

Impacts of Climate Change on Frequency of Droughts in Idaho



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Purpose:

Attempt to determine if changes in climate have resulted in detectable changes in the frequency of low flows for the headwaters of the Boise River in Idaho.



Approach:

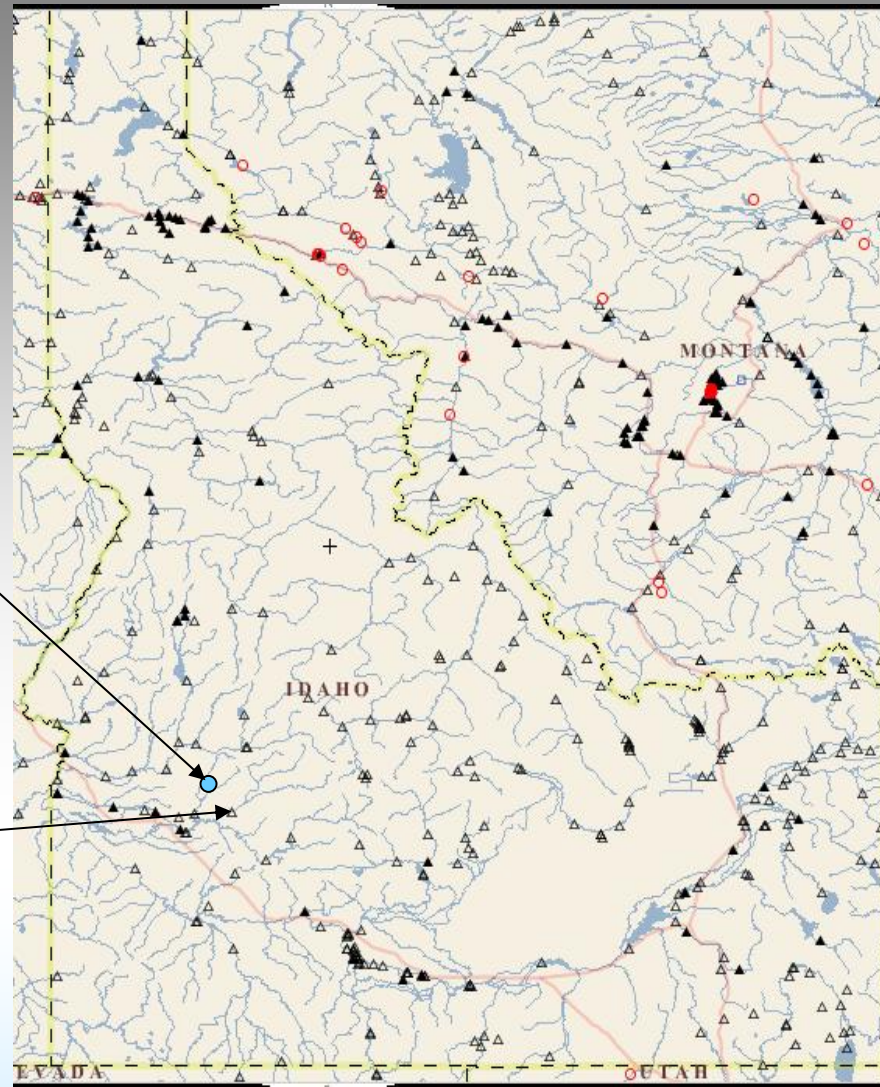
- Select stream flow gage station with:
 - Undisturbed flows; and
 - Long record of flows.
- Select meteorological station near gaging site with:
 - Temperature Records;
 - Precipitation Records.
- Determine if trends in records are apparent
- Analyze if changes in mean and variance of flows are detectable using split data set analyses
- Determine changes in low-flow frequencies



