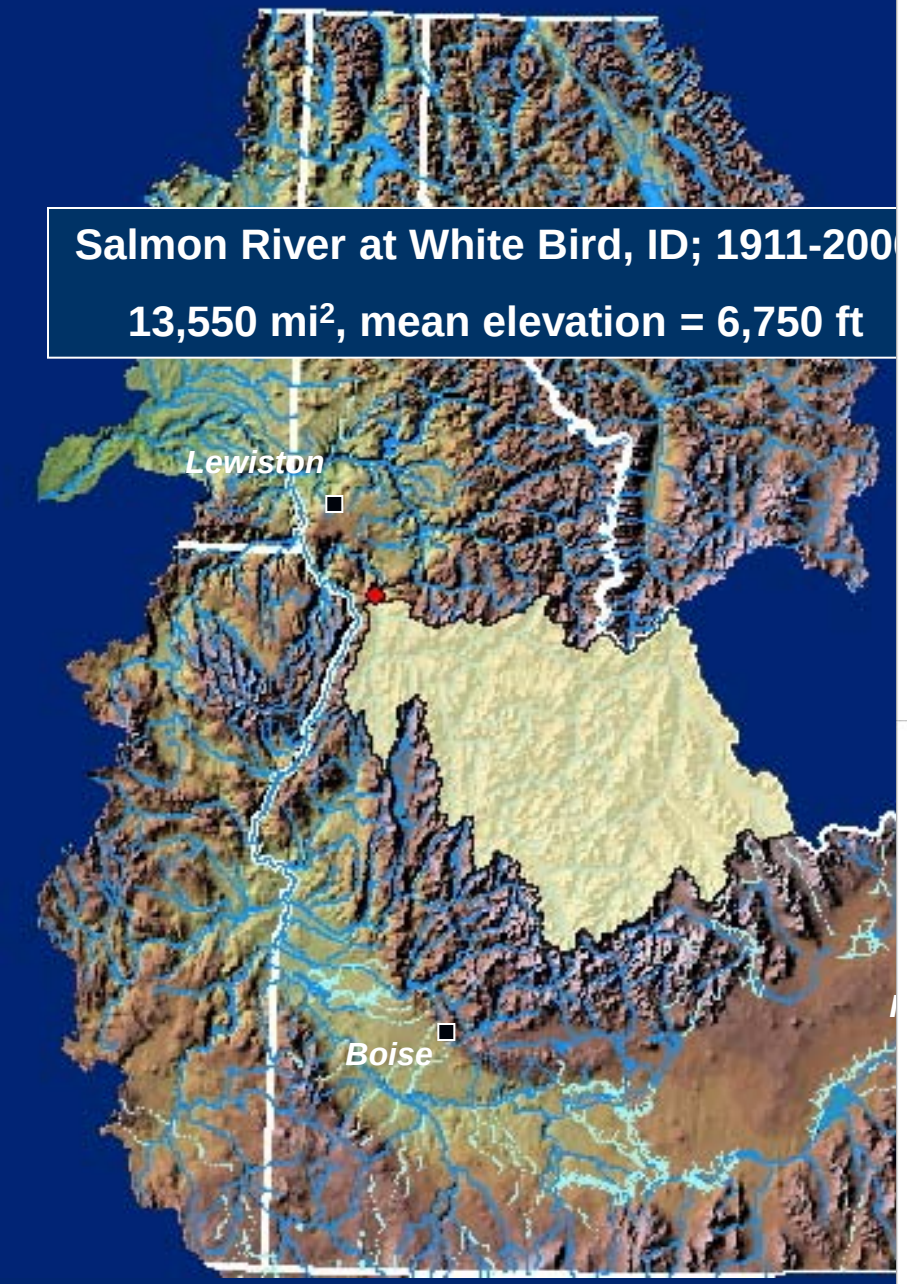
Salmon River at Salmon, ID; 1913-2006

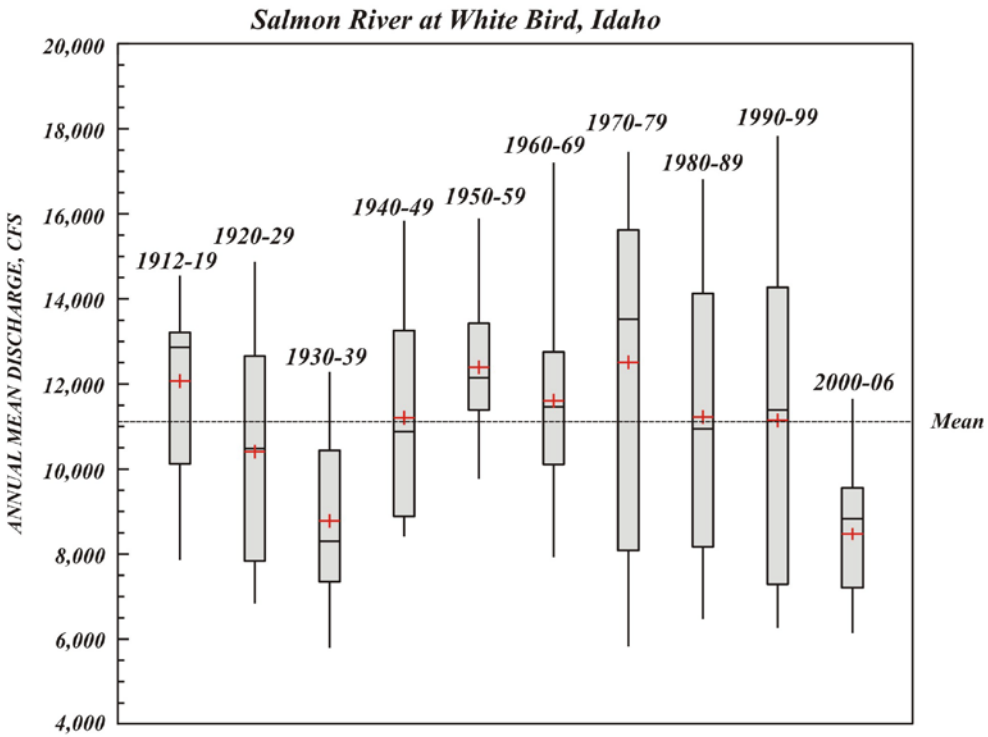
3,760 mi², mean elevation = 7,400 ft

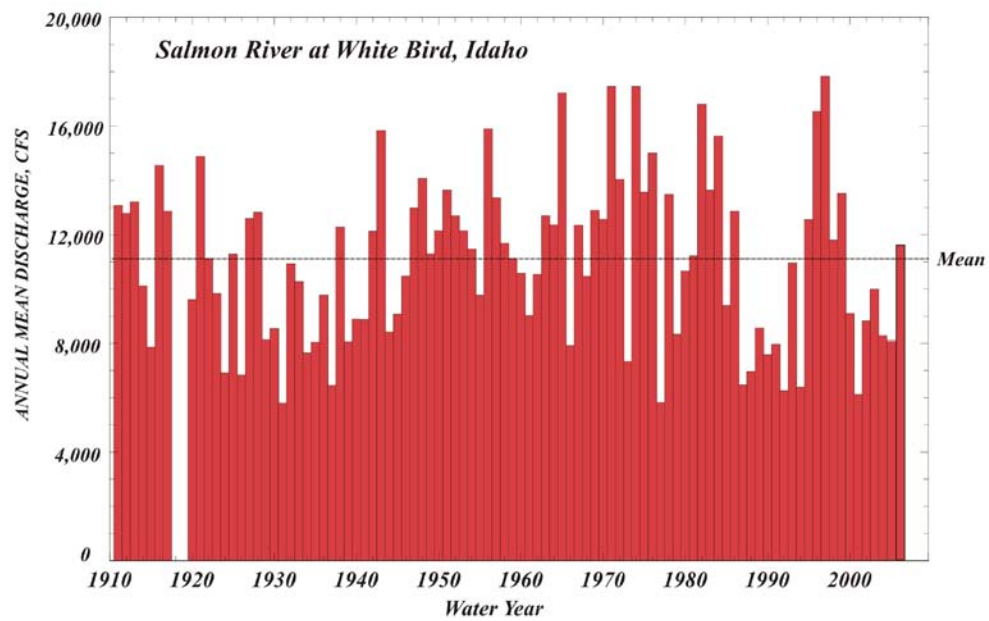


Salmon River at White Bird, ID; 1911-200

13,550 mi², mean elevation = 6,750 ft







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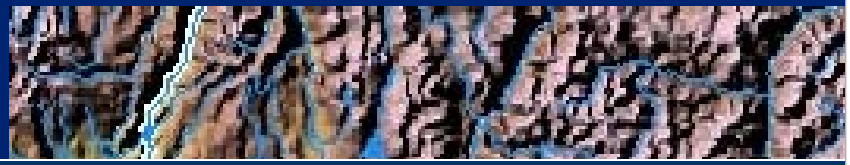
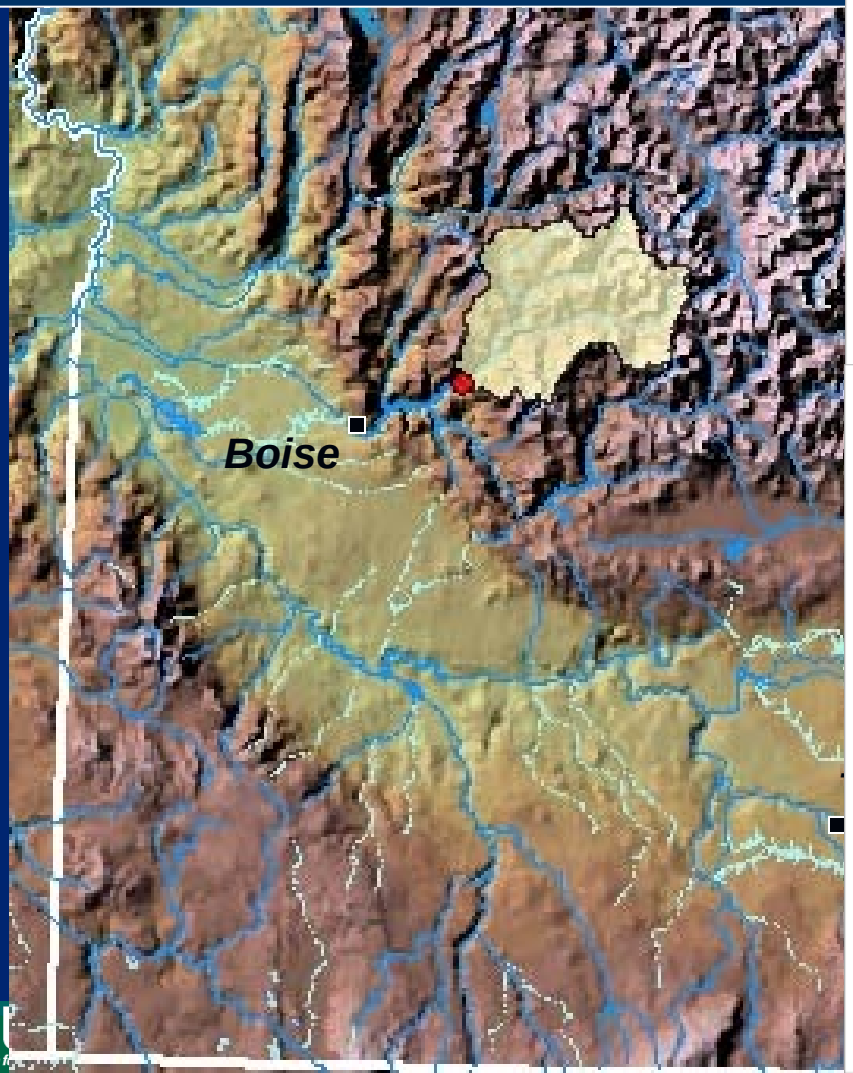
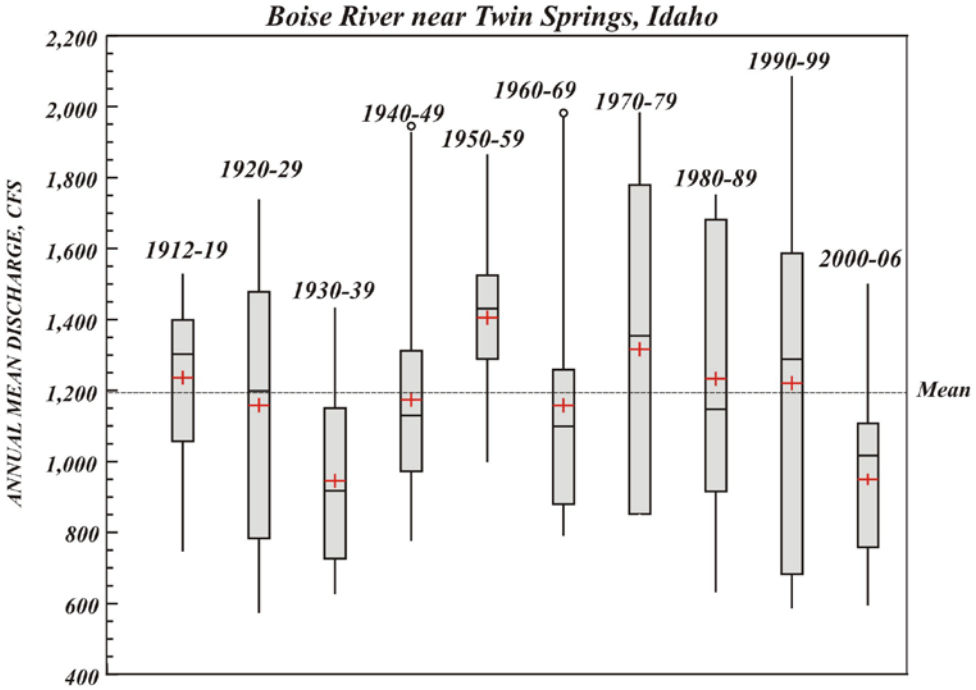
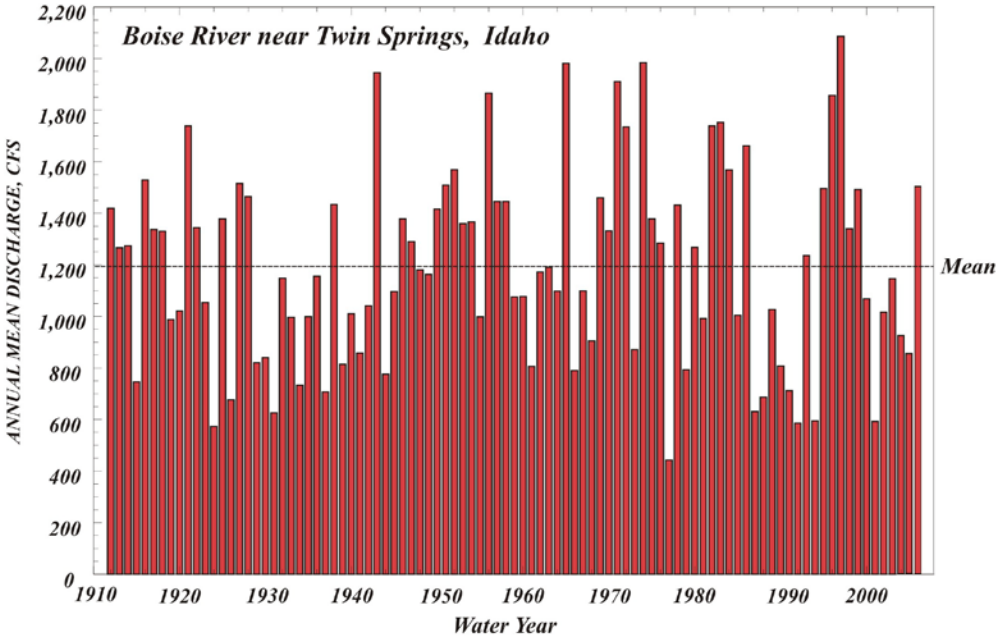


