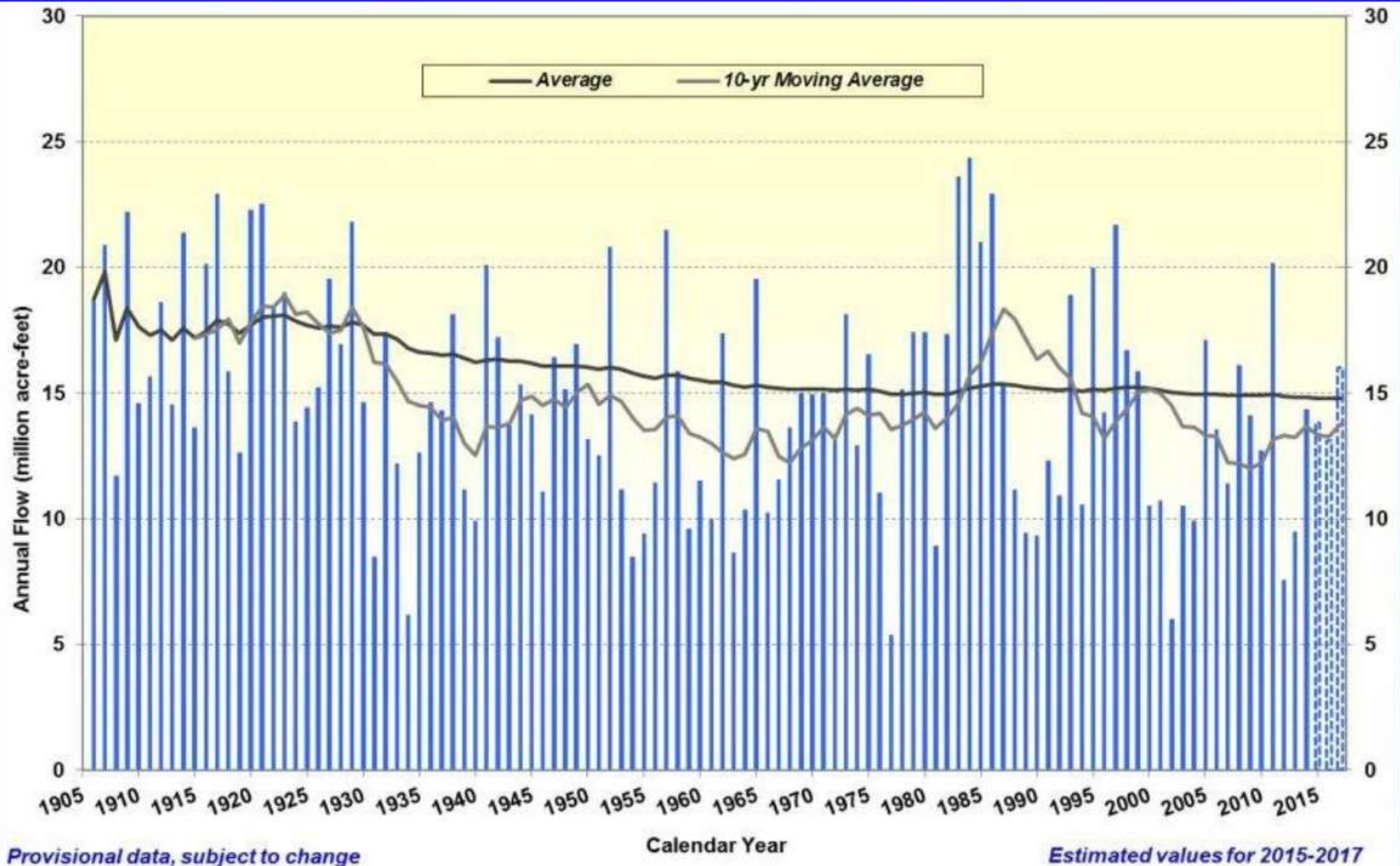


CHOOSING YOUR PERIOD OF RECORD WHEN LOOKING BACKWARDS

Eric Kuhn, John Fleck, Brad Udall, David Kanzer
Mesa College Upper Colorado River Basin Water Forum
Nov. 7, 2018

