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Managing Water in the West

Modeling Climate Change Impacts for Reclamation's PNW Reservoir Systems

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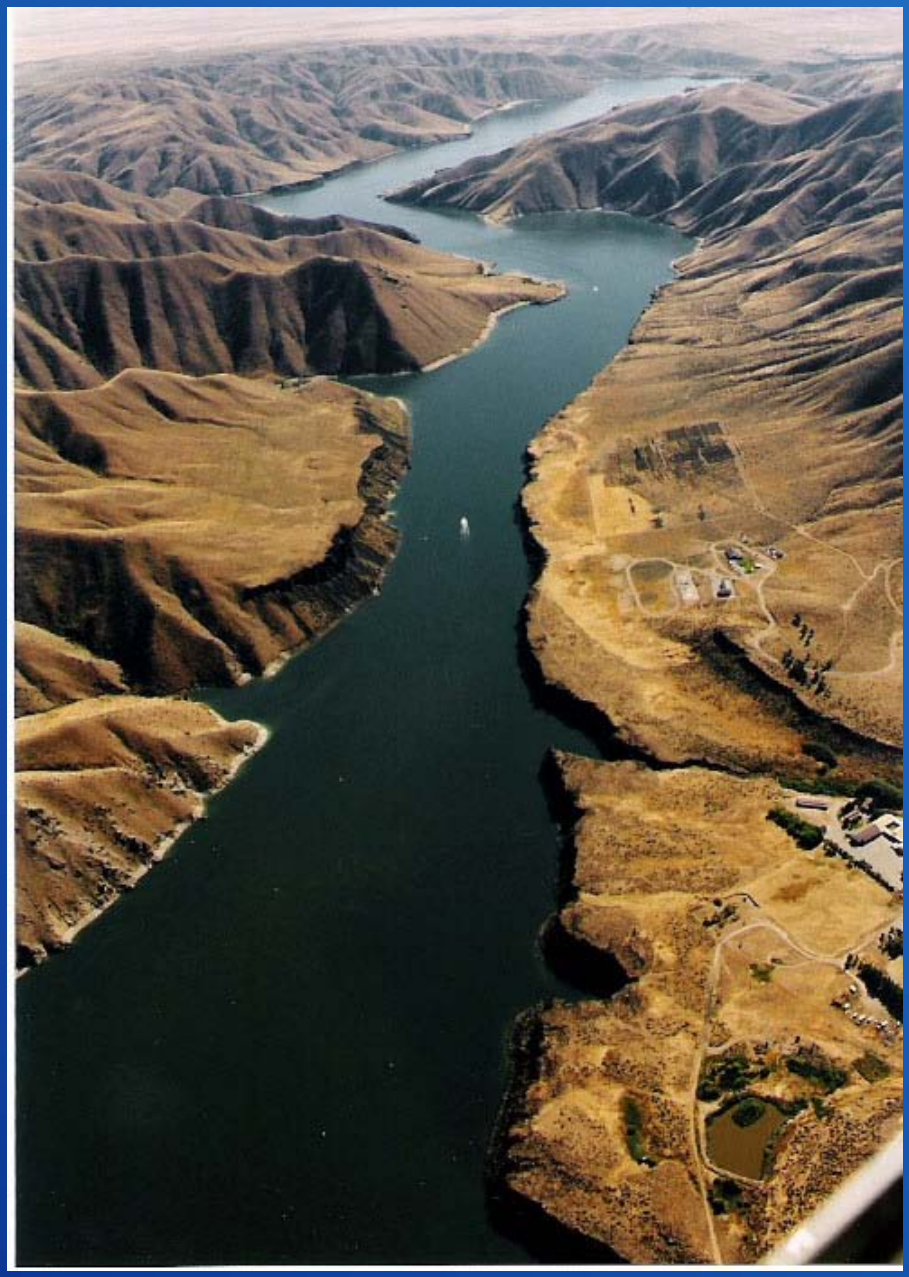
U.S. Department of the Interior
Bureau of Reclamation

will Reclamation be able to…

- **meet contractual obligations for water storage and delivery?**
  - **Irrigation**
  - **Hydropower**
- **meet environmental obligations?**
  - **Local minimum streamflows**
  - **Contributions to Columbia River flow targets for salmon**
- **Manage flood risk?**



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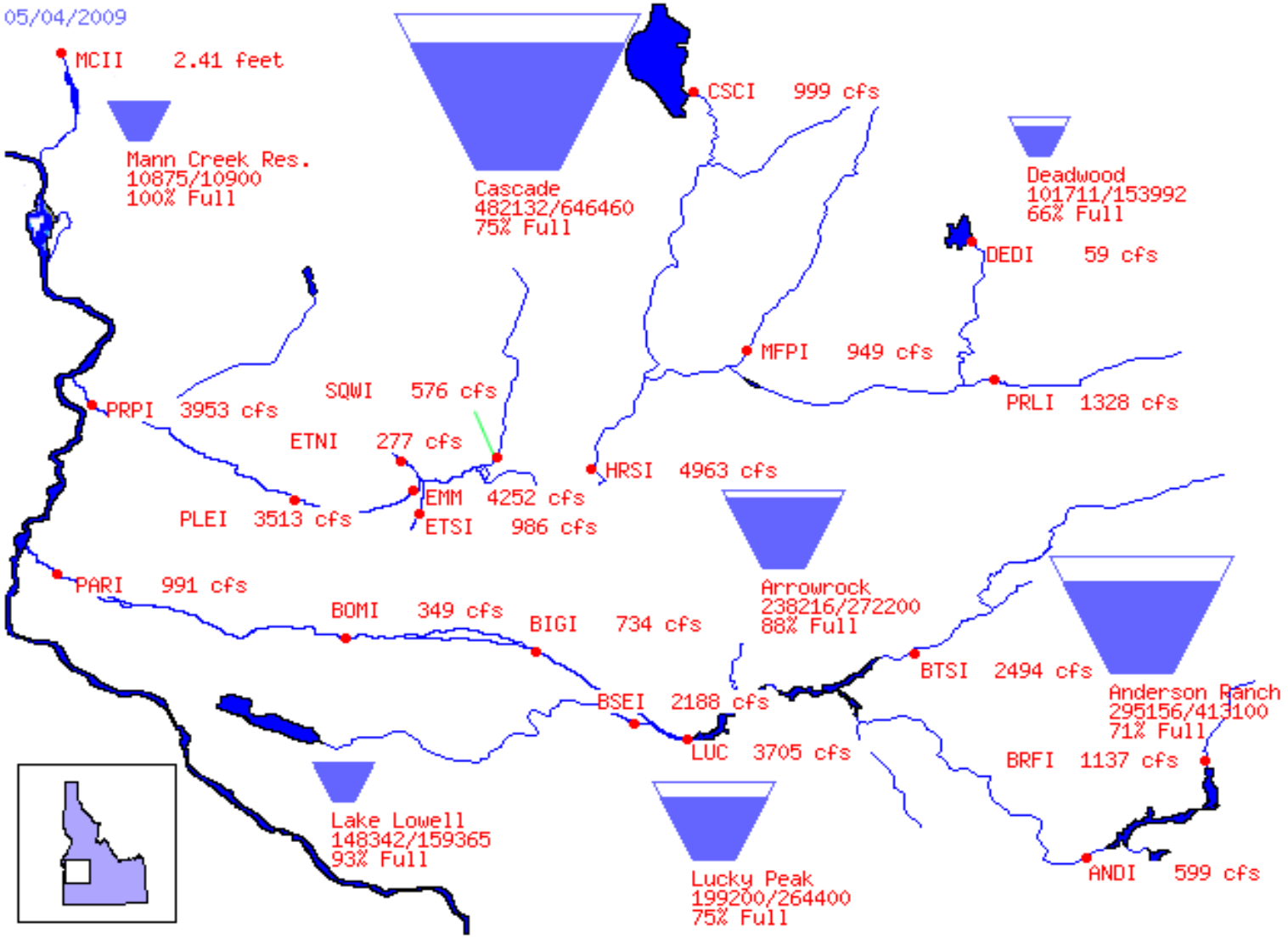
Climate Change Is Likely to Bring…