Study Location

NWS Gage 104442
Idaho City, ID
Period of Record
1931 - 2006

USGS Gage 13185000
Boise River Near Twin Springs
Period of Record
1911 - 2005

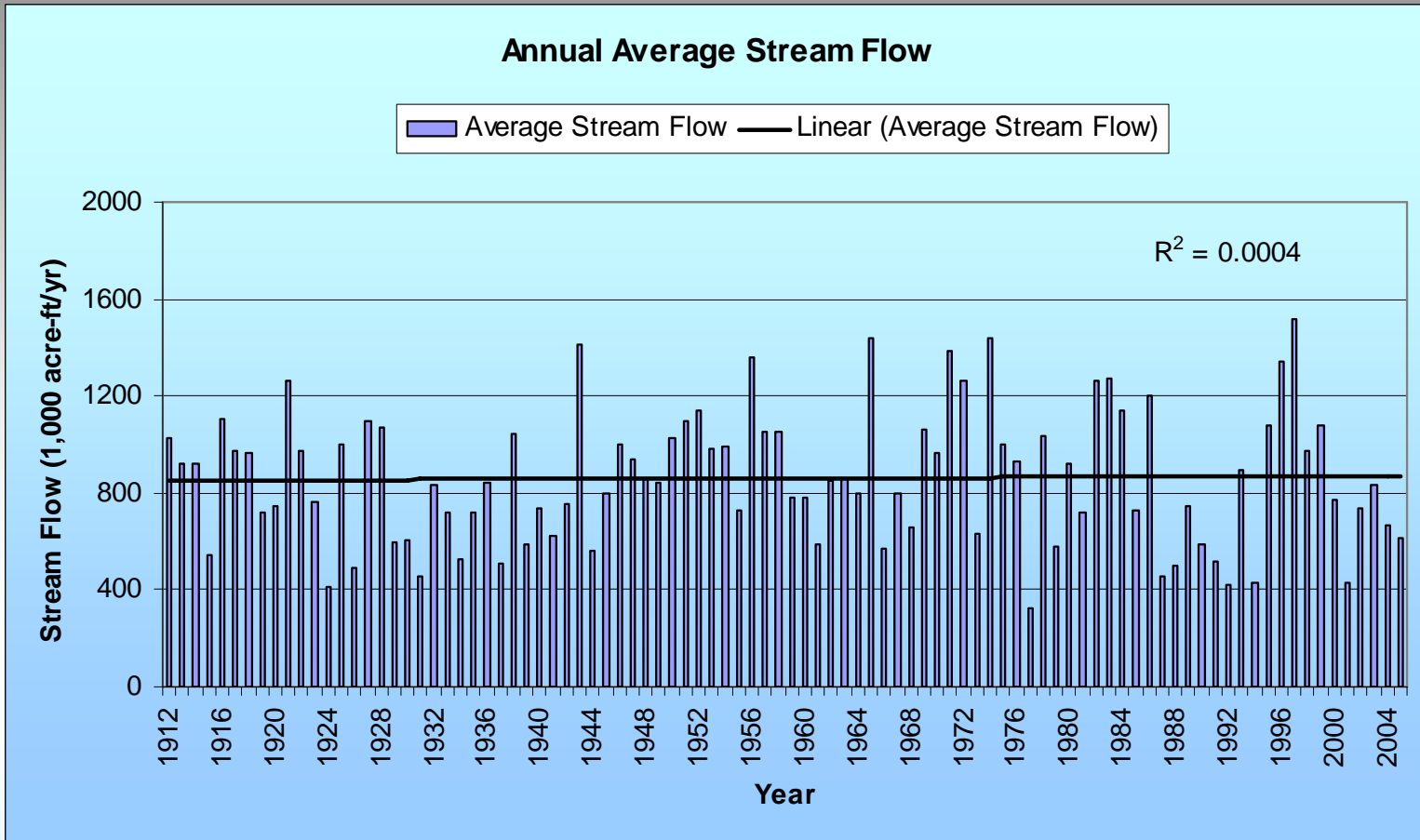


From USGS Annual Water Data Reports Mapper

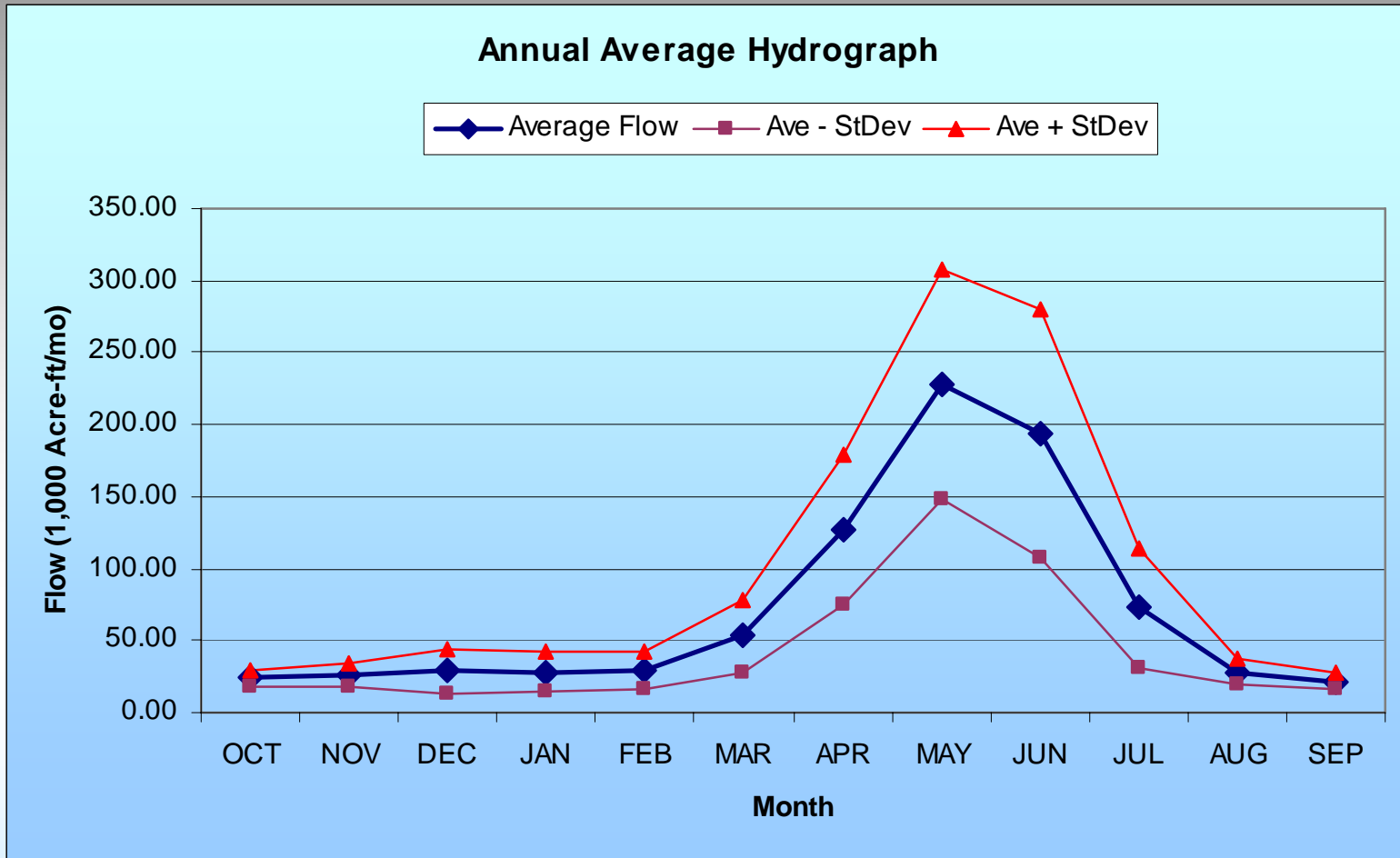
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Historical Flows in the Boise River