Boise River near Twin Springs, ID; 1912-20

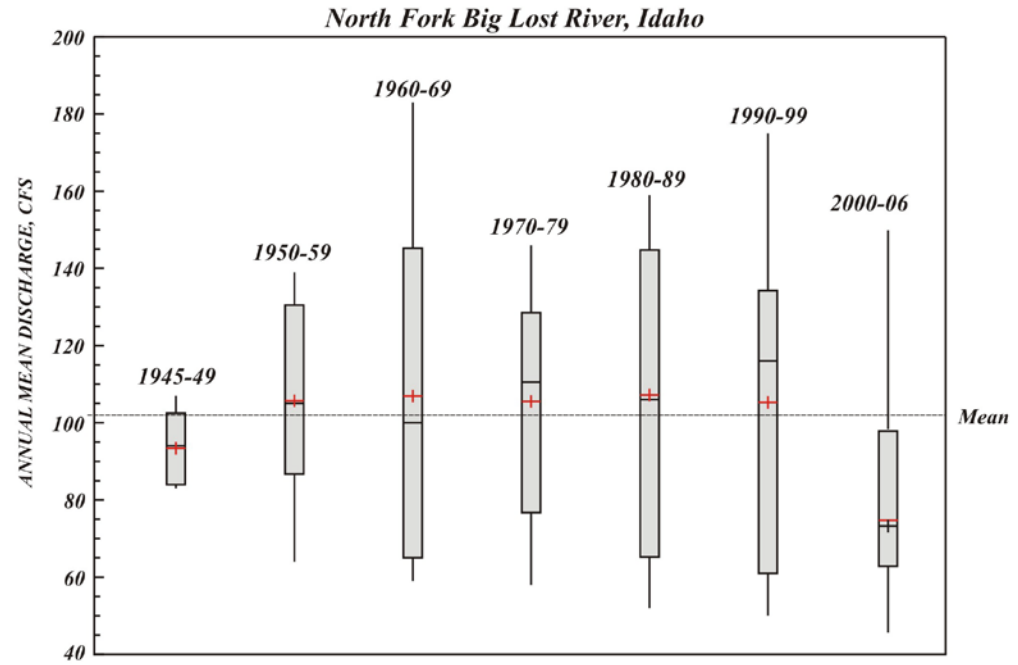
830 mi², mean elevation = 6,420 ft

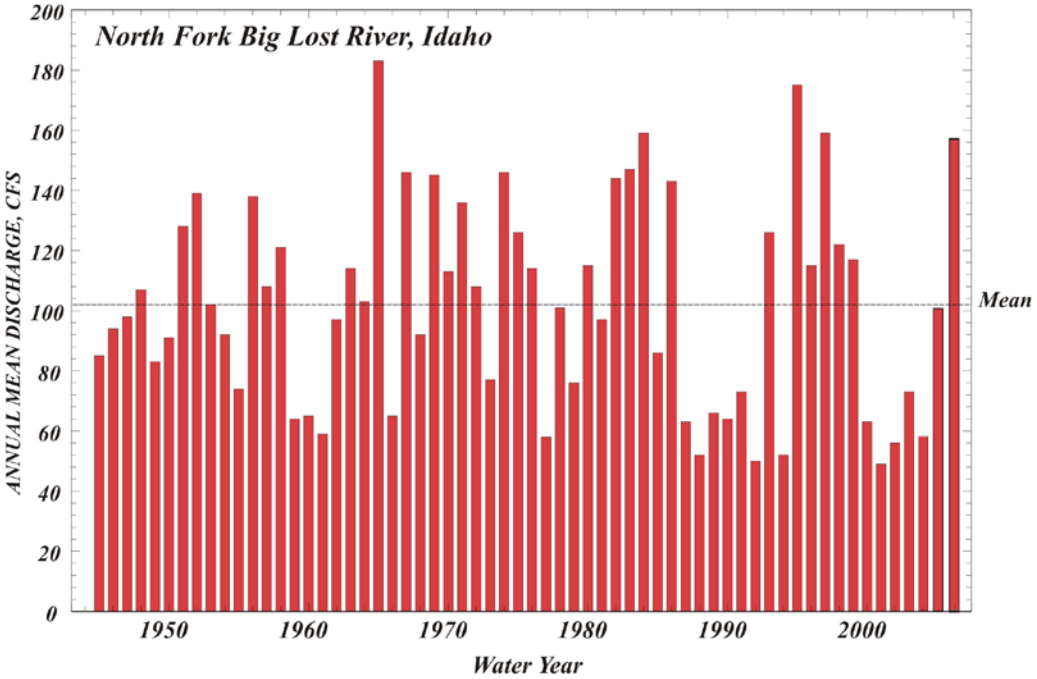


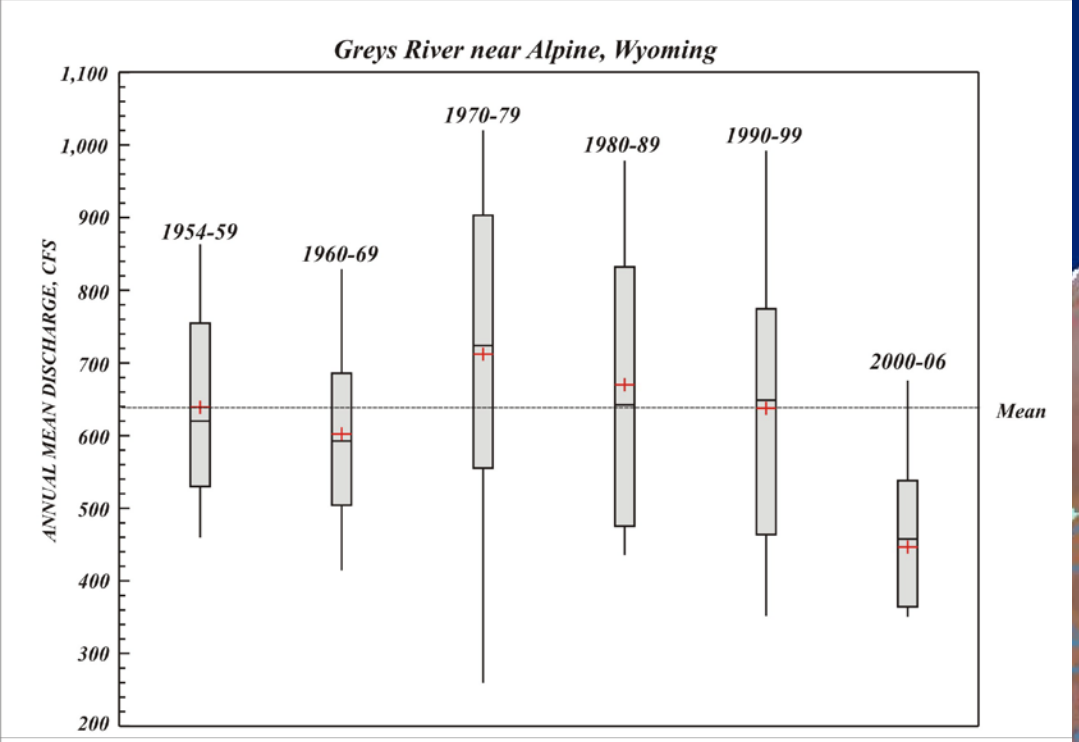


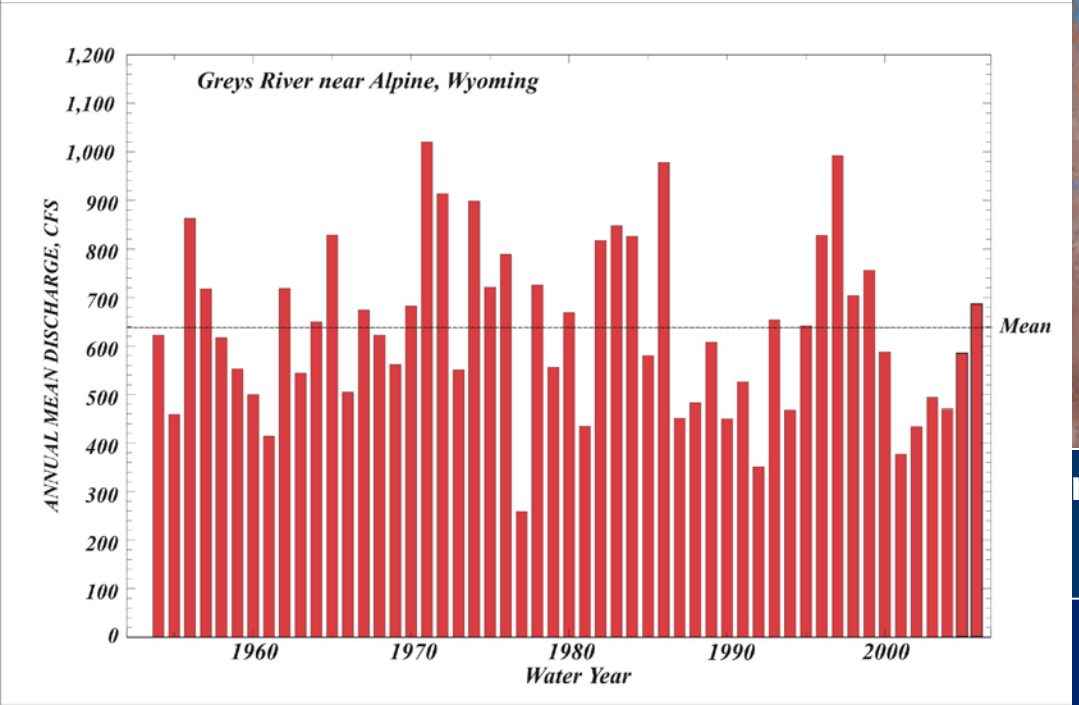


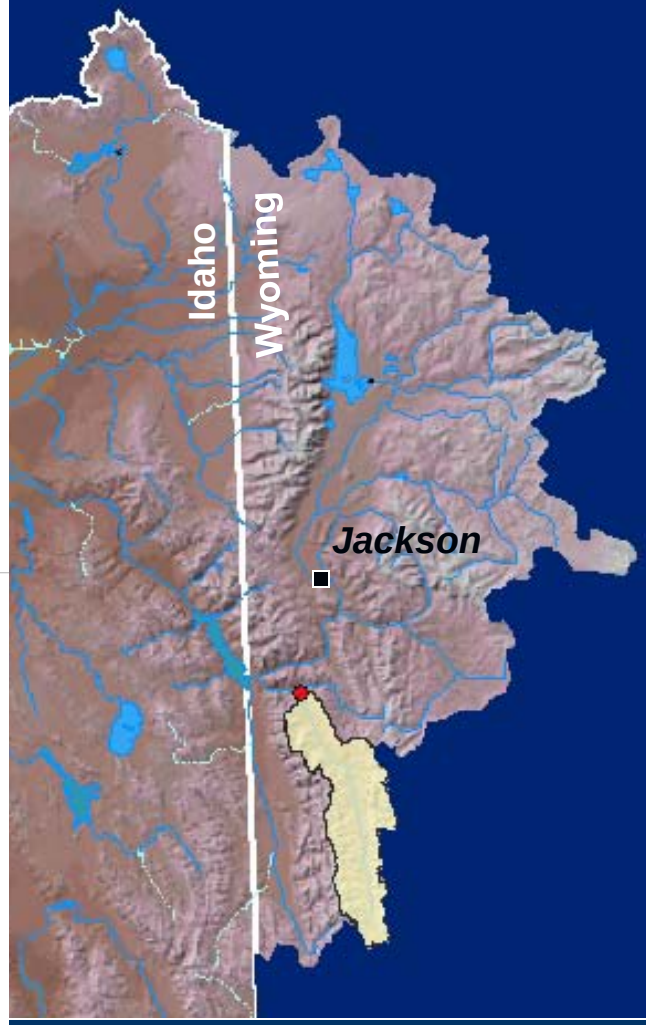
North Fork Big Lost River, ID; 1931-200
114 mi², mean elevation = 8,660 ft