Natural Flow

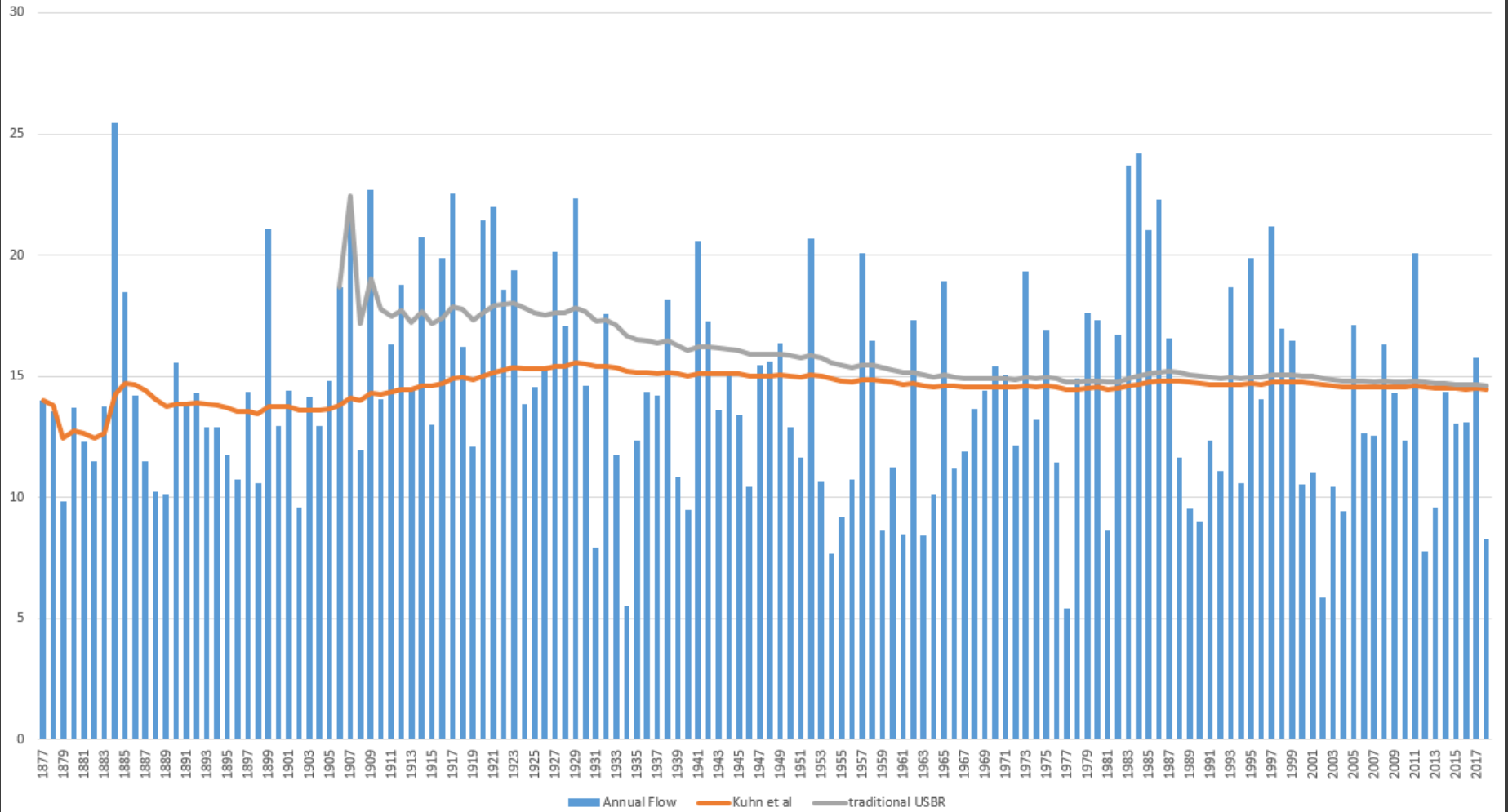
Colorado River at Lees Ferry Gaging Station, AZ



Courtesy of the Bureau of Reclamation

The Colorado River: the traditional view

An Alternative Visualization



A better way?