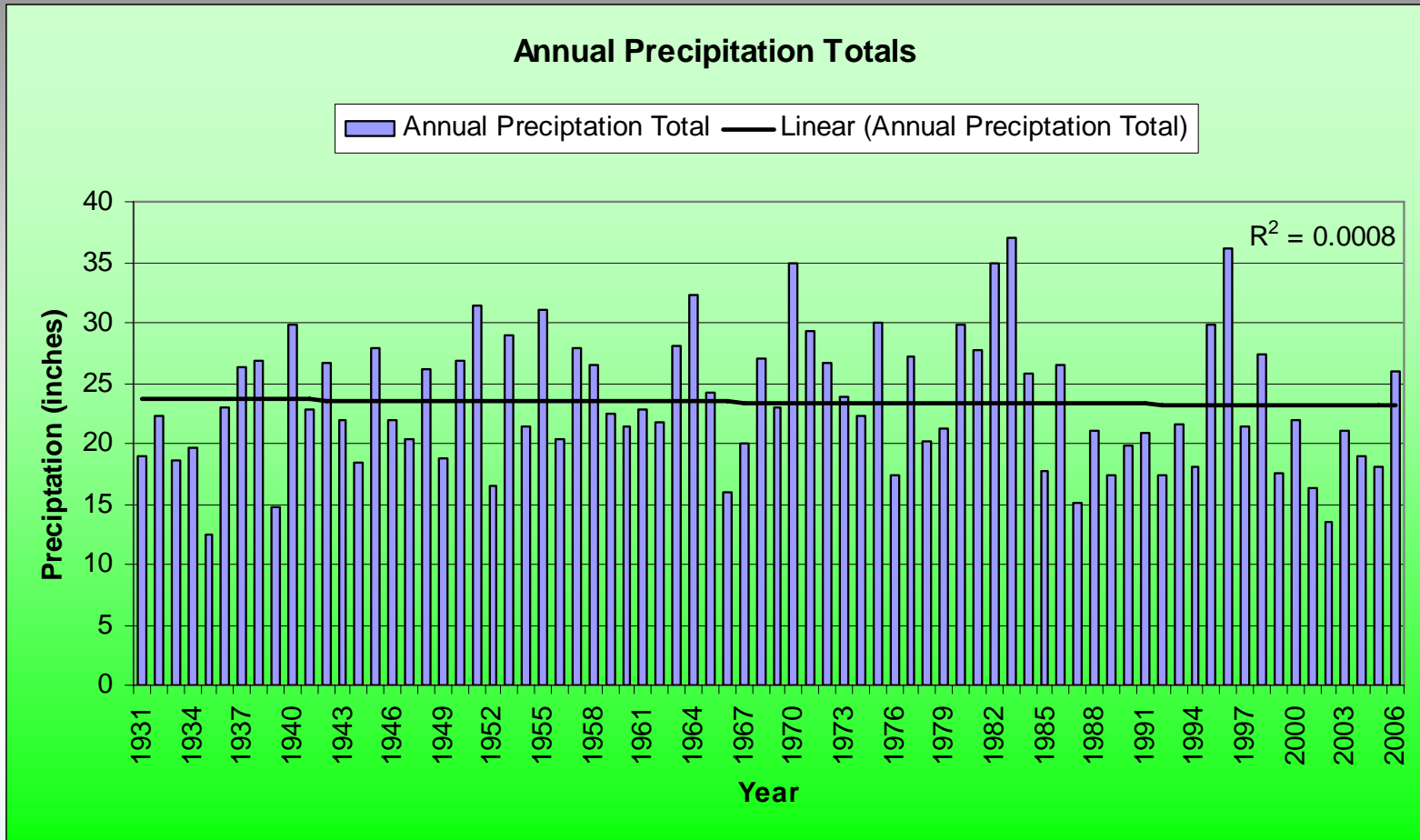
USGS Gage 13185000



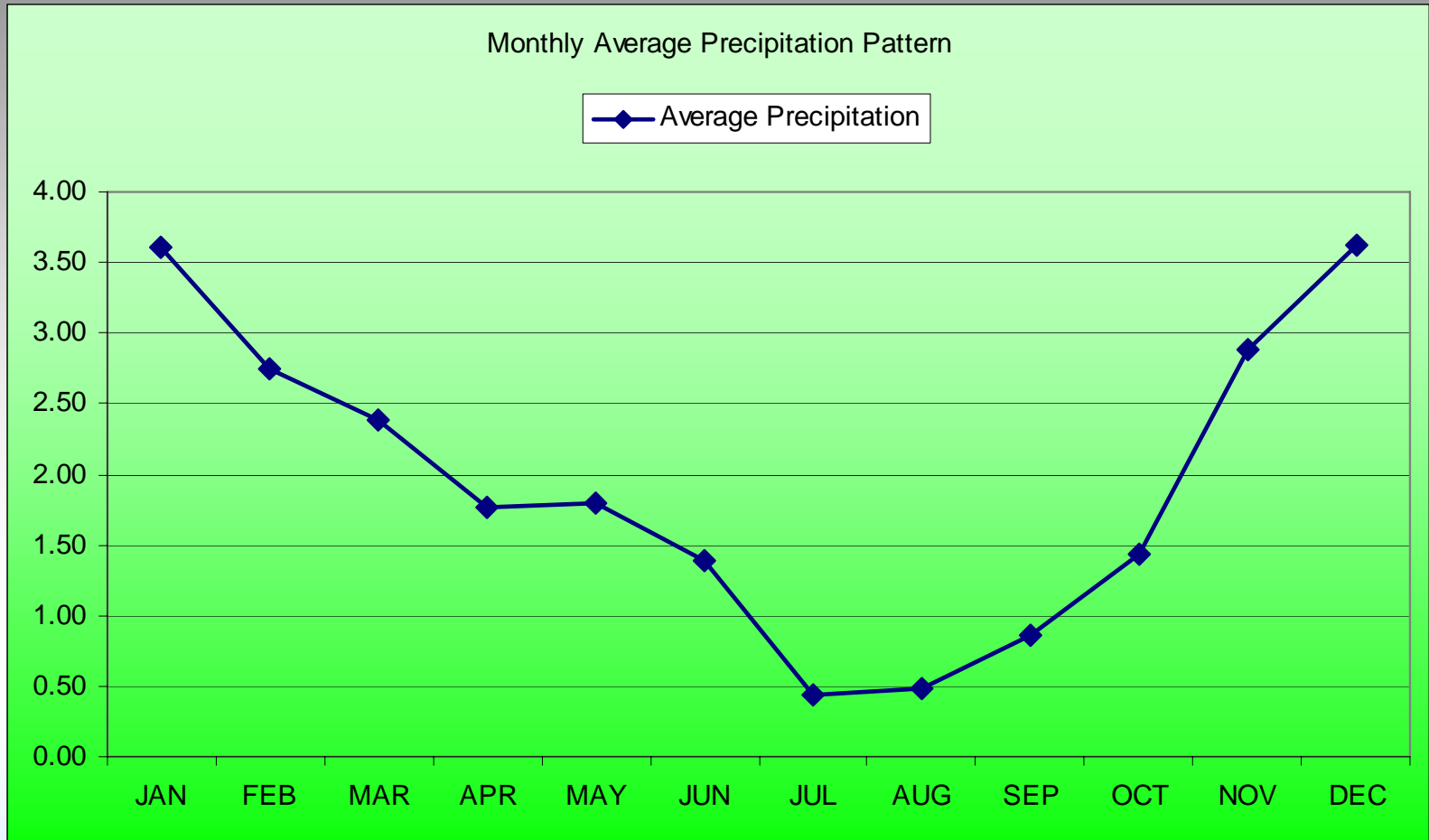
Annual Hydrograph in the Boise River USGS Gage 13185000