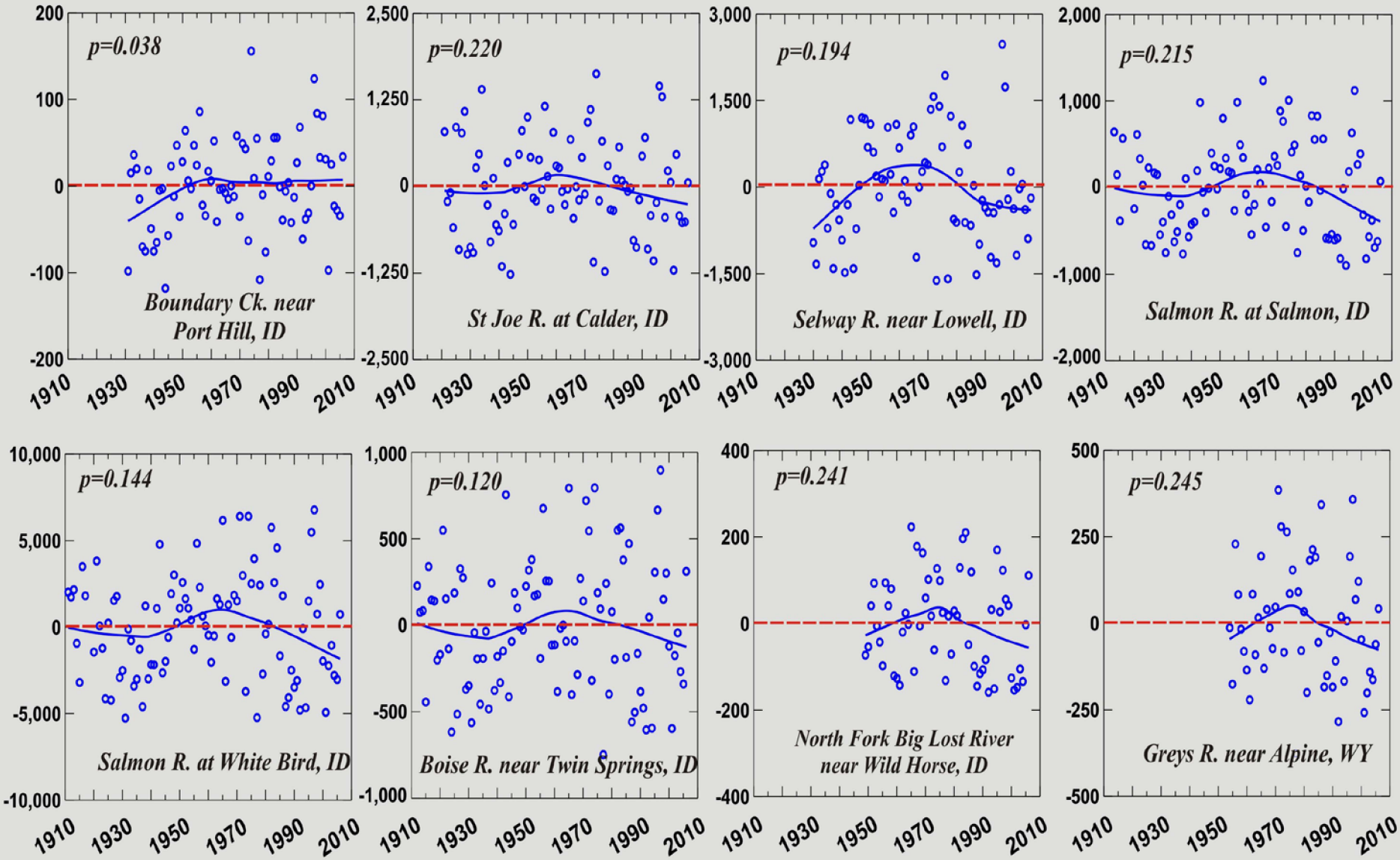




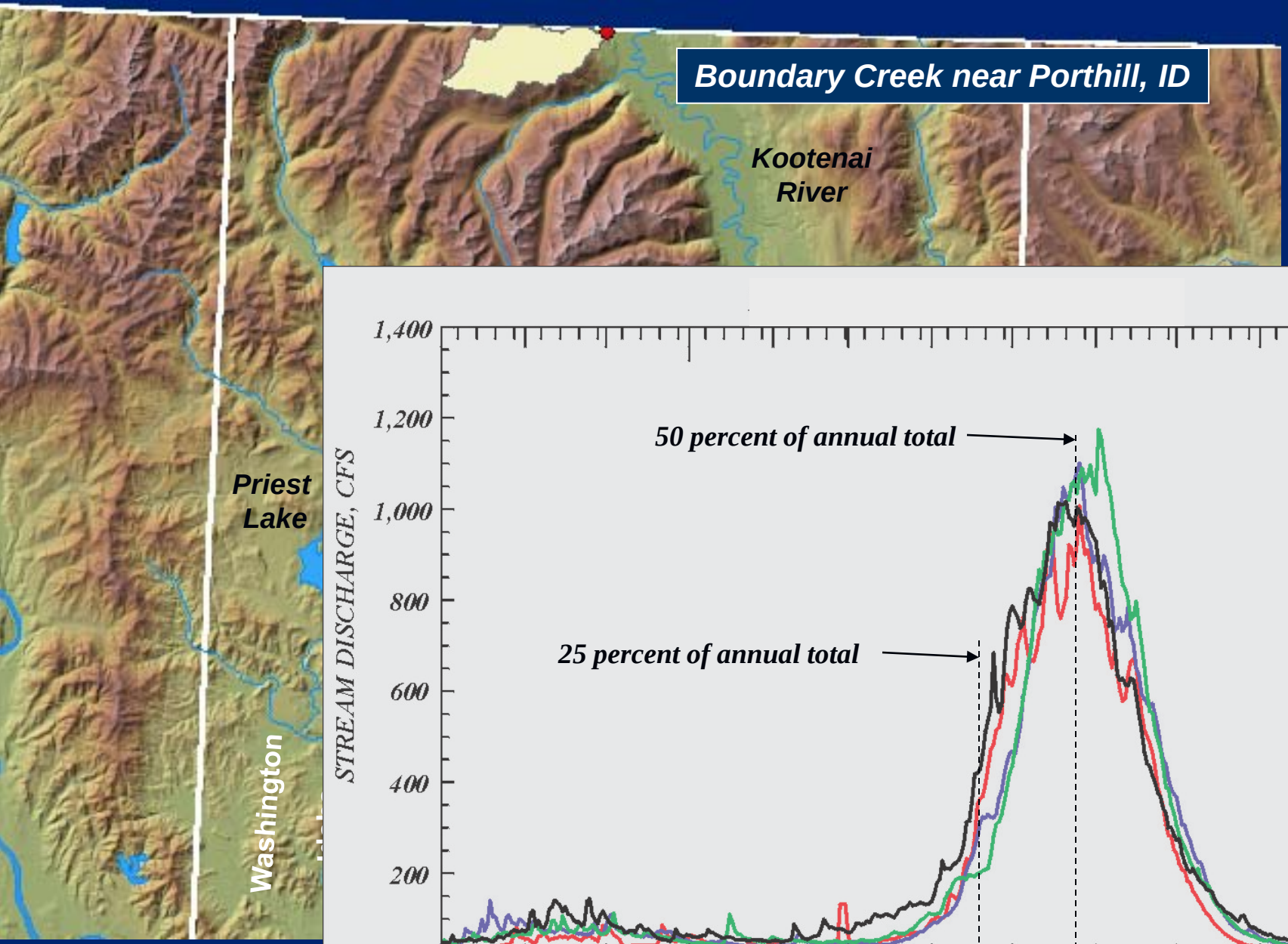
reys River near Alpine, WY; 1954-2006

448 mi^2, mean elevation = 8,100 ft

Residual Stream Discharge from the Historic Mean



Boundary Creek near Porthill, ID



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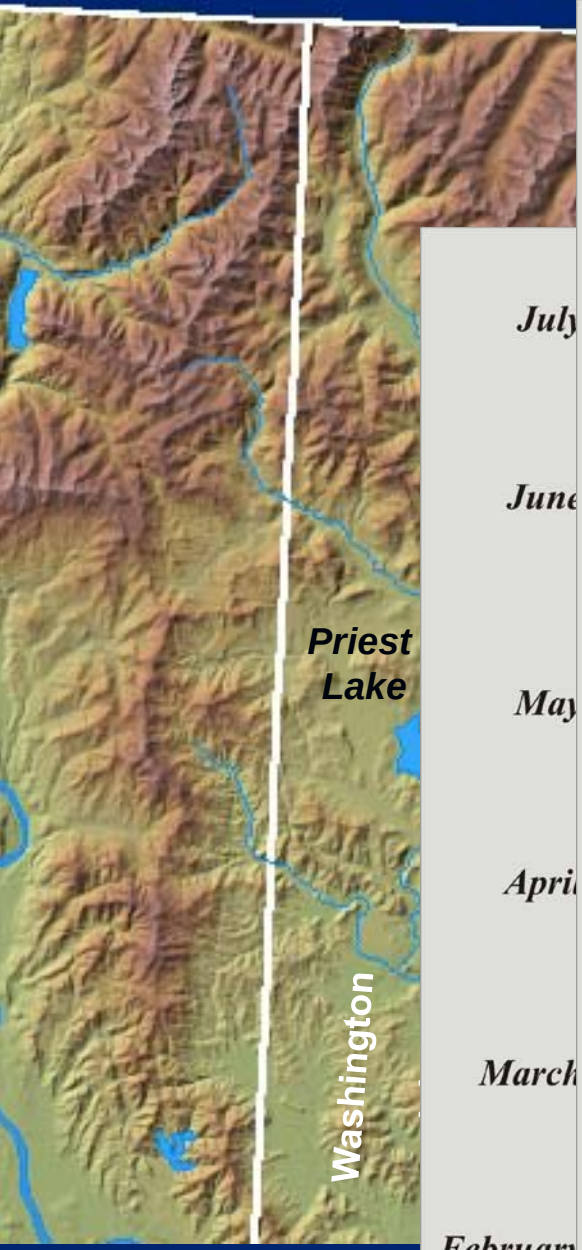