- *Warmer Temperatures*
- *Less Snowpack*
- *More Precipitation (some say)*
- *Greater variability in flows*
- *Earlier runoff*
- *Higher winter flows; lower summer flows*

Reclamation's Boise and Payette Projects



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Reclamation's Boise Project

The Boise Project provides water to lands in southwestern Idaho and eastern Oregon

Boise Basin Project Reservoirs, active capacities:

- Anderson Ranch, 413 kAF
- Arrowrock, 272 kAF
- LuckyPeak (COE facility), 264 kAF
- Lake Lowell, 159 kAF

Irrigated Lands:

- 224,000 acres primary supply
- 173,000 acres supplemental supply

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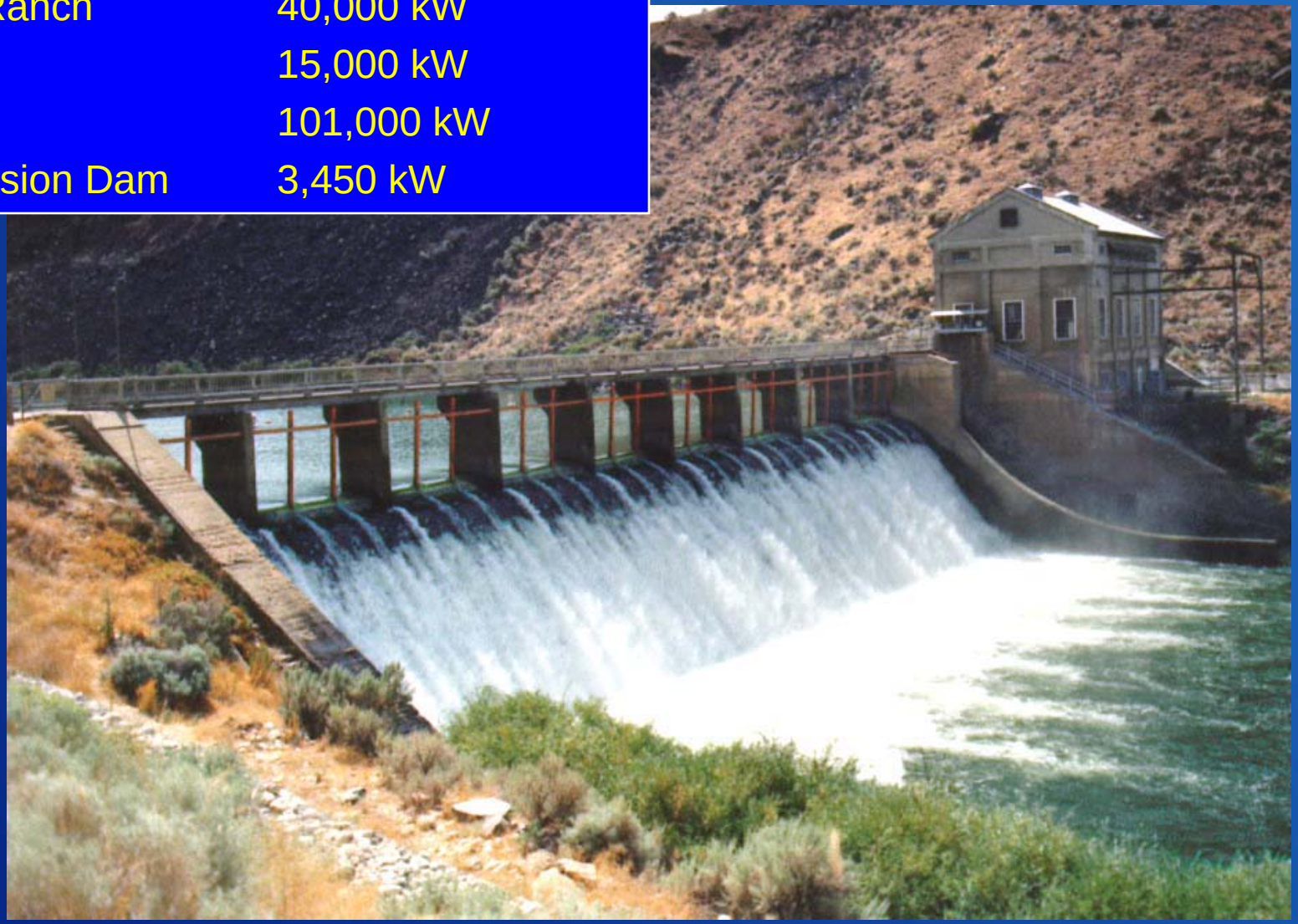
Boise Project Hydropower

Anderson Ranch	40,000 kW
Arrowrock	15,000 kW
LuckyPeak	101,000 kW
Boise Diversion Dam	3,450 kW