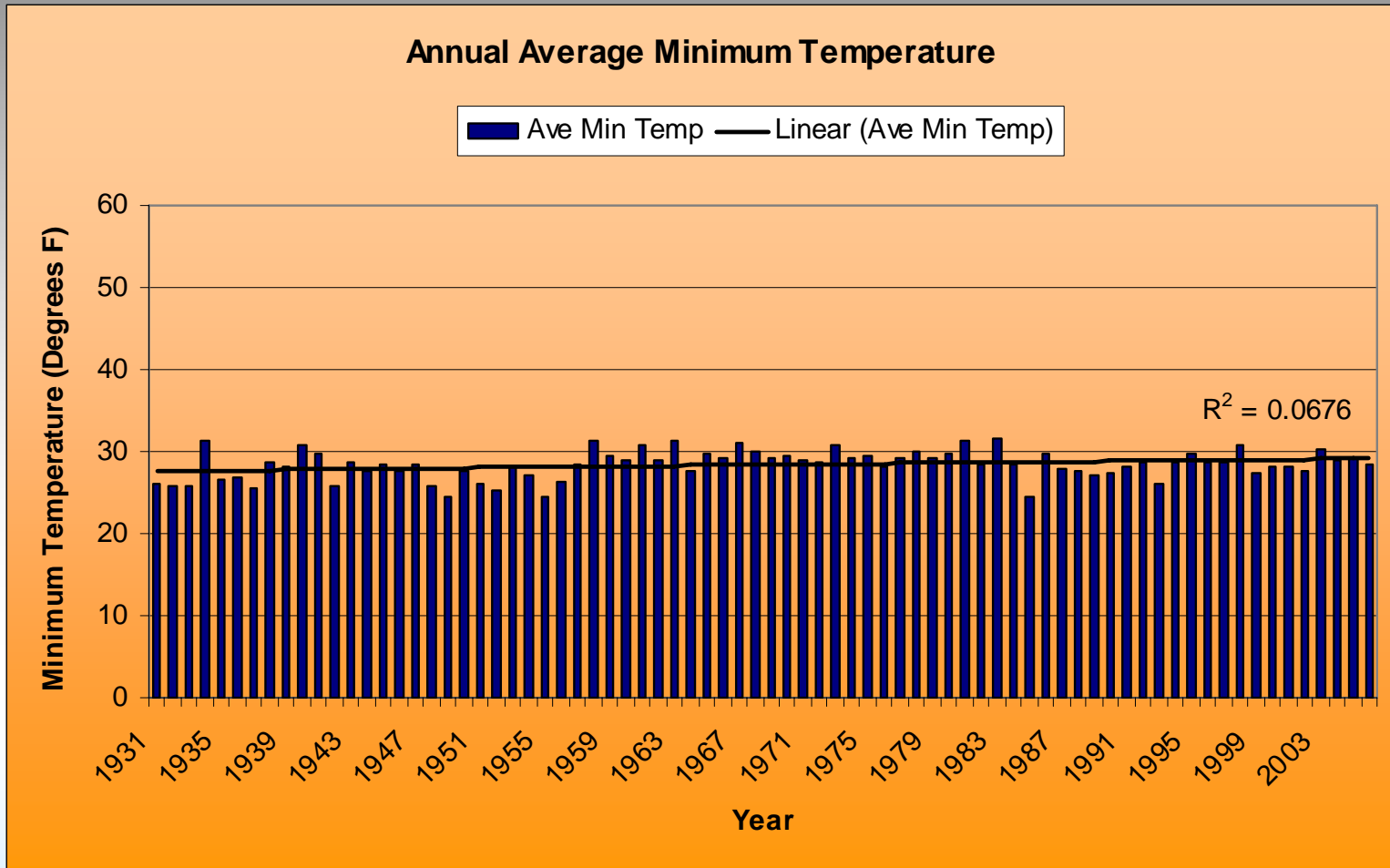
Historical Annual Precipitation Idaho City, ID - NWS Gage 104442