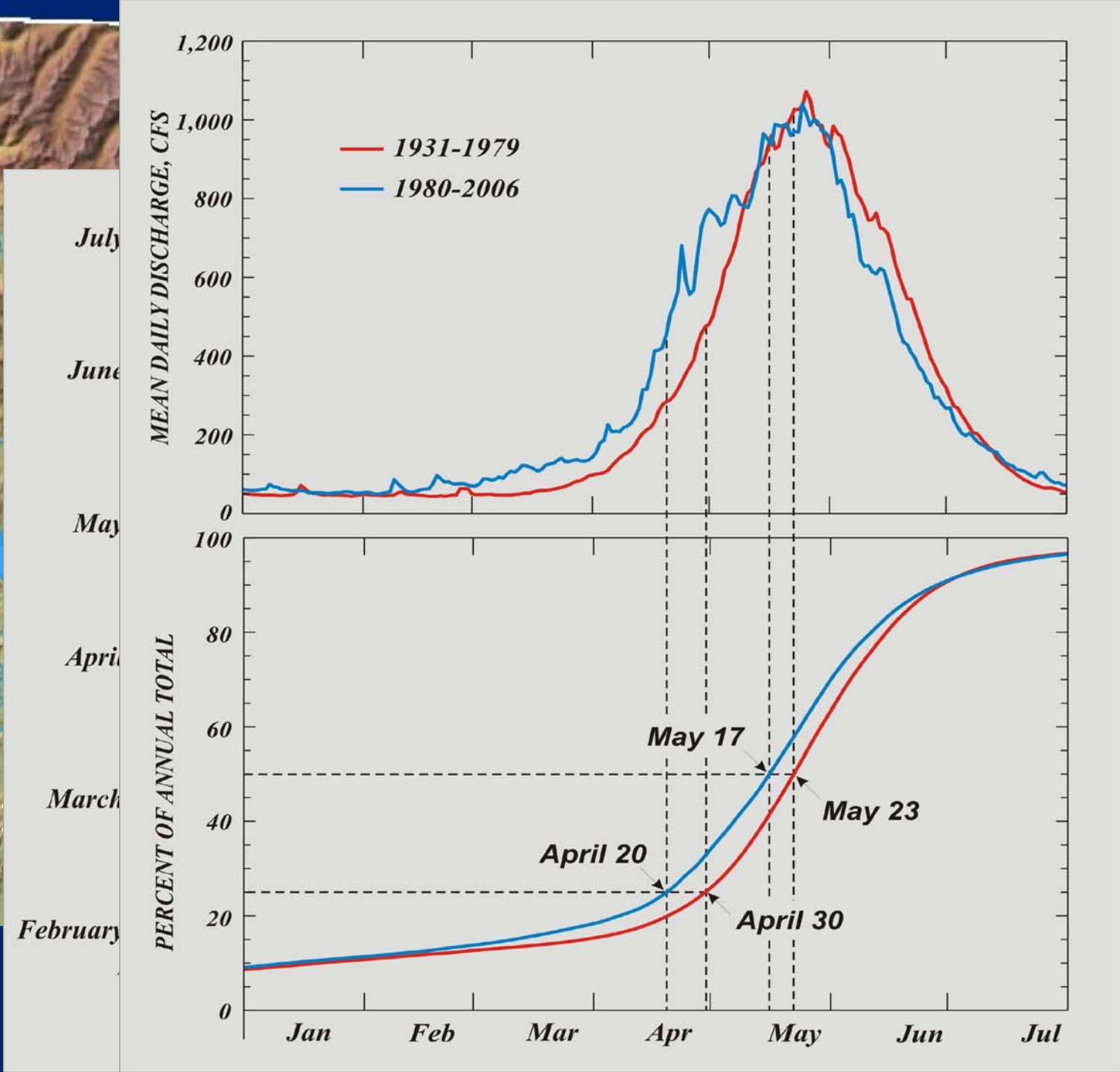

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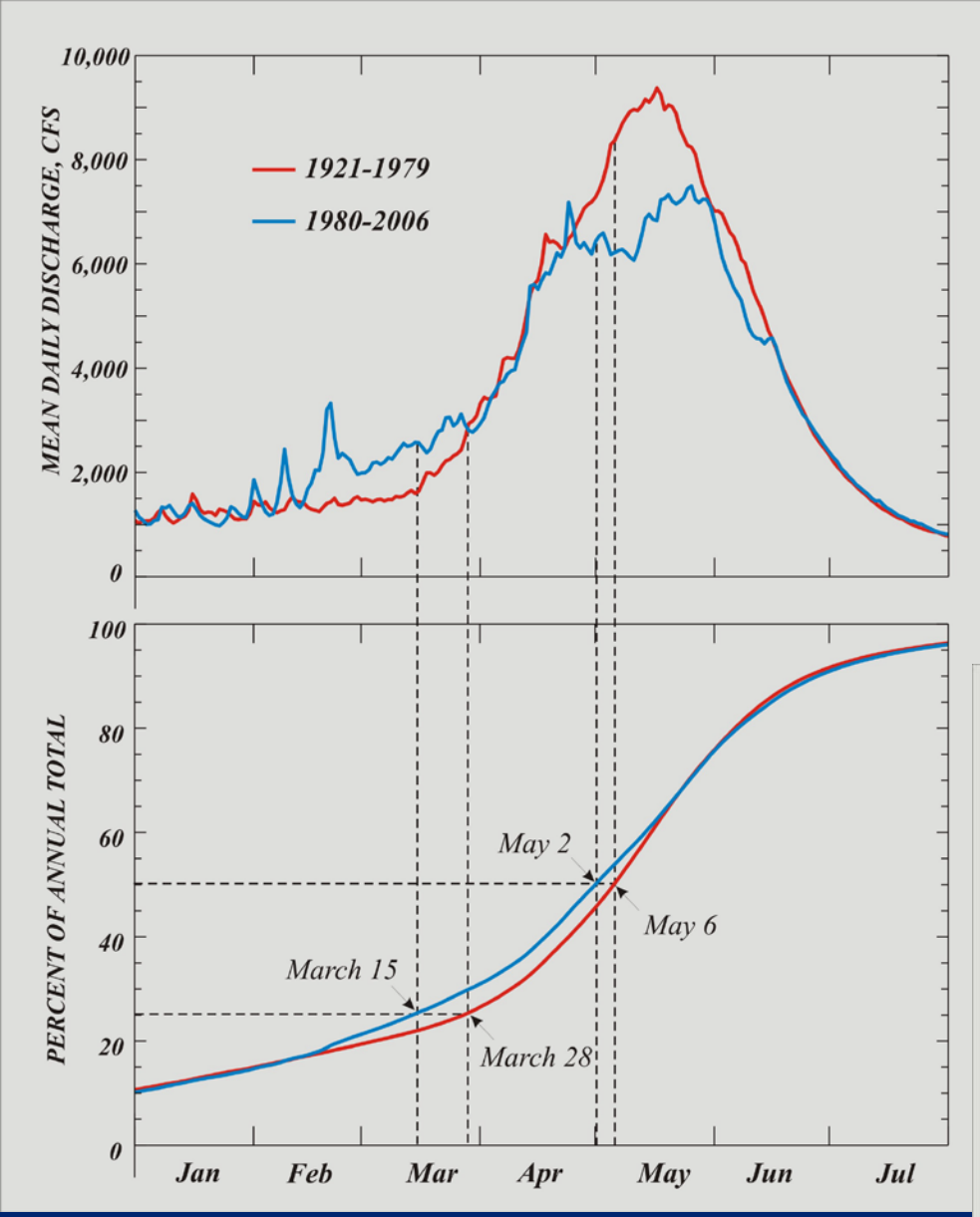
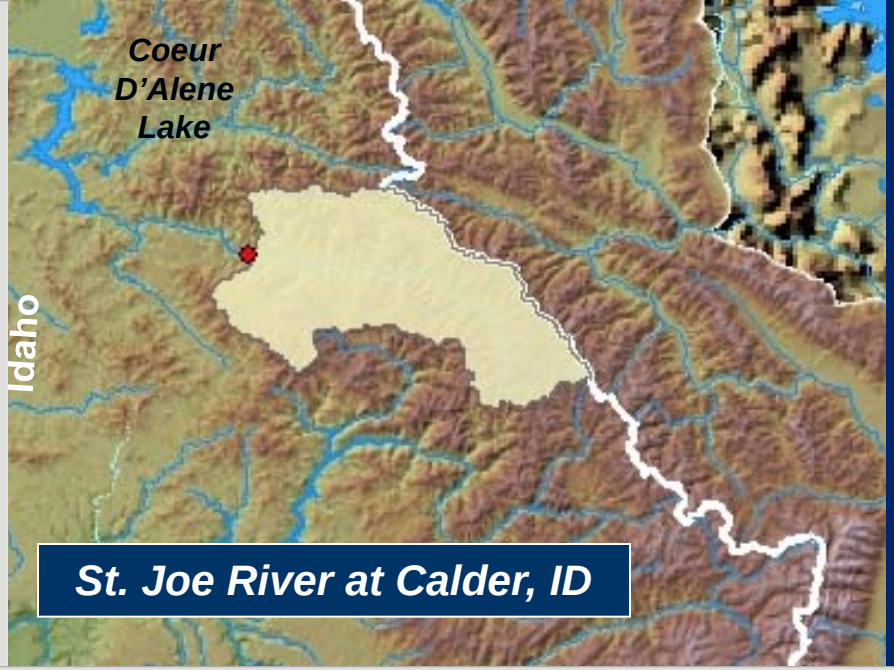
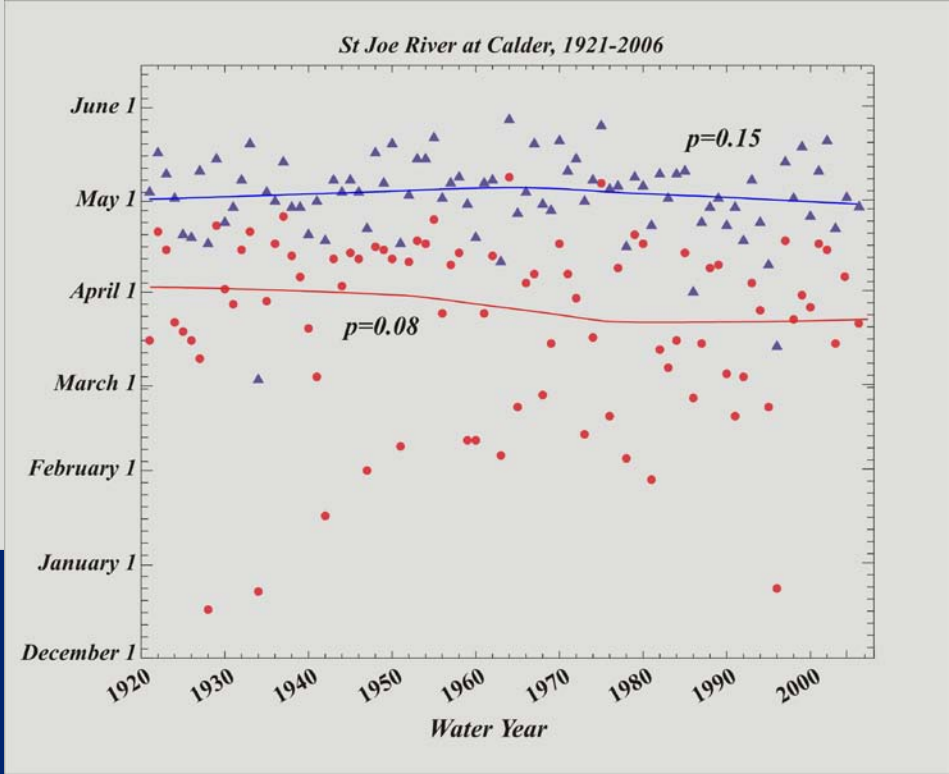
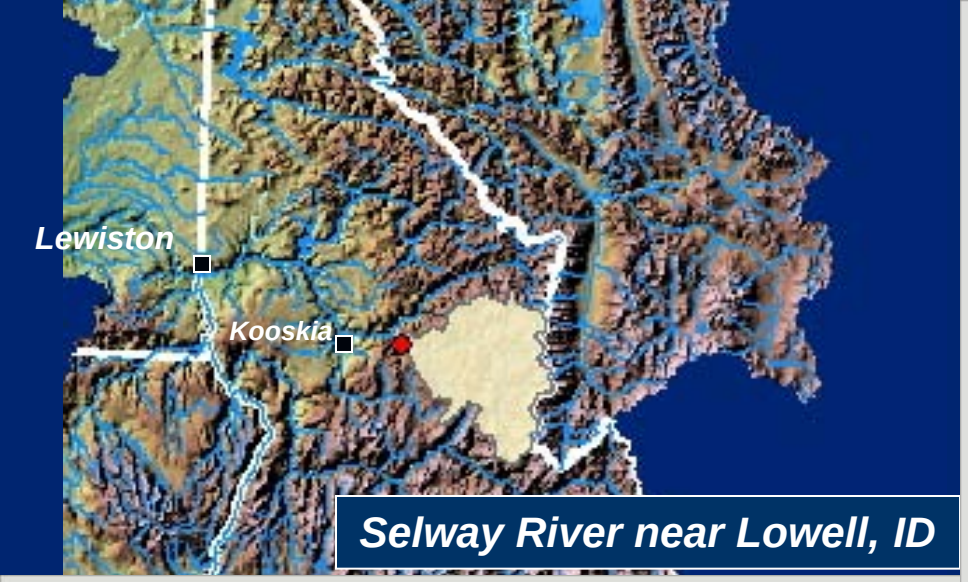
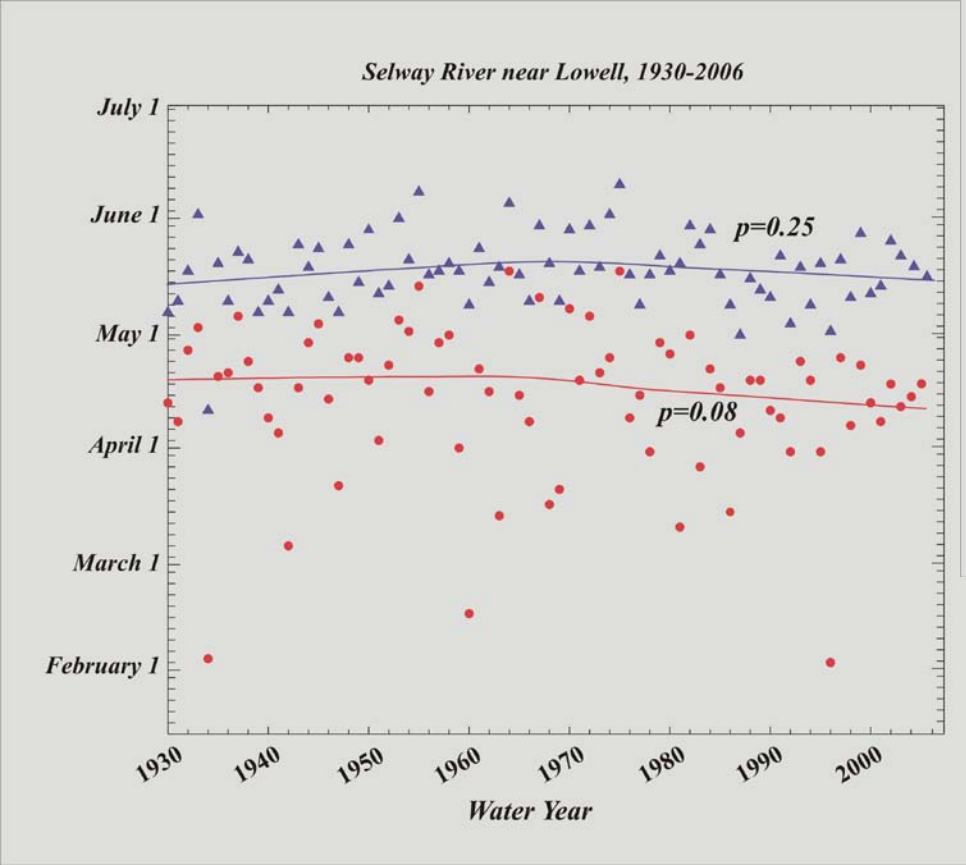
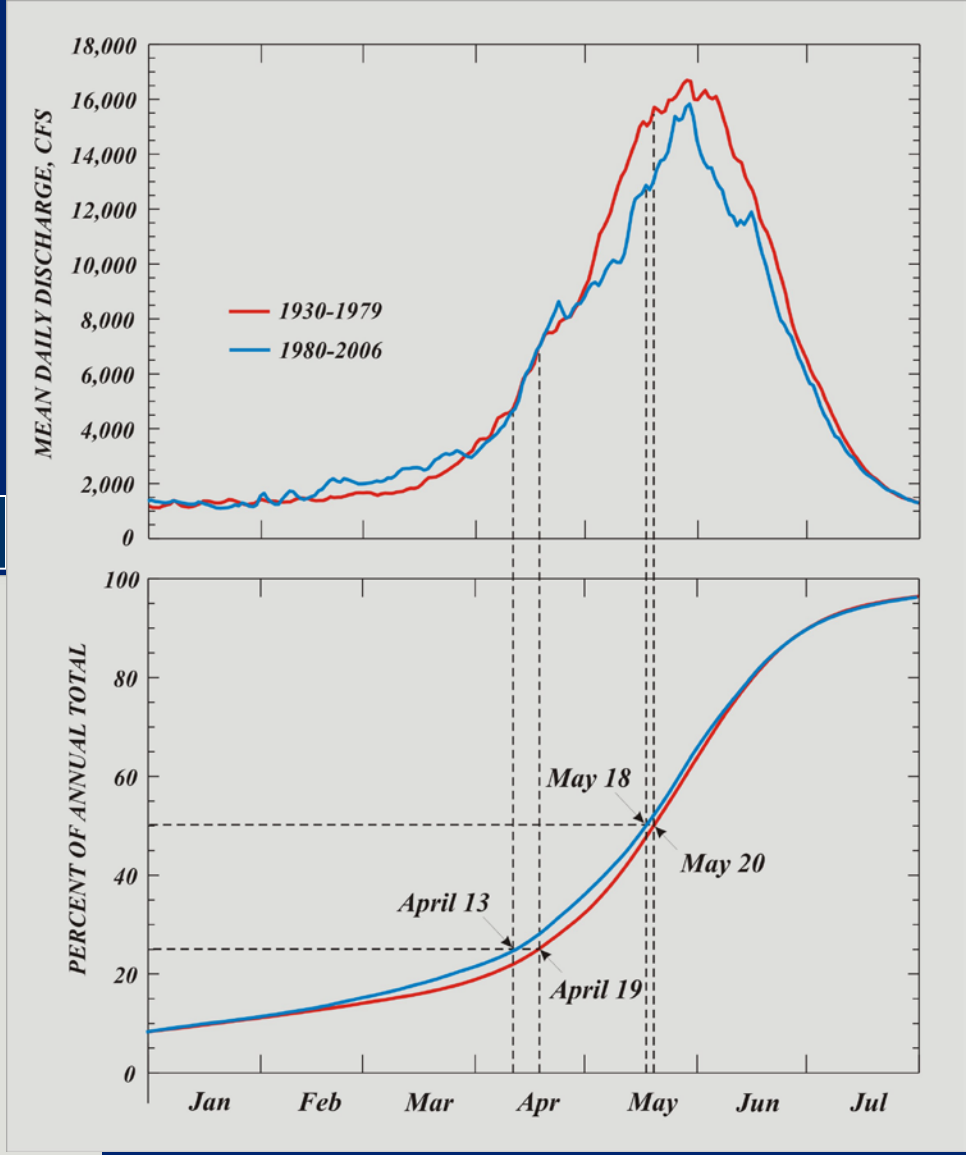