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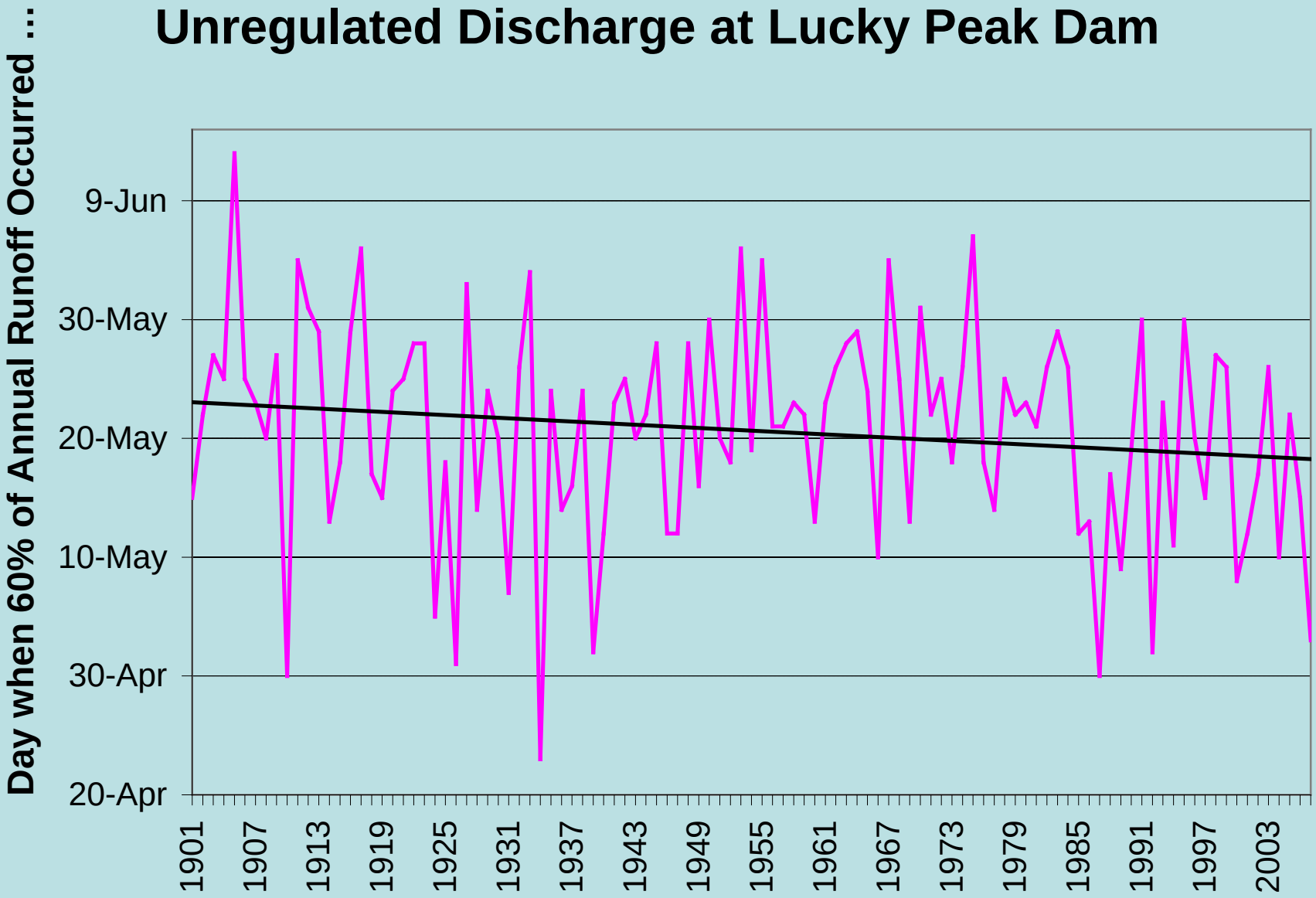
Unregulated Discharge at Lucky Peak Dam



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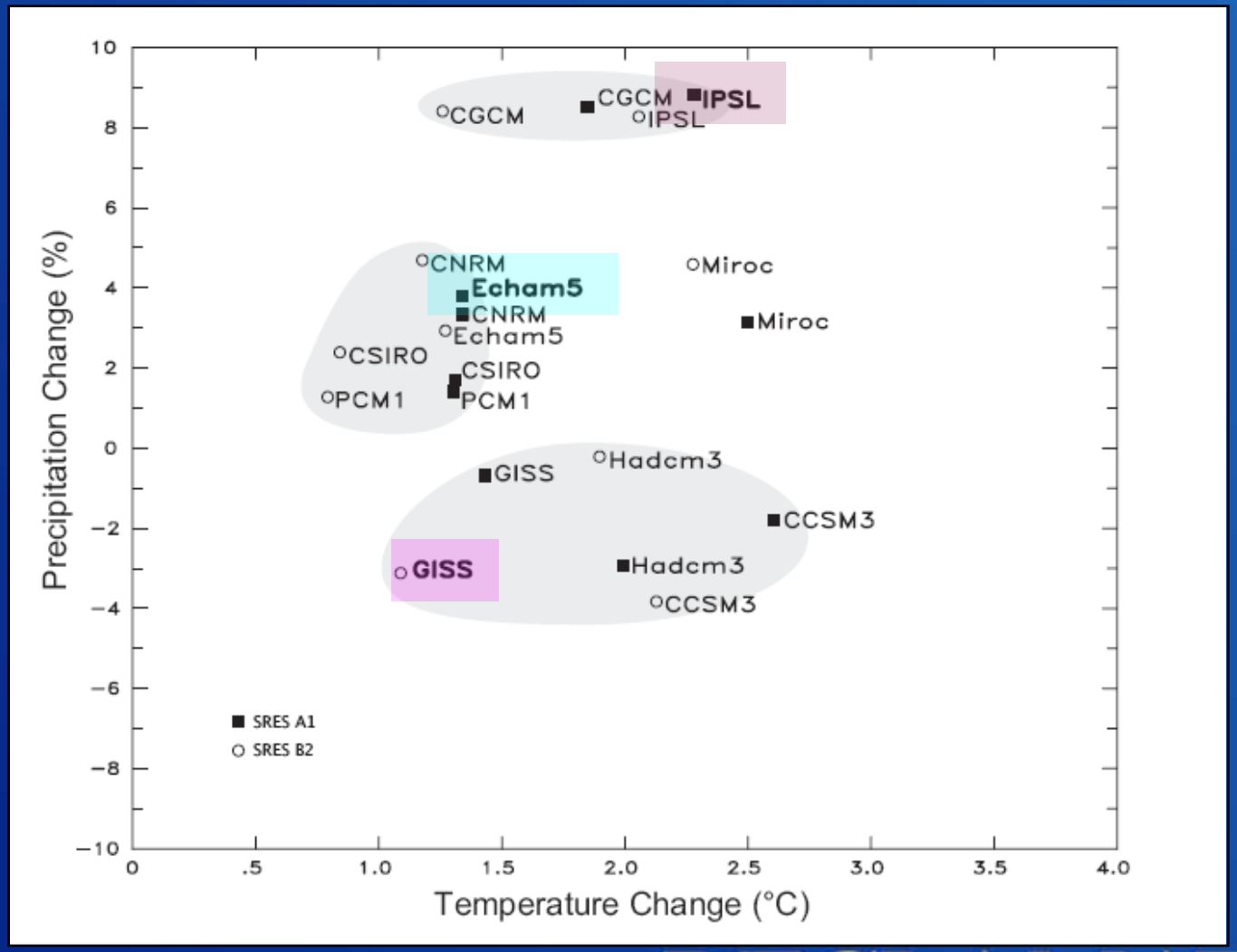
Intergovernmental Panel on Climate Change (4th Assessment Report) Projections for the Year 2040