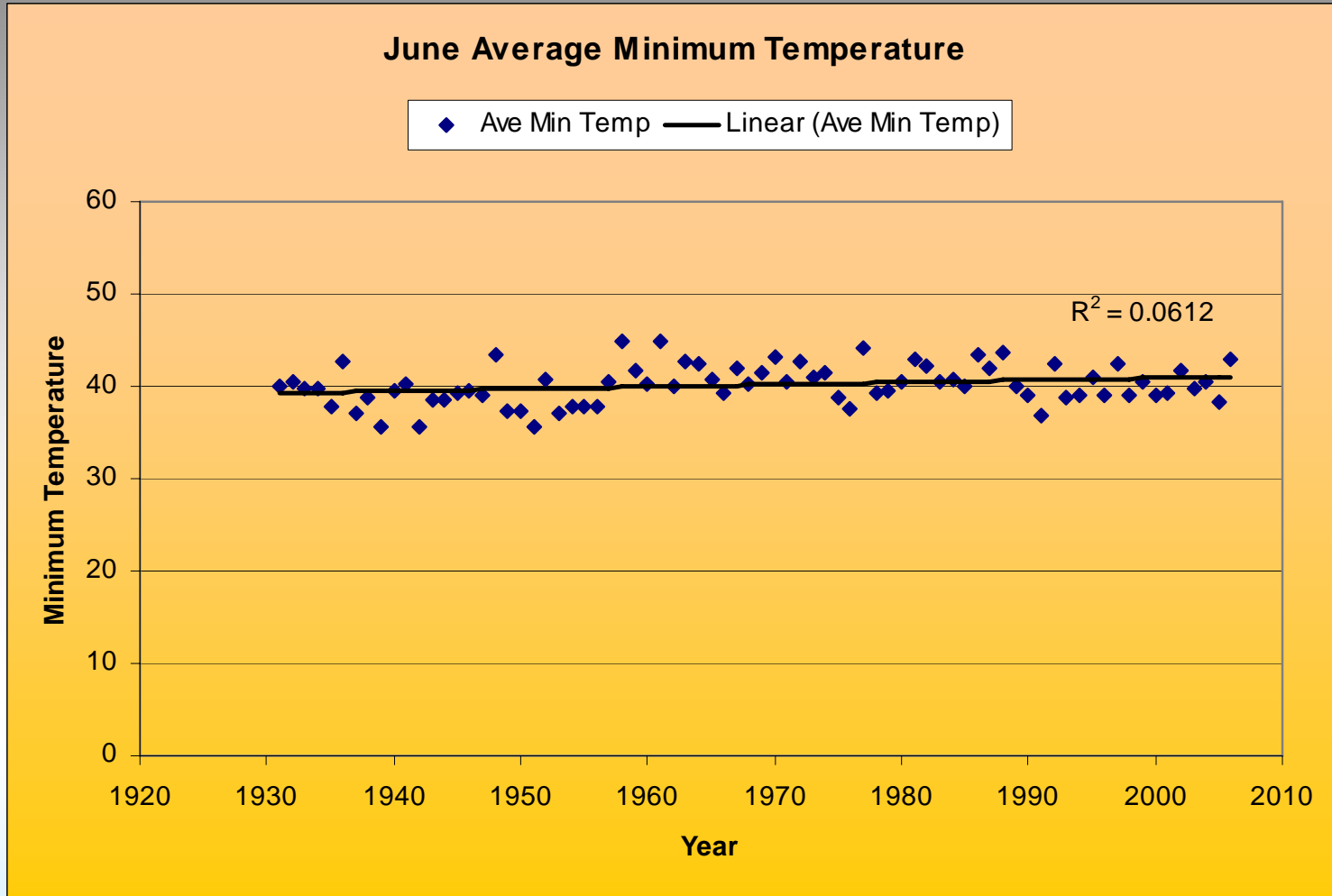
Monthly Average Precipitation Idaho City, ID - NWS Gage 104442



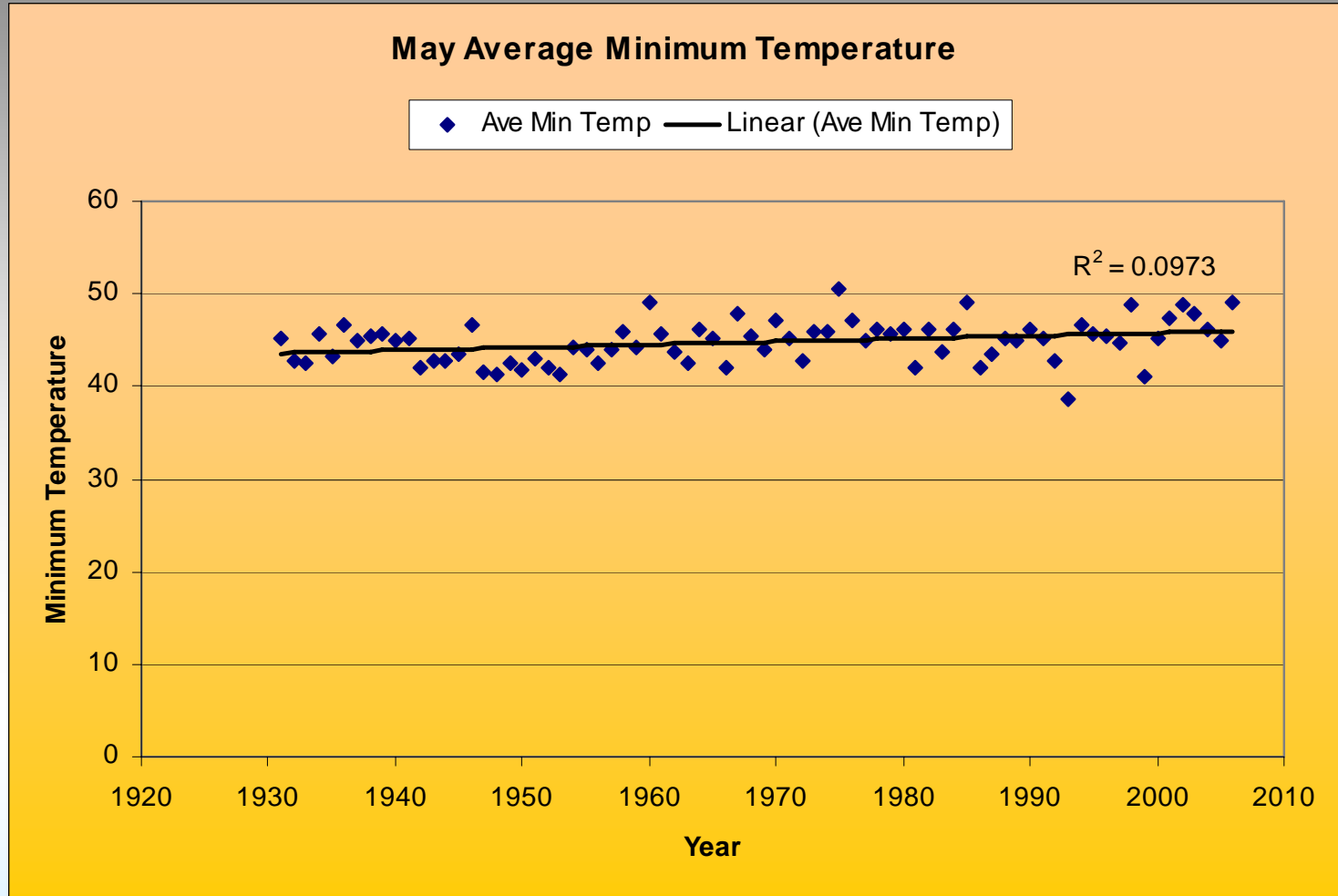
Minimum Average Annual Temperature Idaho City, ID - NWS Gage 104442