MEAN DAILY DISCHARGE, CFS
10,000
8,000
6,000
4,000
2,000
0
1921-1979
1980-2006
PERCENT OF ANNUAL TOTAL
100
80
60
40
20
0
May 2
May 6
March 15
March 28
Jan
Feb
Mar
Apr
May
Jun
Jul


Coeur
D'Alene
Lake
Idaho
St. Joe River at Calder, ID

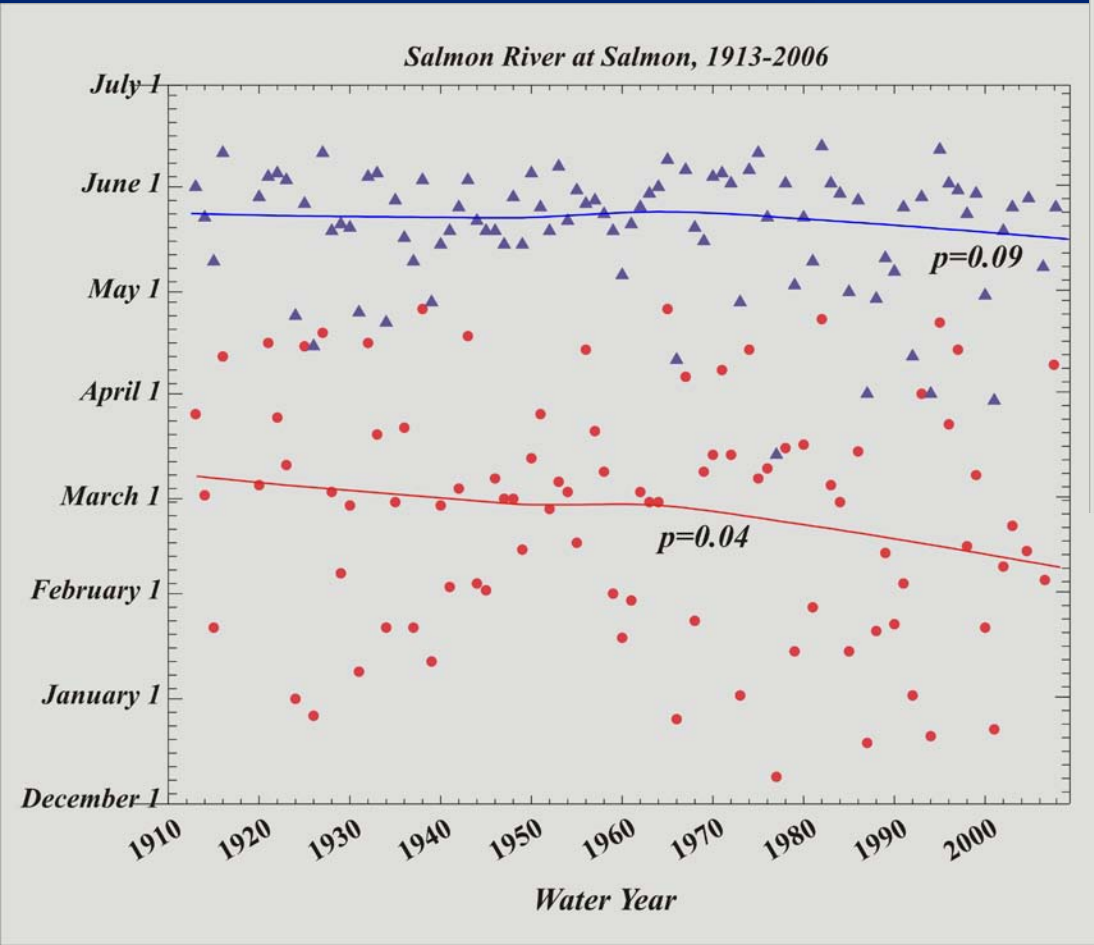

St Joe River at Calder, 1921-2006
June 1
May 1
April 1
March 1
February 1
January 1
December 1
p=0.15
p=0.08
1920
1930
1940
1950
1960
1970
1980
1990
2000
Water Year

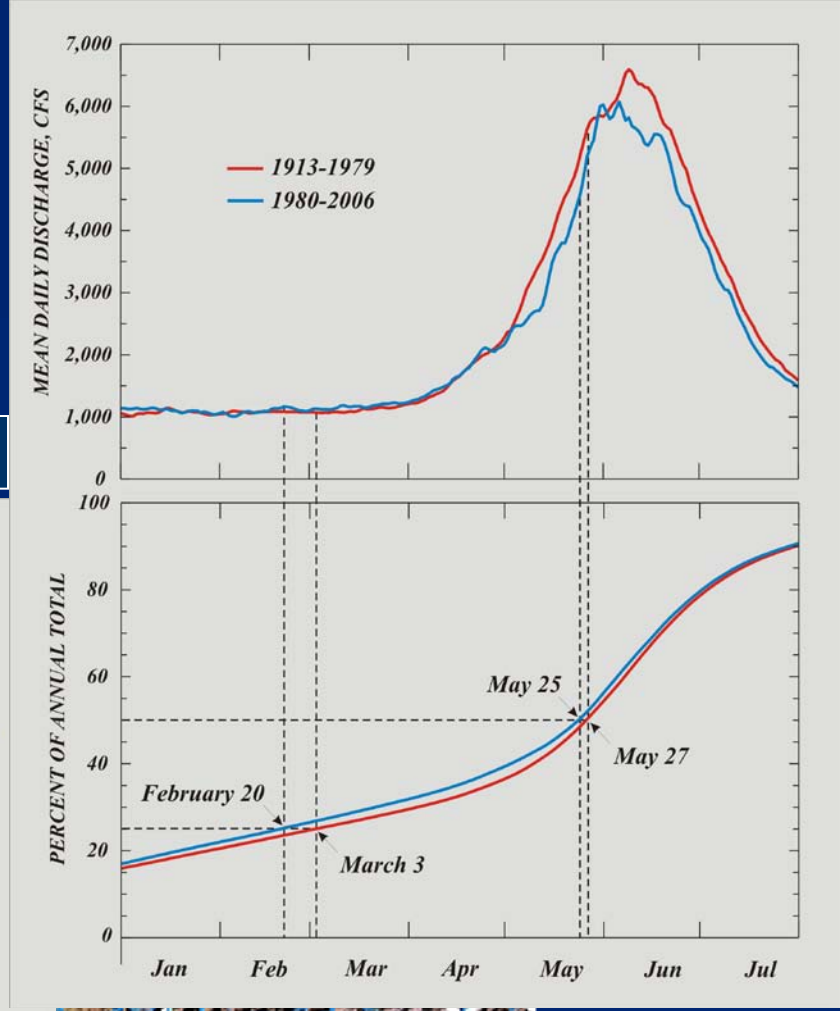

Lewiston
Kooskia
Selway River near Lowell, ID

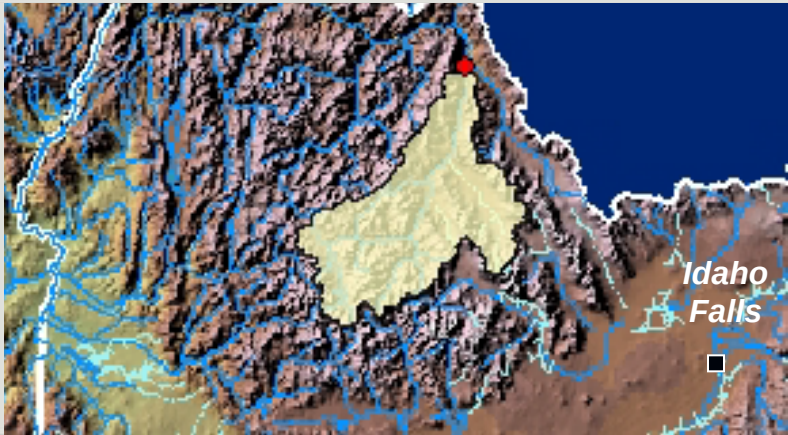

Selway River near Lowell, 1930-2006
July 1
June 1
May 1
April 1
March 1
February 1
p=0.25
p=0.08
1930
1940
1950
1960
1970
1980
1990
2000
Water Year


MEAN DAILY DISCHARGE, CFS
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1930-1979
1980-2006
PERCENT OF ANNUAL TOTAL
100
80
60
40
20
0
May 18
May 20
April 13
April 19
Jan
Feb
Mar
Apr
May
Jun
Jul