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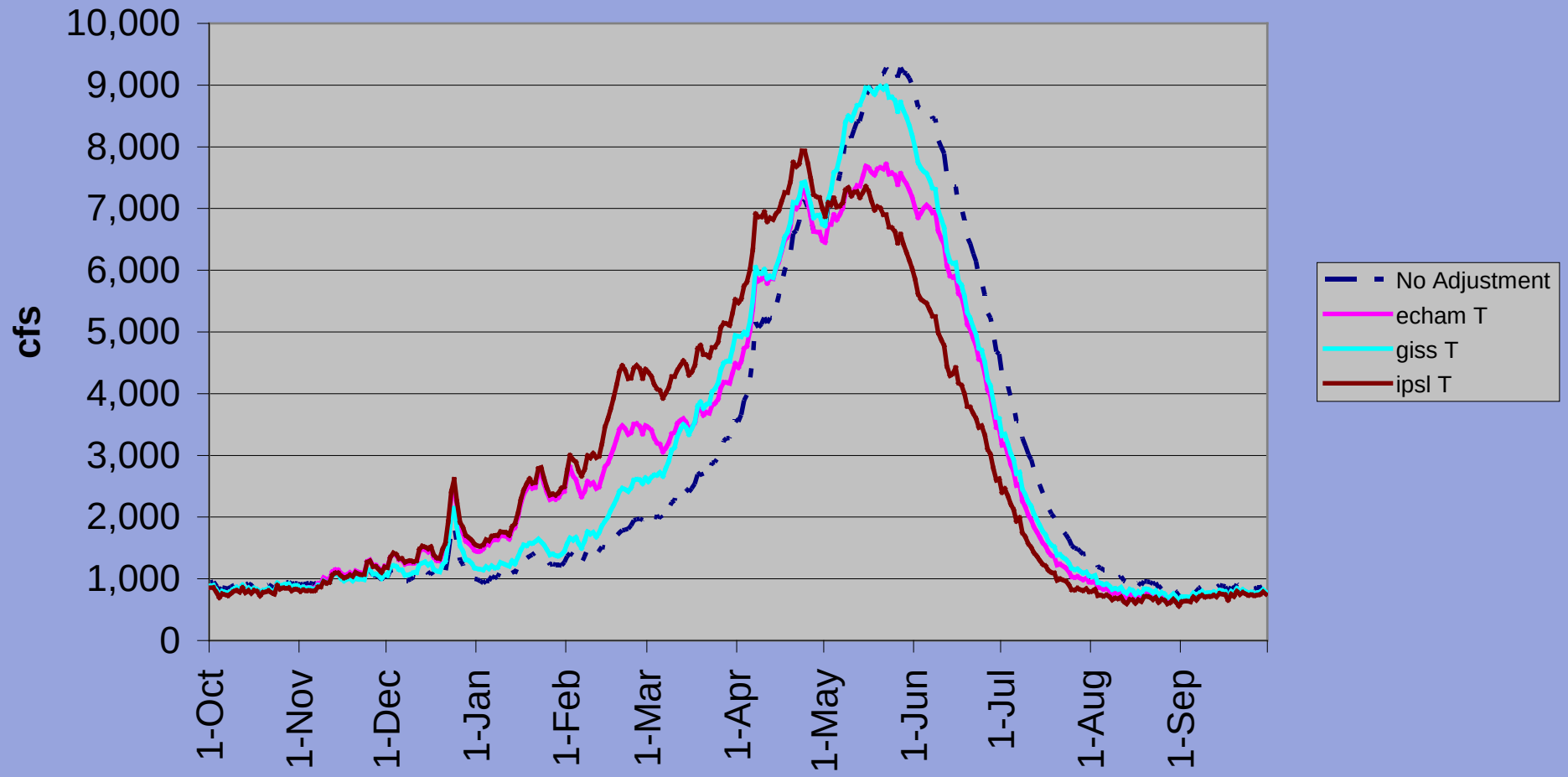
Daily Naturalized Flows at Lucky Peak

using Temperature Predictions for 2040
(NWSRFS model results)