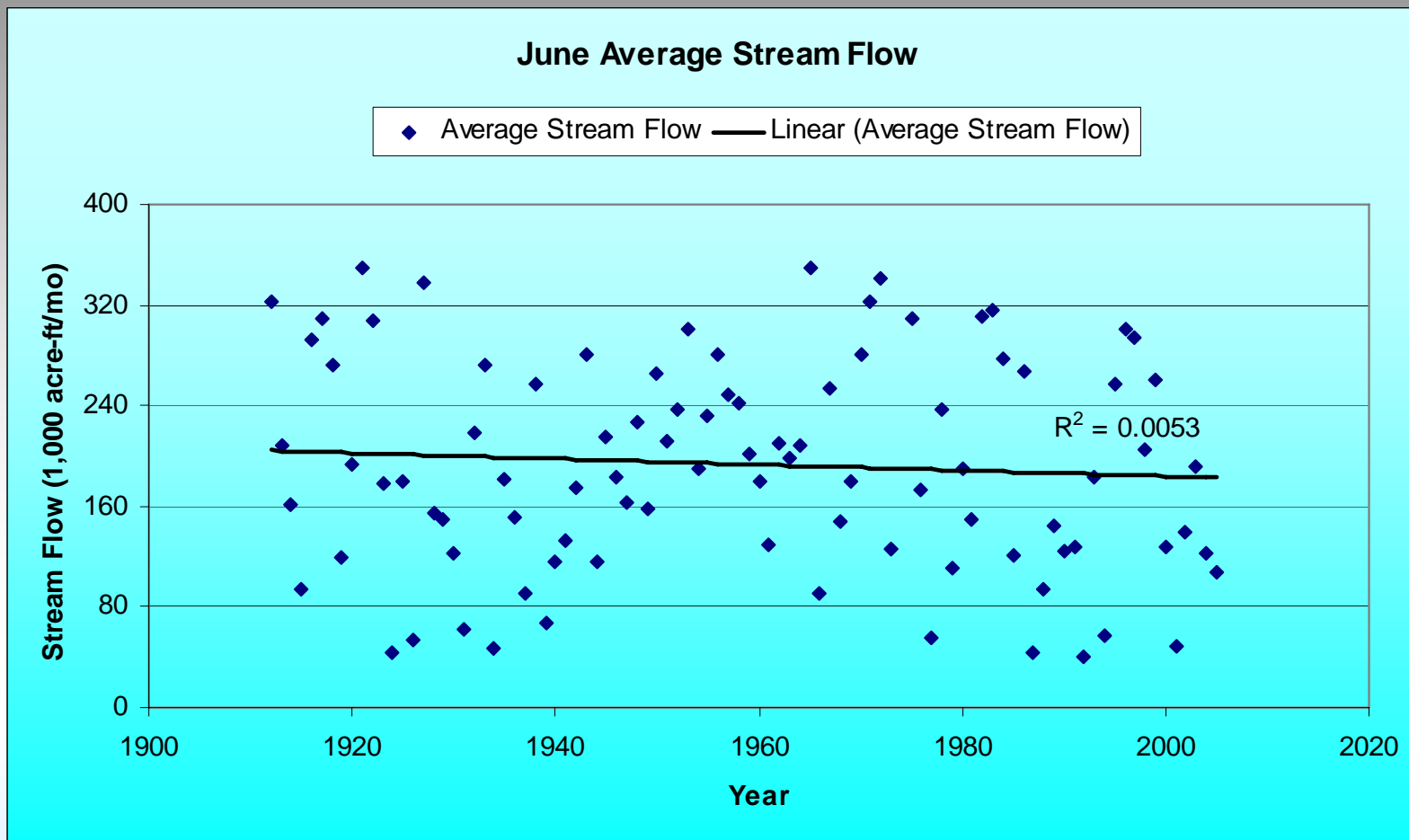
Minimum June Temperatures Idaho City, ID - NWS Gage 104442