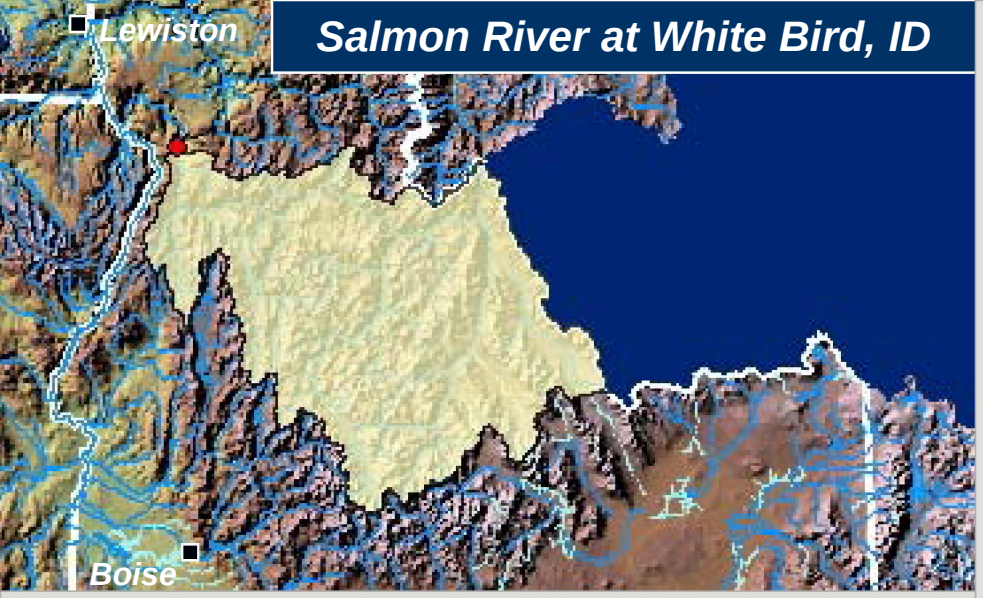
Salmon River at Salmon, ID

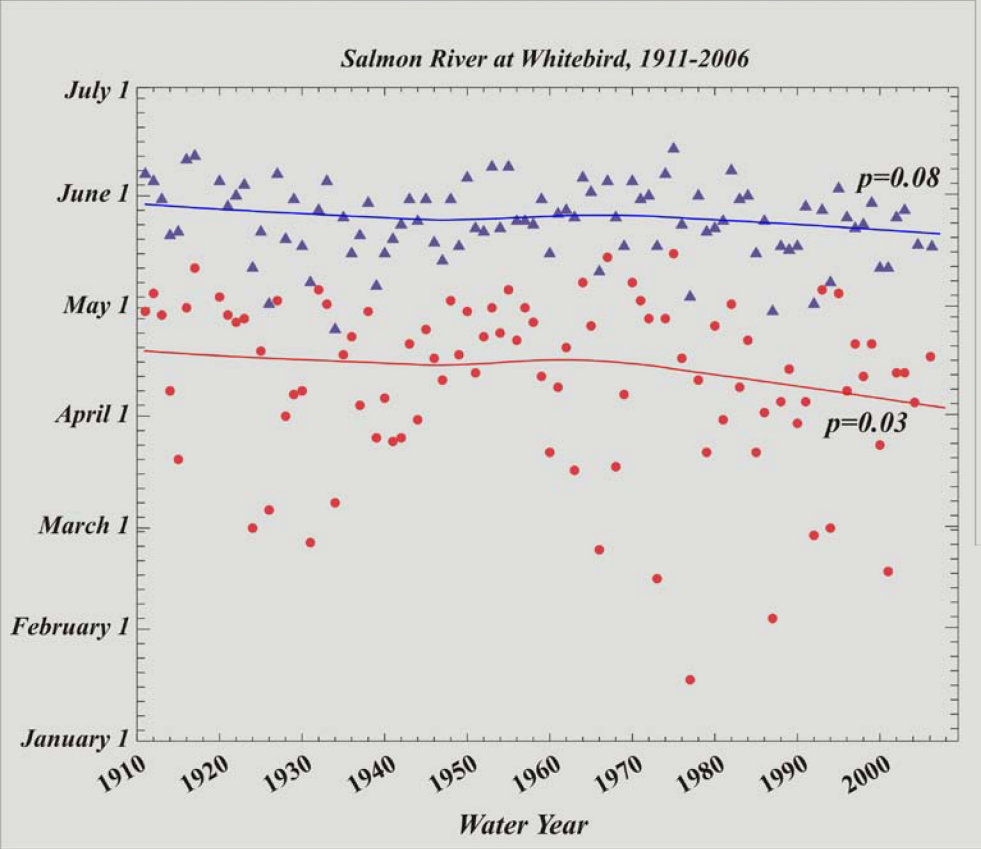


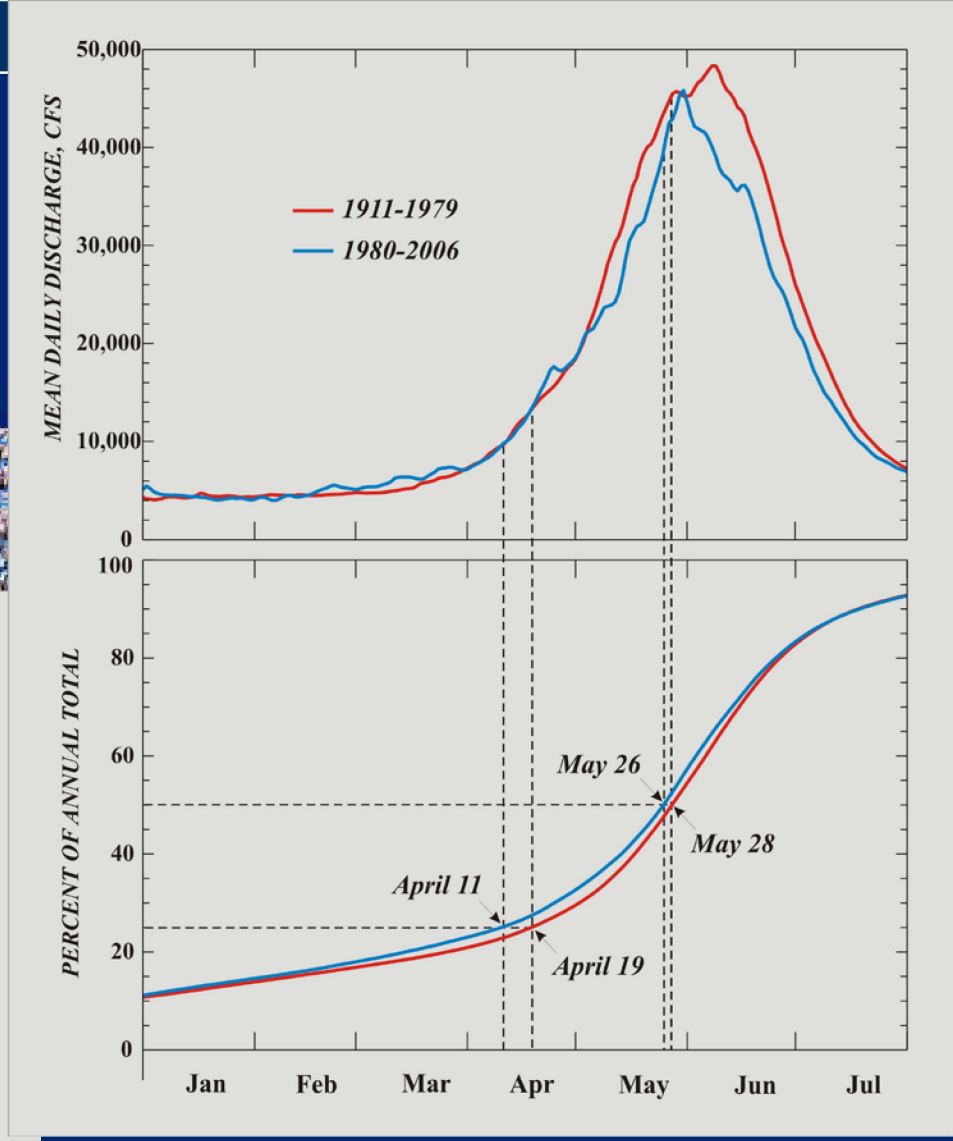




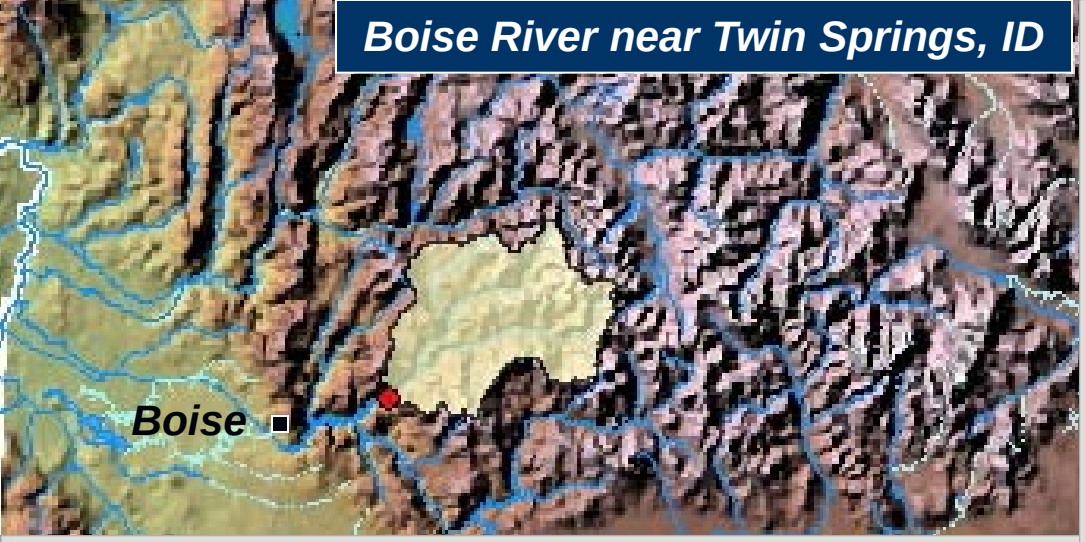
Salmon River at White Bird, ID

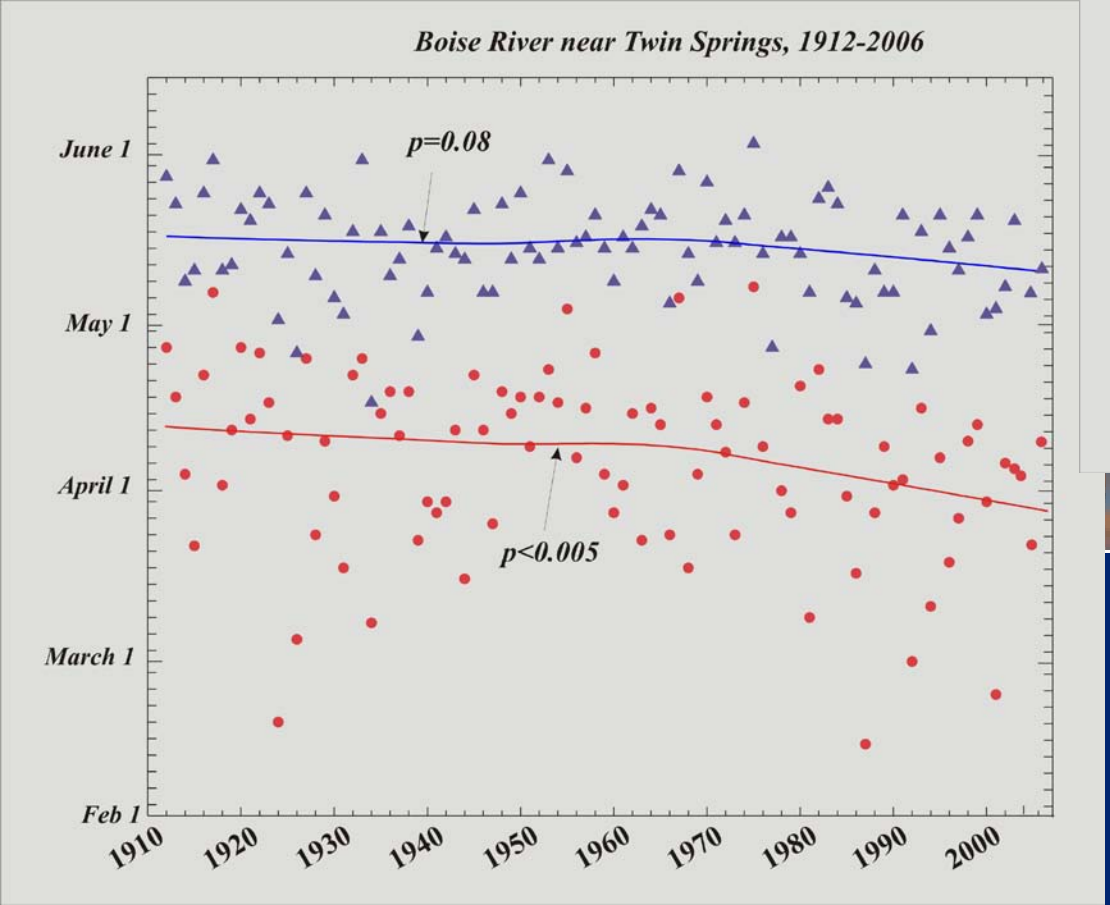


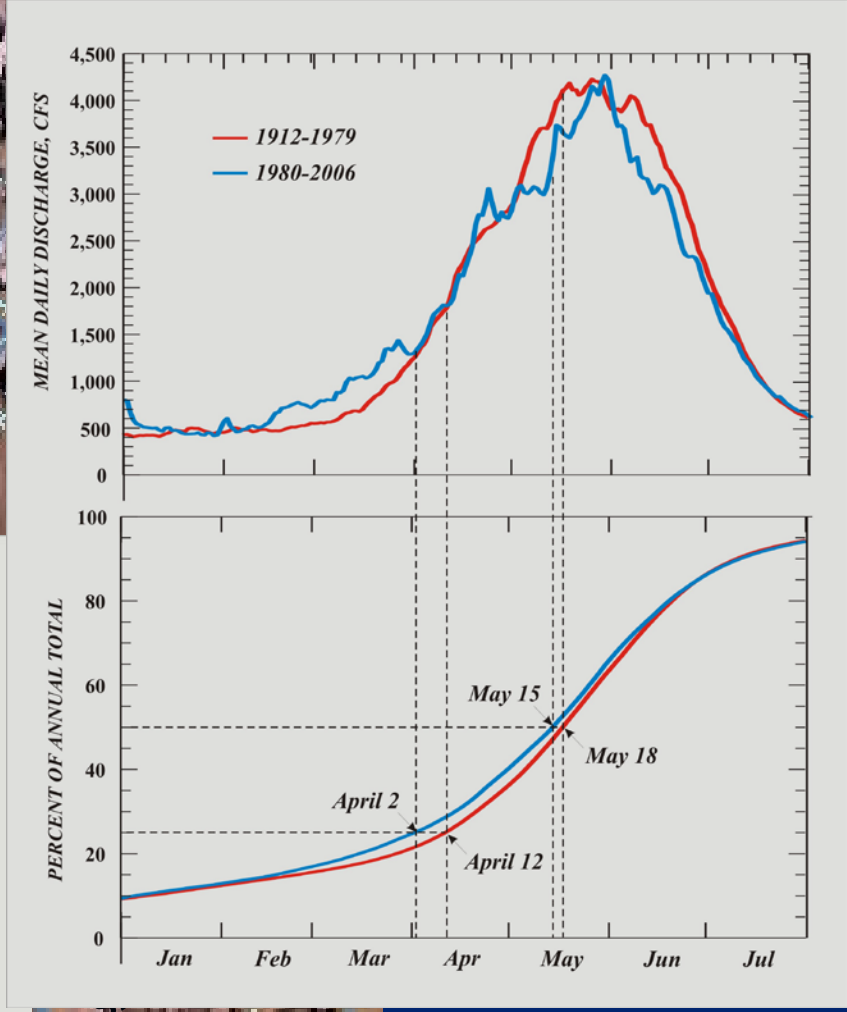




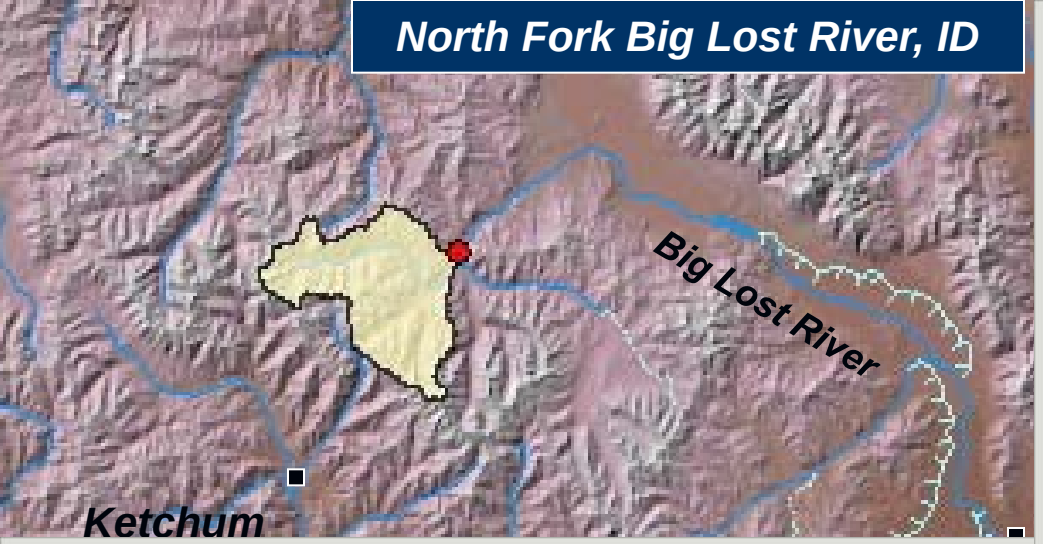
Boise River near Twin Springs, ID

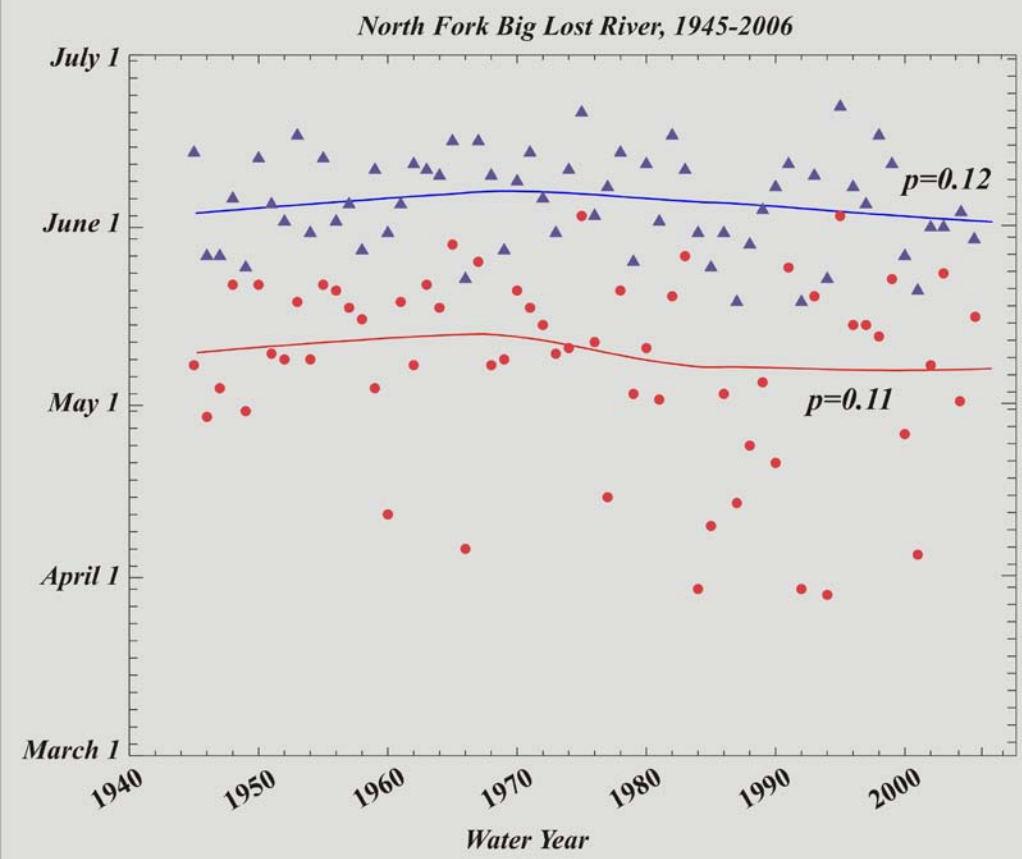


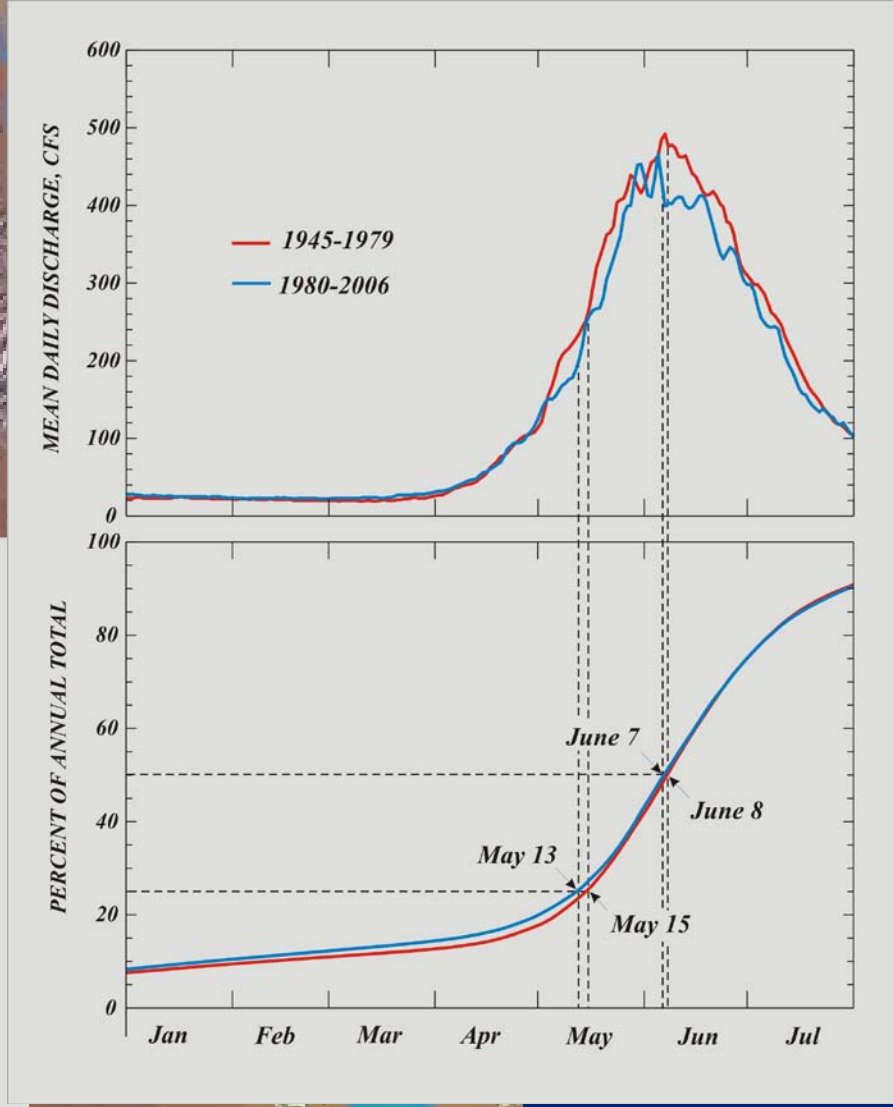


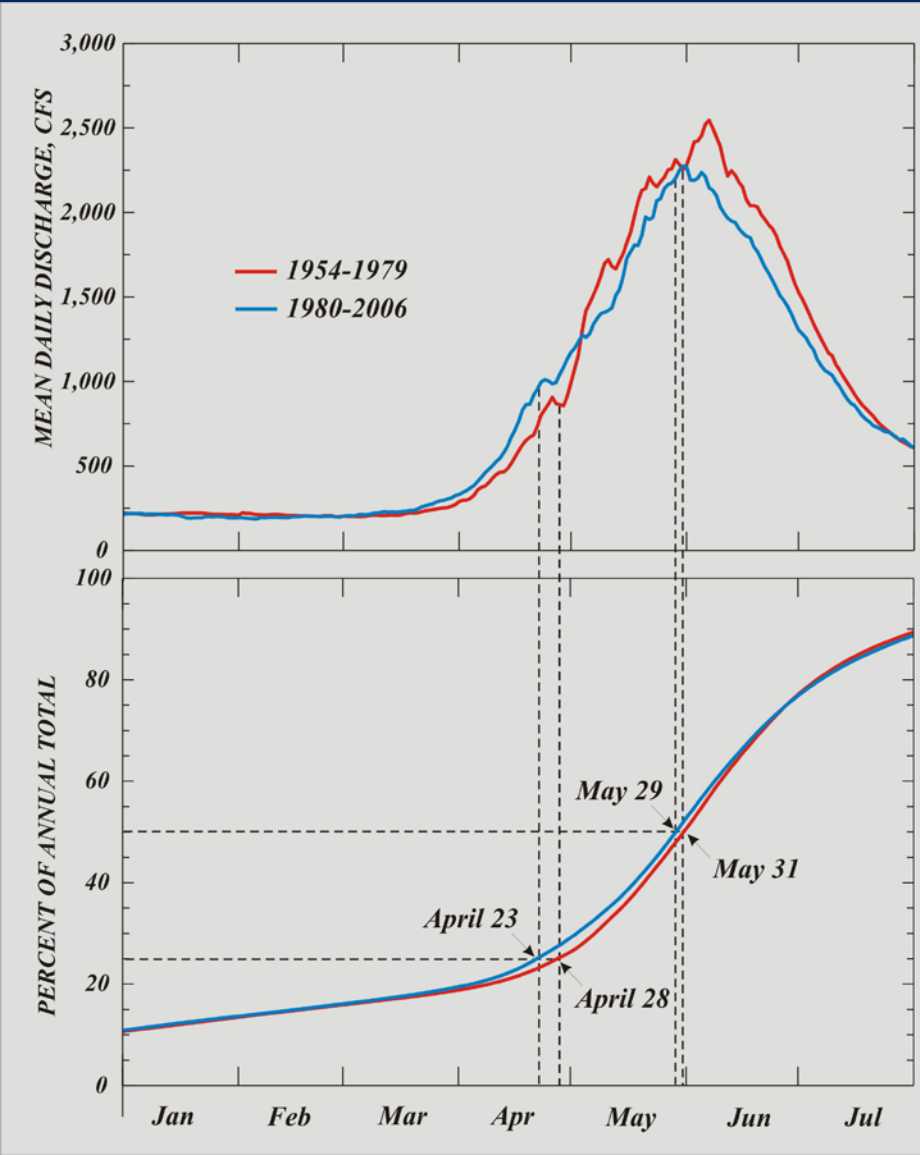


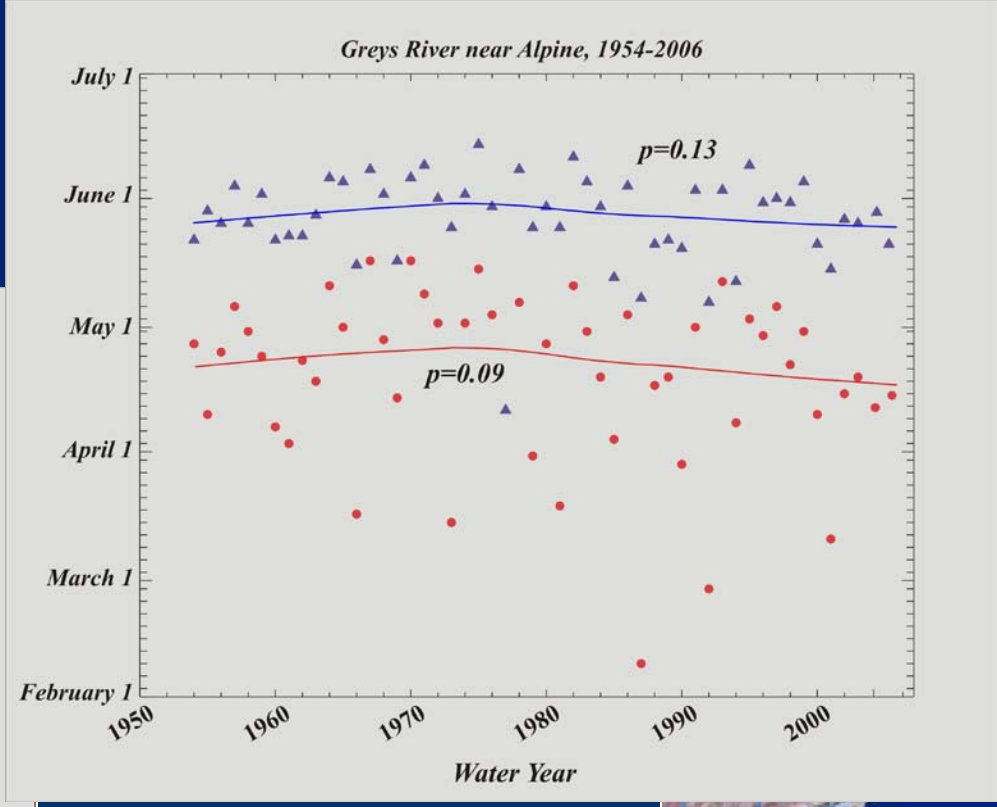
North Fork Big Lost River, ID

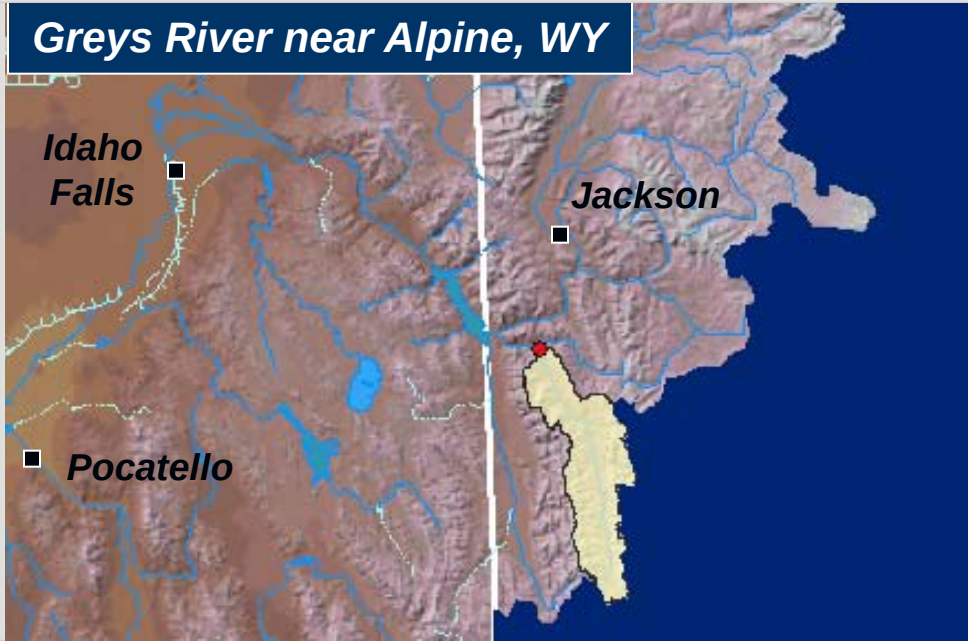






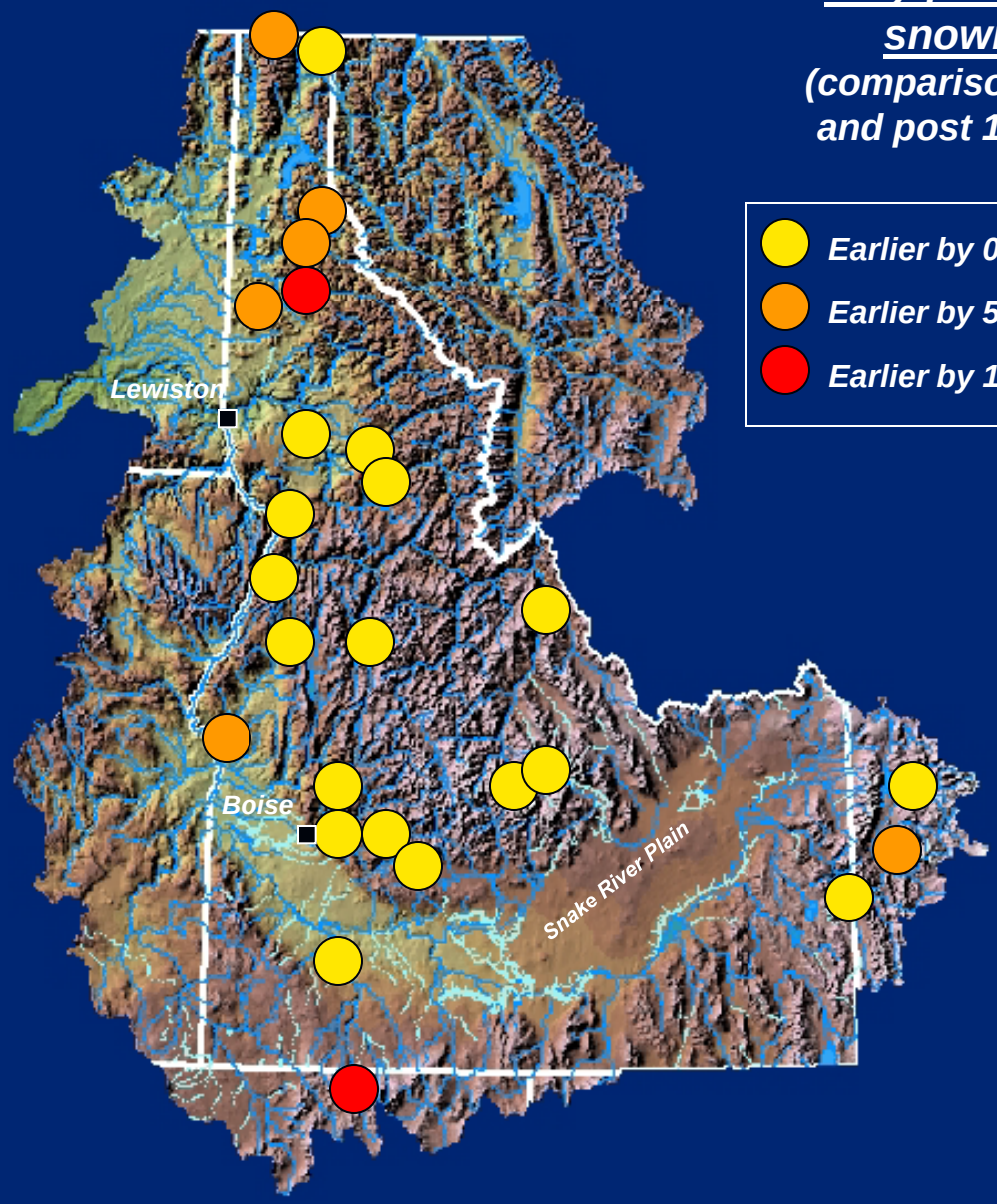

MEAN DAILY DISCHARGE, CFS
3,000
2,500
2,000
1,500
1,000
500
0
1954-1979
1980-2006
PERCENT OF ANNUAL TOTAL
100
80
60
40
20
0
May 29
May 31
April 23
April 28
Jan
Feb
Mar
Apr
May
Jun
Jul