Daily Naturalized Flows at Lucky Peak

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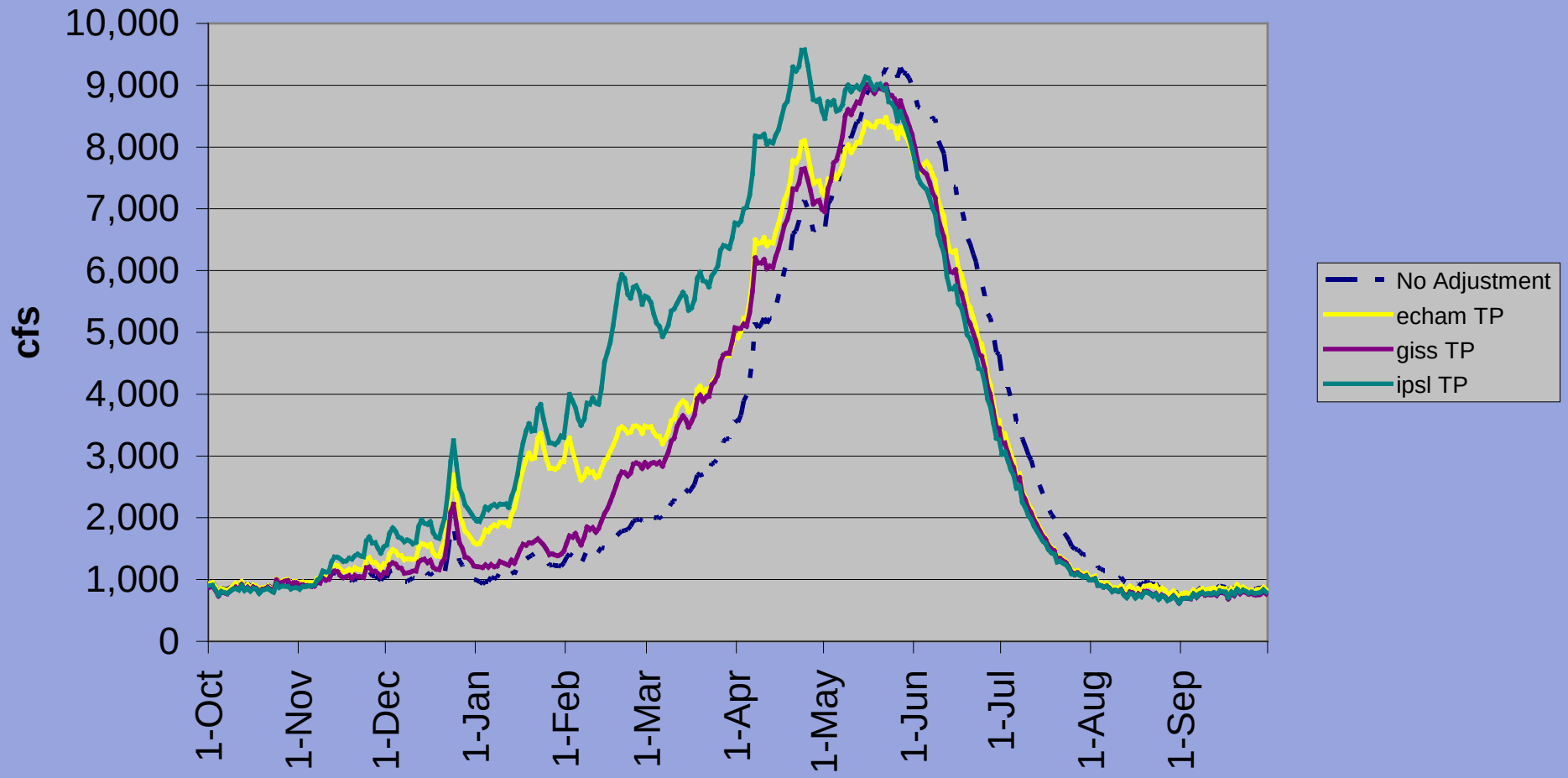
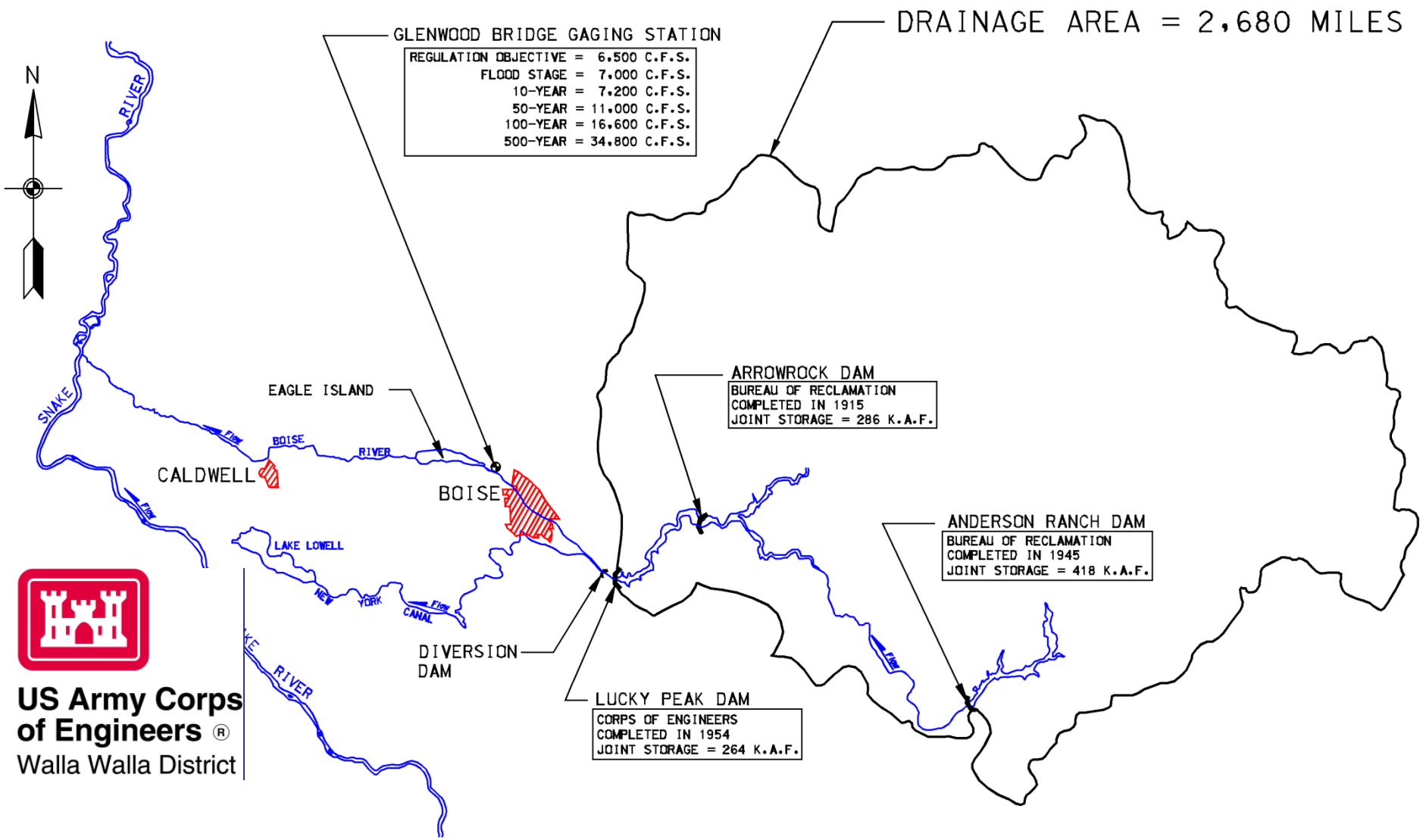


Anticipated Results

- Reclamation will find it difficult meet it's current contractual obligations for water storage and delivery.
- Reclamation will find it difficult to meet it's current environmental obligations.
- A slight increase in flood risk.