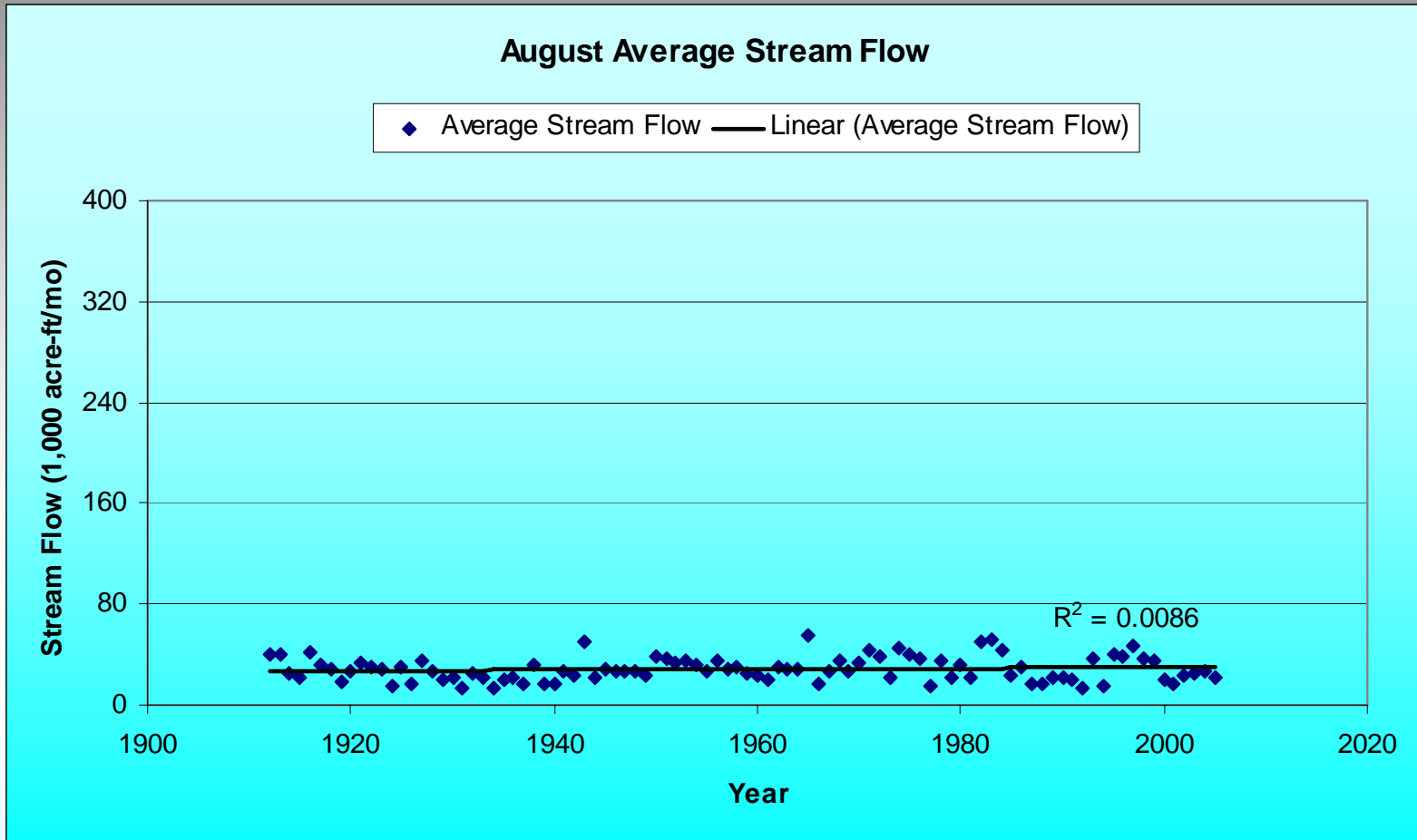
Minimum May Temperatures Idaho City, ID - NWS Gage 104442



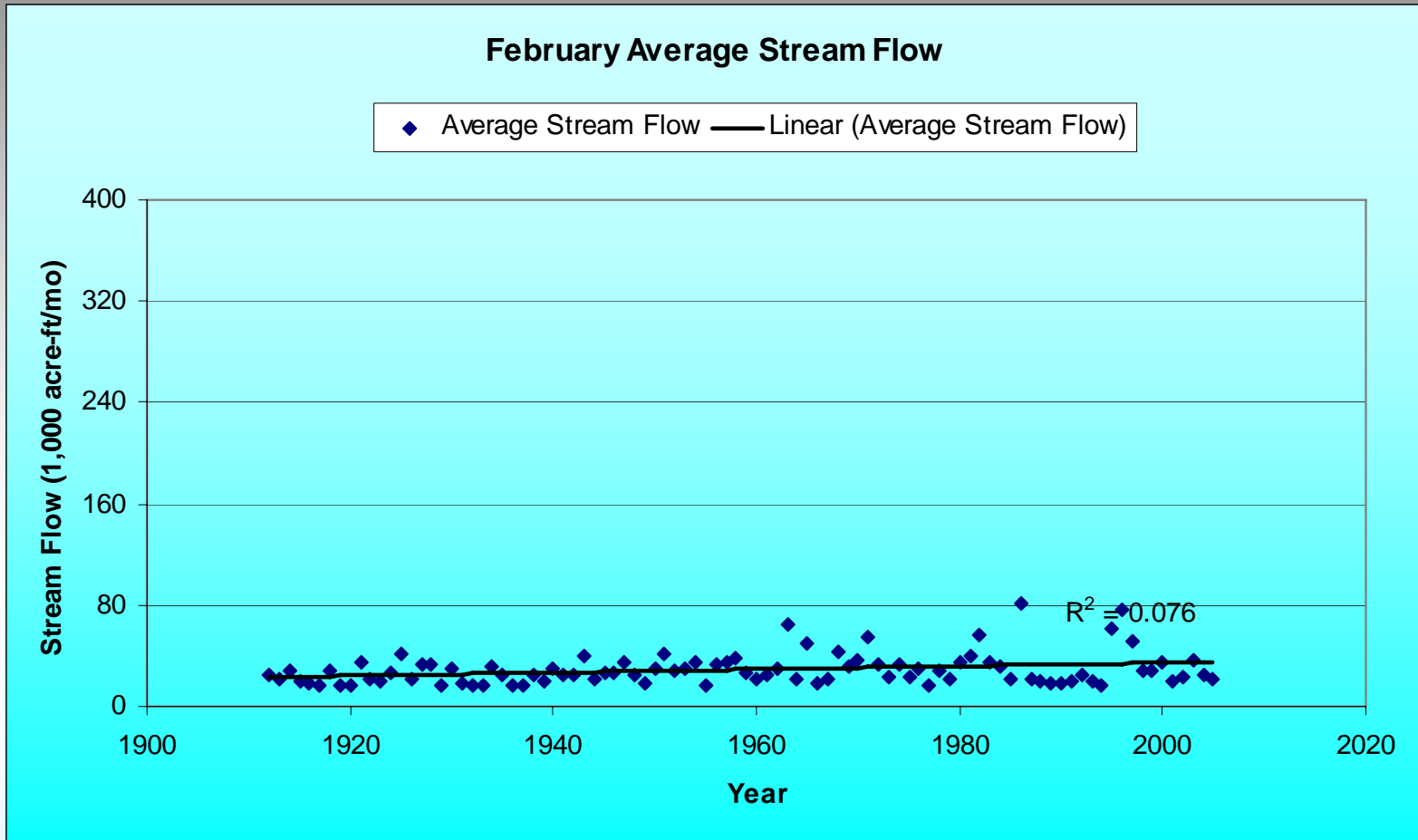
Historical June Flows in the Boise River USGS Gage 13185000