Greys River near Alpine, 1954-2006
July 1
June 1
May 1
April 1
March 1
February 1
p=0.13
p=0.09
1950
1960
1970
1980
1990
2000
Water Year


Greys River near Alpine, WY
Idaho Falls
Jackson
Pocatello

Fifty percent of annual snowmelt runoff

(comparison of average pre and post 1980 runoff data)



- Earlier by 0-4 days (18 sites)
- Earlier by 5-9 days (6 sites)
- Earlier by 10 days or more (2 sites)

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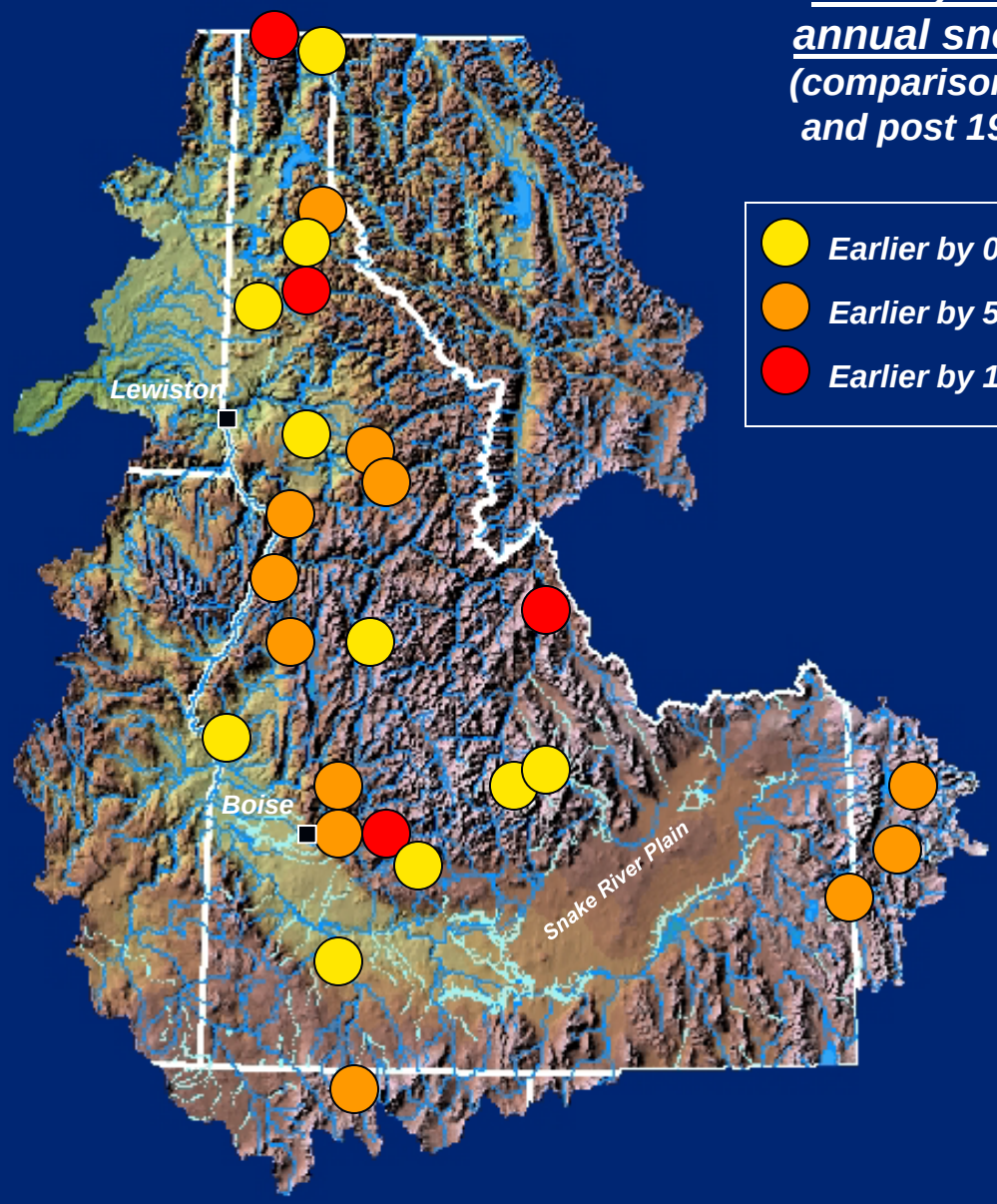
Twenty-five percent of annual snowmelt runoff

(comparison of average pre and post 1980 runoff data)



- Earlier by 0-4 days (10 sites)
- Earlier by 5-9 days (12 sites)
- Earlier by 10 days or more (4 sites)

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Summary

- As a group, the first 7 years of this decade have been some of the driest on record. This is especially evident in central and southern Idaho.
- There is an apparent increase in the variability of annual mean discharge in the last 25-30 years. Timing of runoff also appears to be increasingly variable with runoff occurring earlier as compared to historical patterns.
- Based on the 26 stations examined, on average, the first quartile of the annual runoff occurred between 1 and 13 days earlier during 1980-2006 as compared with the average prior to 1980. The first half of annual runoff occurred between 0– 10 days earlier.
- At a number of the stations evaluated, the earlier onset of runoff has resulted in a decrease in the annual peak discharge and overall flattening of the annual hydrograph.
- Records from long-term gaging stations on unregulated streams are a valuable tool for examining historical changes in stream discharge, basin runoff characteristics, and climatic changes.