May 2006

Reclamation's Boise Project



US Army Corps of Engineers ®
Walla Walla District

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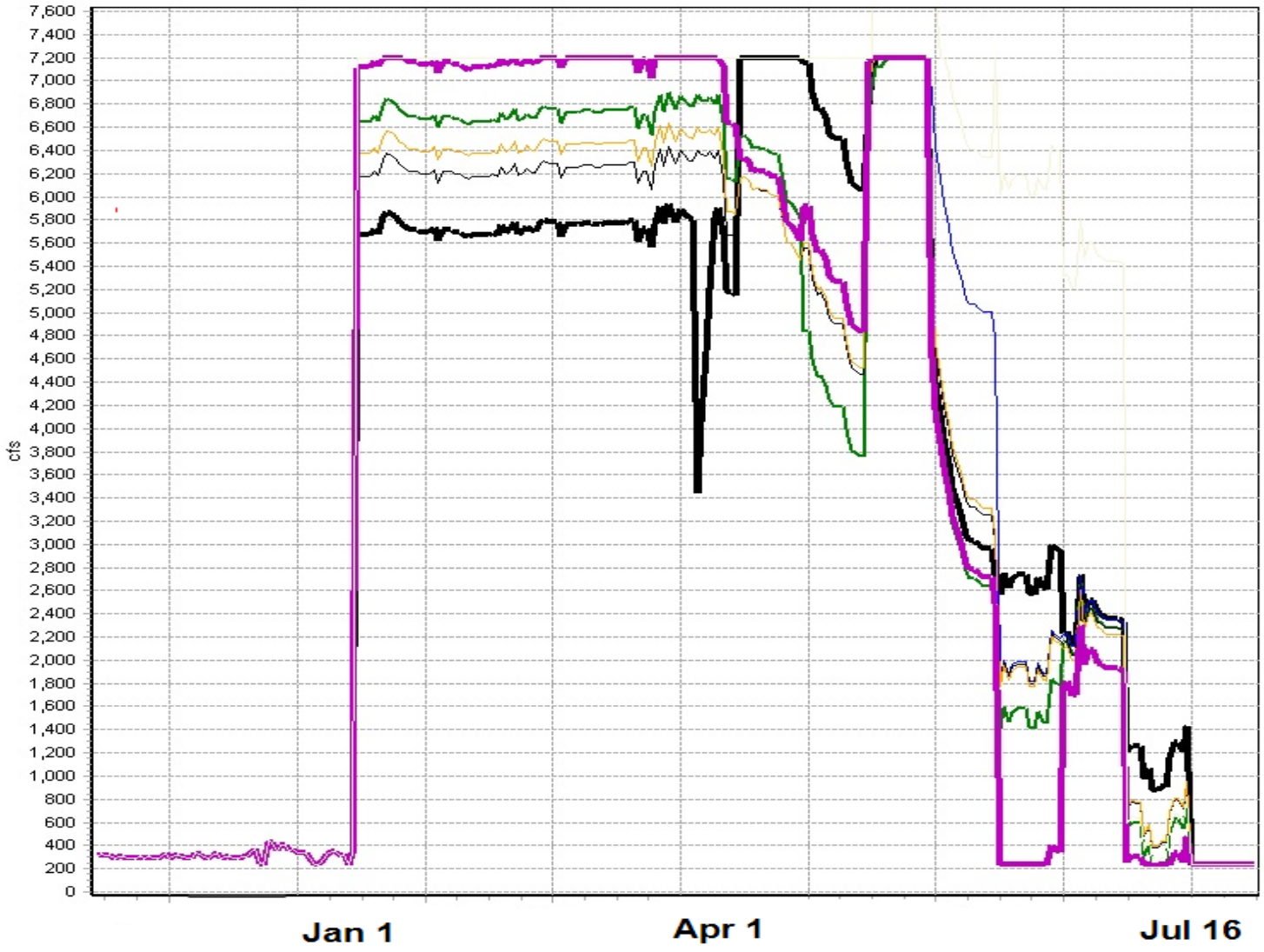
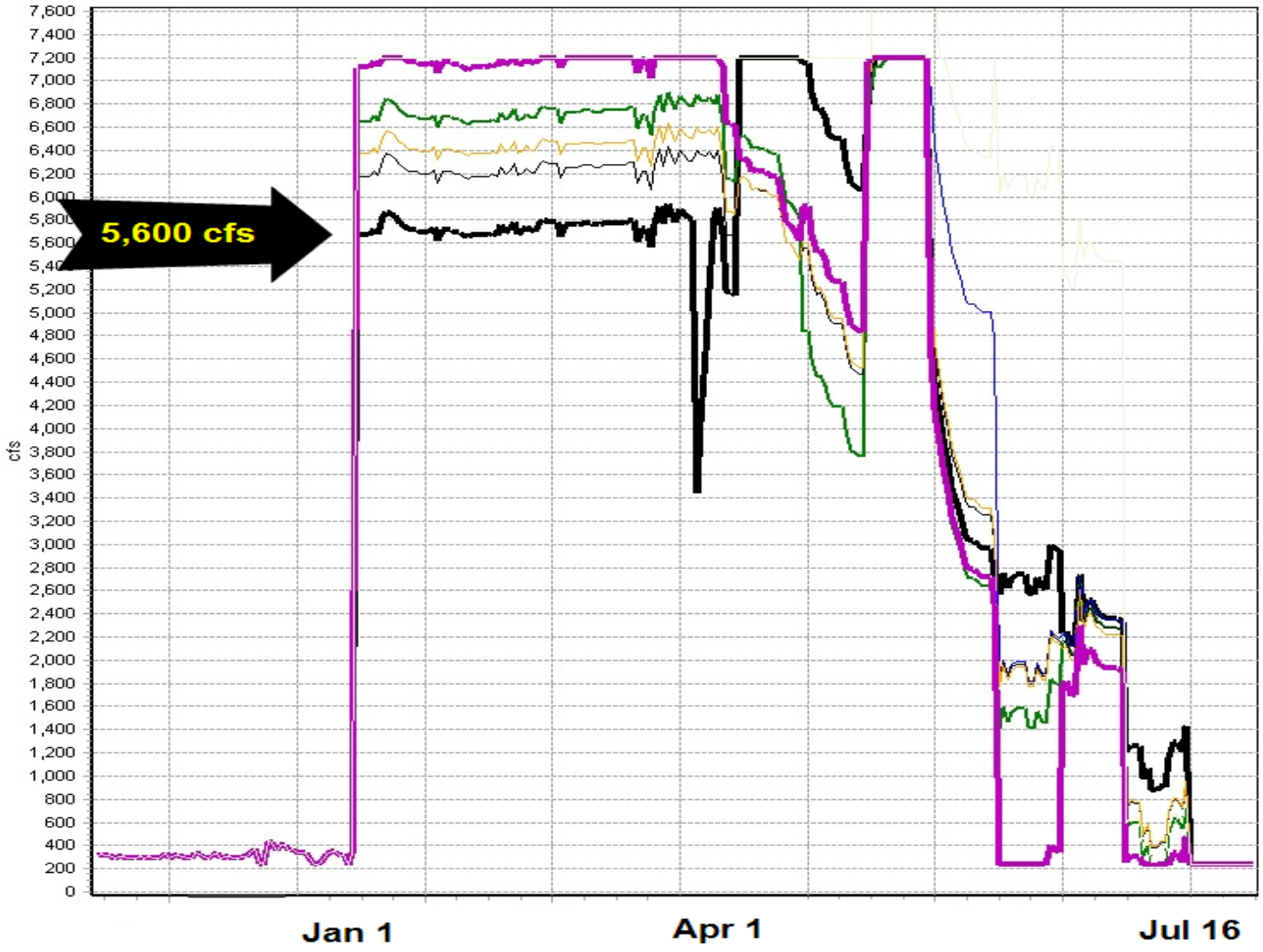
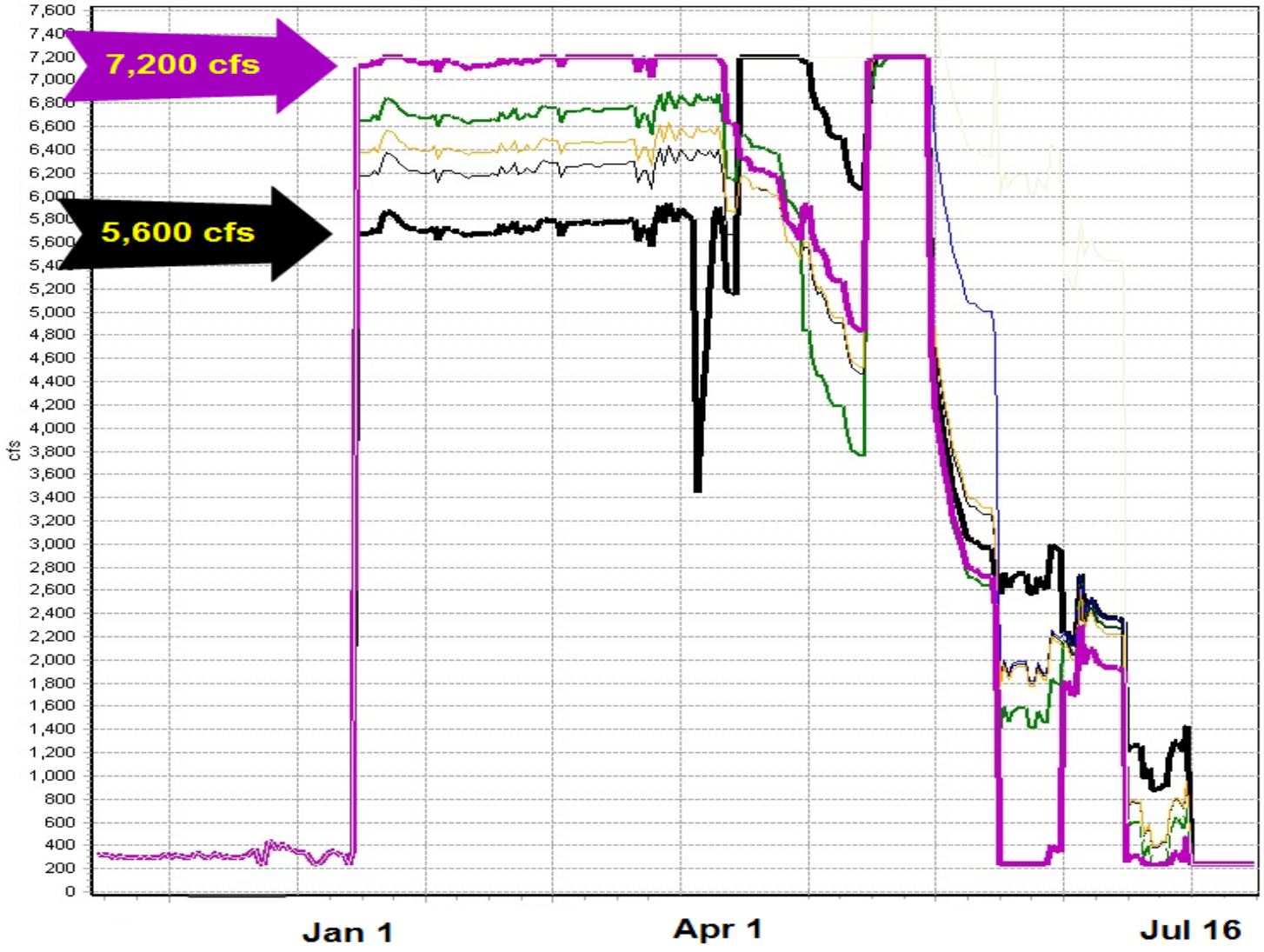
Discharge at Glenwood Bridge adjusted 1971 hydrology