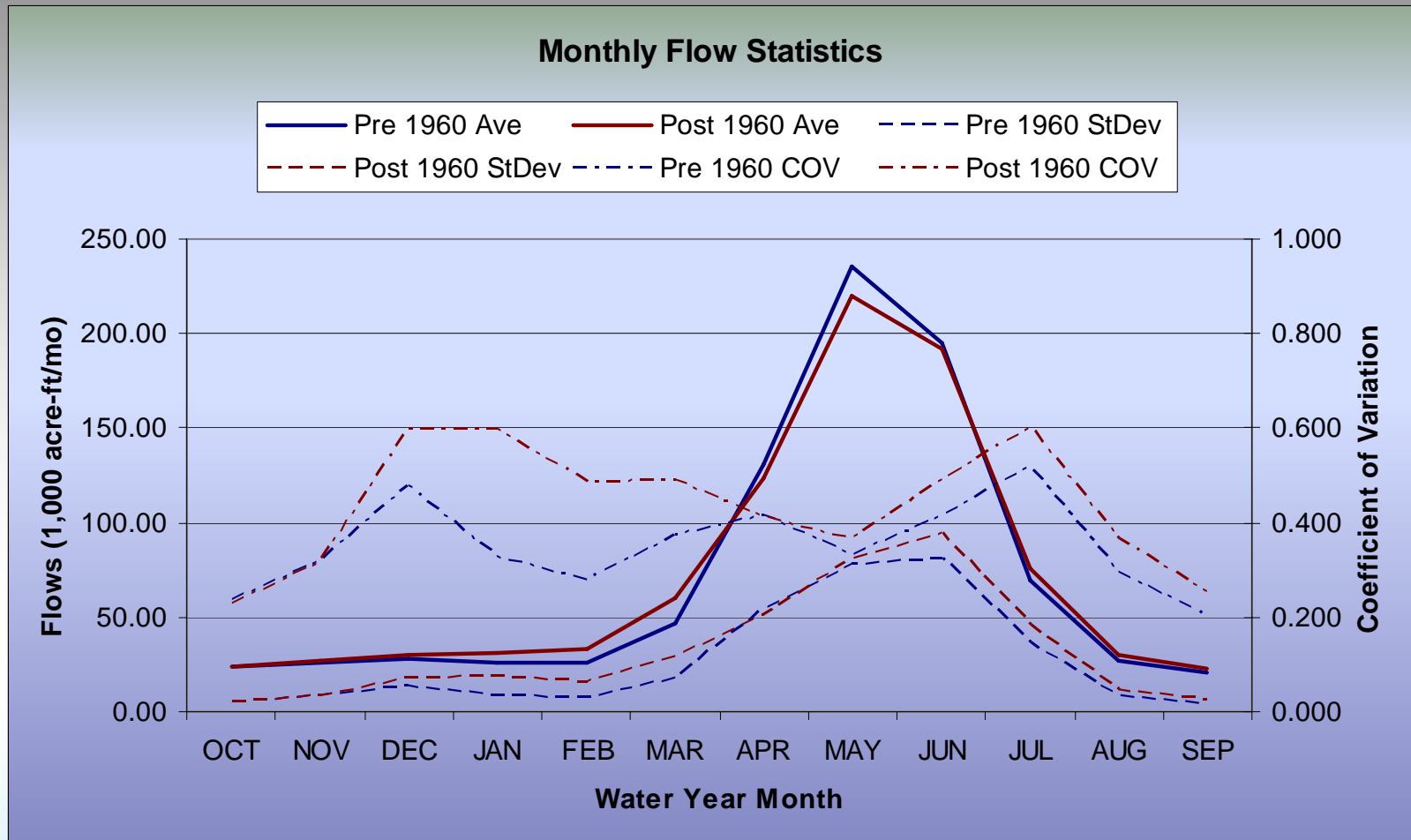
Historical August Flows in the Boise River USGS Gage 13185000



Historical February Flows in the Boise River USGS Gage 13185000



Monthly Mean, Standard Deviation and Coefficient of Variation for Boise River Flows



Statistical Analysis of Split Data Sets

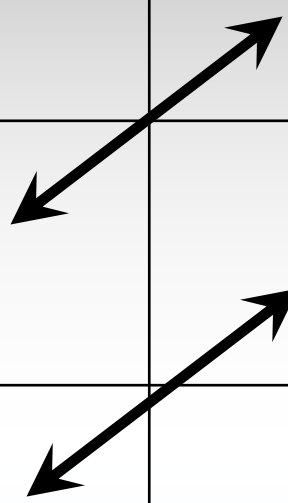
Are changes in Mean and Variance Significant?

	Pre 1960 Flows	Post 1960 Flows
Annual Mean Flow (Acre-Ft)	855,000	866,000
Annual St Dev (Acre-Ft)	233,000	315,000
Significance of Change in Mean (t-test)		0.358
Significance of Change in Variance (F-test)		0.024

Statistical Analysis of Split Data Sets

What are the impacts on the frequency of low flows?

	Pre 1960 Flows	Post 1960 Flows
10 Year Return Period Flow (Acre-ft/year)	557,000	463,000
20 Year Return Period Flow (Acre-ft/year)	472,000	349,000
50 Year Return Period Flow (Acre-ft/year)	377,000	220,000



Summary and Conclusions

For flows in the Boise River Headwaters:

- No discernable trend in precipitation
- No discernable trend in temperatures
- No discernable trends in flows
- Significant change in annual flow variability
- The old 20 yr low flow is the new 10 yr low flow