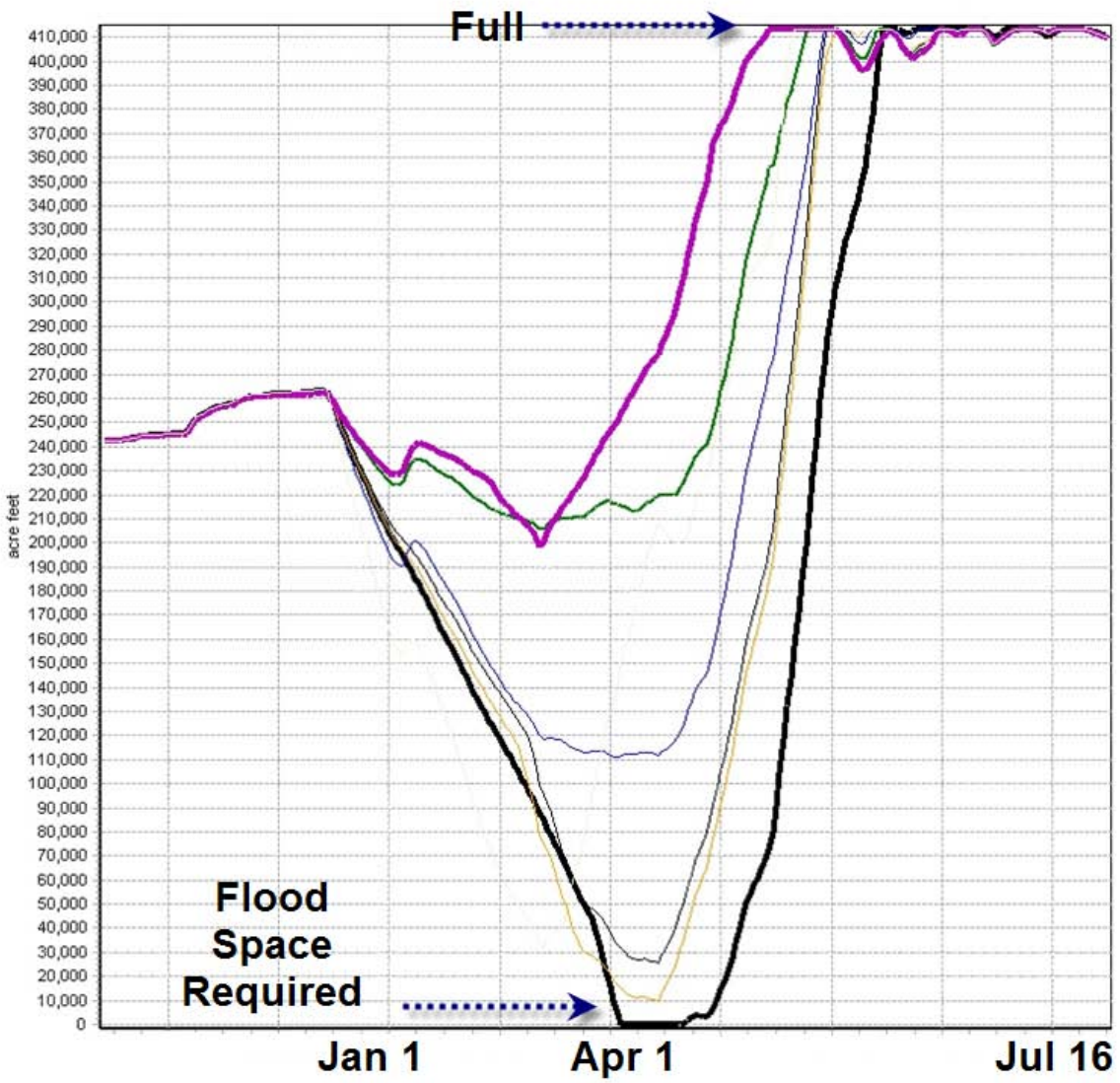
Discharge at Glenwood Bridge adjusted 1971 hydrology



Discharge at Glenwood Bridge adjusted 1971 hydrology



Anderson Ranch Contents adjusted 1971 hydrology



Observations on Flood Risk Management and Reservoir Refill (page1)

- Current COE regulations, guidelines and space requirements are outdated, having been developed using data from 1895 through 1980.

- Starting about 1980, the guidelines under-predict inflows prior to April 1 and over-predict inflows after April 1 (change in El Nino-Southern Oscillation)

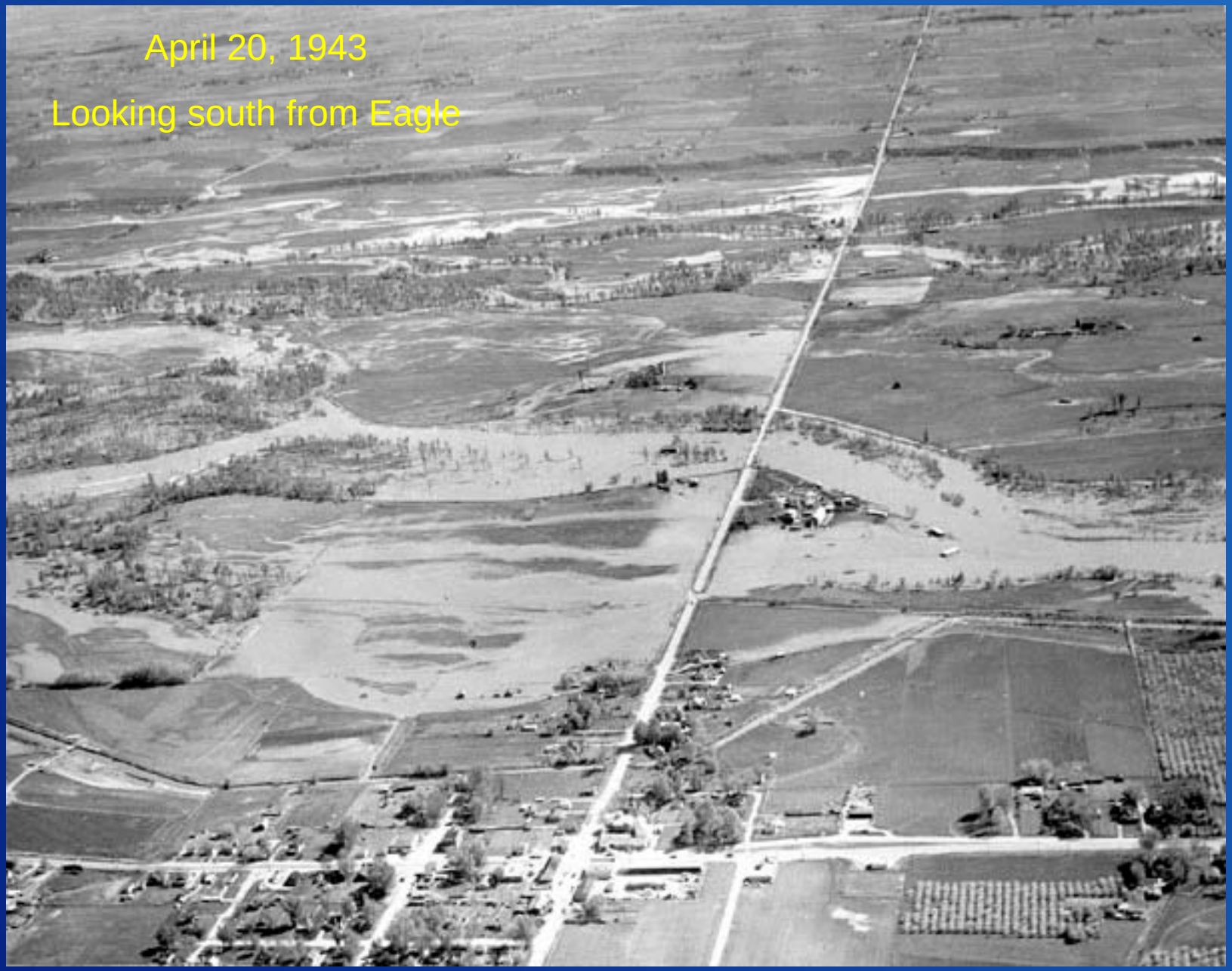
- With Climate Change, the under- and over- predictions are even larger

Observations on Flood Risk Management and Reservoir Refill (page2)

- Accurate forecasts will become more difficult develop to due to the influences of precipitation on the basin and increased flow variability

Comments on the Daily Operations Studies

- Assumptions drive the study results
  - A2 IPCC scenarios (aggressive emissions)
  - T and P results are scalable to PN Region and to the Boise Basin
  - *Starting storage conditions of Nov 2001 (historic median)*
  - *Perfect forecasts*
- We addressed uncertainties by employing results from a range of IPCC models


April 20, 1943
Looking south from Eagle