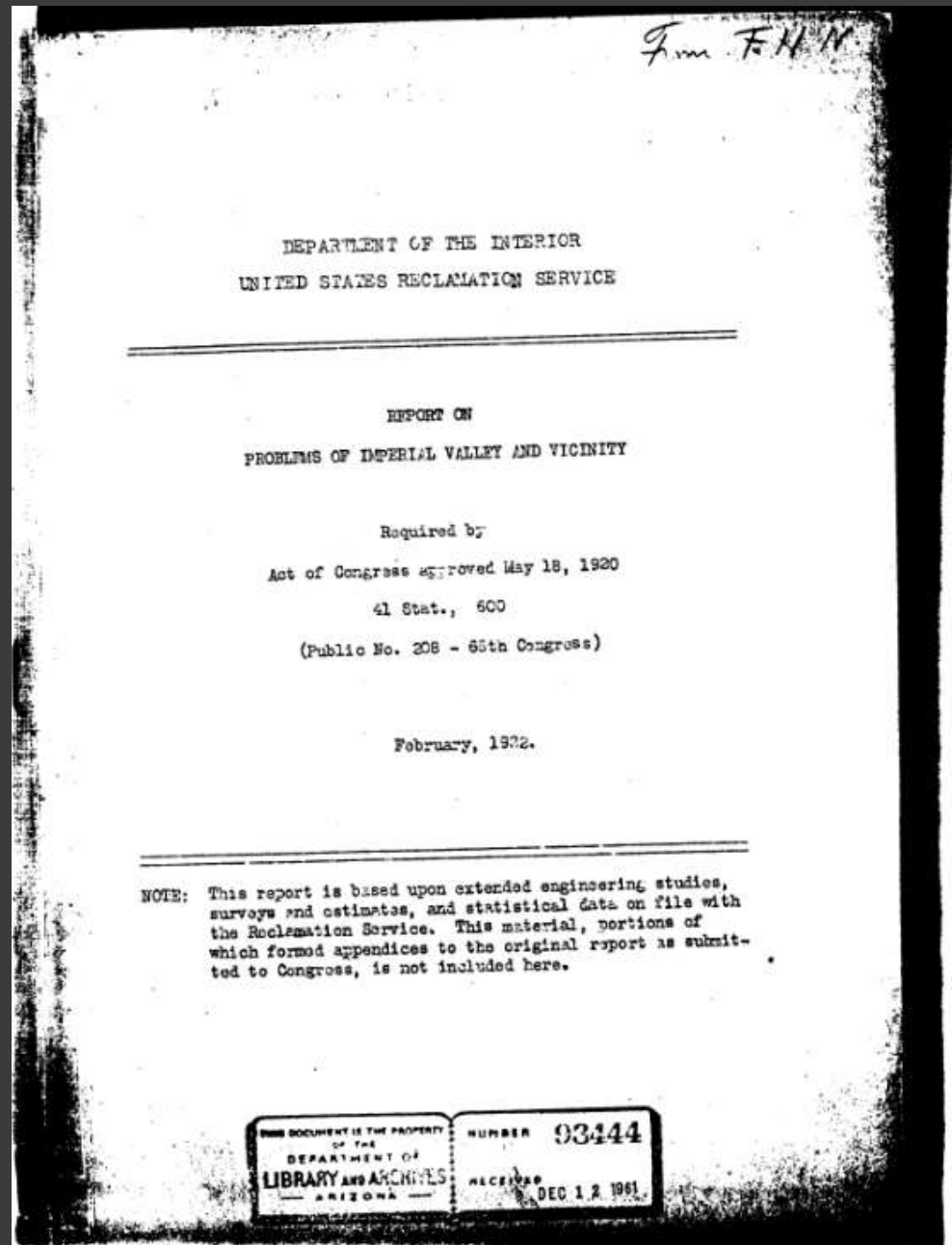
How much water does the Colorado River have? The key questions:

- Where do we measure?
- How do we account for human modification and use?
- How will we combine the accounting for modification with the actual measurements?
- How do we estimate on streams where there are no gauges?
- Given the answers to the above questions:

What “period of record” should we use?

The numbers used to negotiate the Colorado River Compact – the “Fall-Davis Report”

- Measurement at Laguna Dam
- Period of record **1899-1920**
- Used actual measured flow, without accounting for upstream diversions



The first “natural flow” calculation

- **18.1** million acre feet at Lee Ferry
- Arthur Powell Davis, 1923
- Period of record: **1903 - 1920**



**Herman
Stabler,
USGS, 1923**

**Uses river
stage
measurements
at the Yuma
railroad bridge
to estimate
actual flows
1878 - 1922**



Herman Stabler,
USGS, 1923

Stabler's numbers
suggest an
average annual
flow of **15.7 maf**



E.C. LaRue, USGS, 1925

- Corrects for changes in upstream depletions over time
- Uses Great Salt Lake as a proxy to extend record back in time
- **1875 - 1922**

DEPARTMENT OF THE INTERIOR
Hubert Work, Secretary

U. S. GEOLOGICAL SURVEY
George Otis Smith, Director

Water-Supply Paper 556

WATER POWER AND FLOOD CONTROL
OF
COLORADO RIVER BELOW GREEN RIVER, UTAH

BY

E. C. LARUE

WITH A FOREWORD BY
HUBERT WORK
SECRETARY OF THE INTERIOR



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WASHINGTON
GOVERNMENT PRINTING OFFICE
1925

E.B. Debler, USBR, 1930-34

- Analysis of available water supply to support Hoover Dam power contracts
- **1897-1934**
- **16.66 maf at Lee Ferry**

House Document 419 – USBR report in support of Upper Basin development

- 1897-1943
- 16.27 maf at Lee Ferry

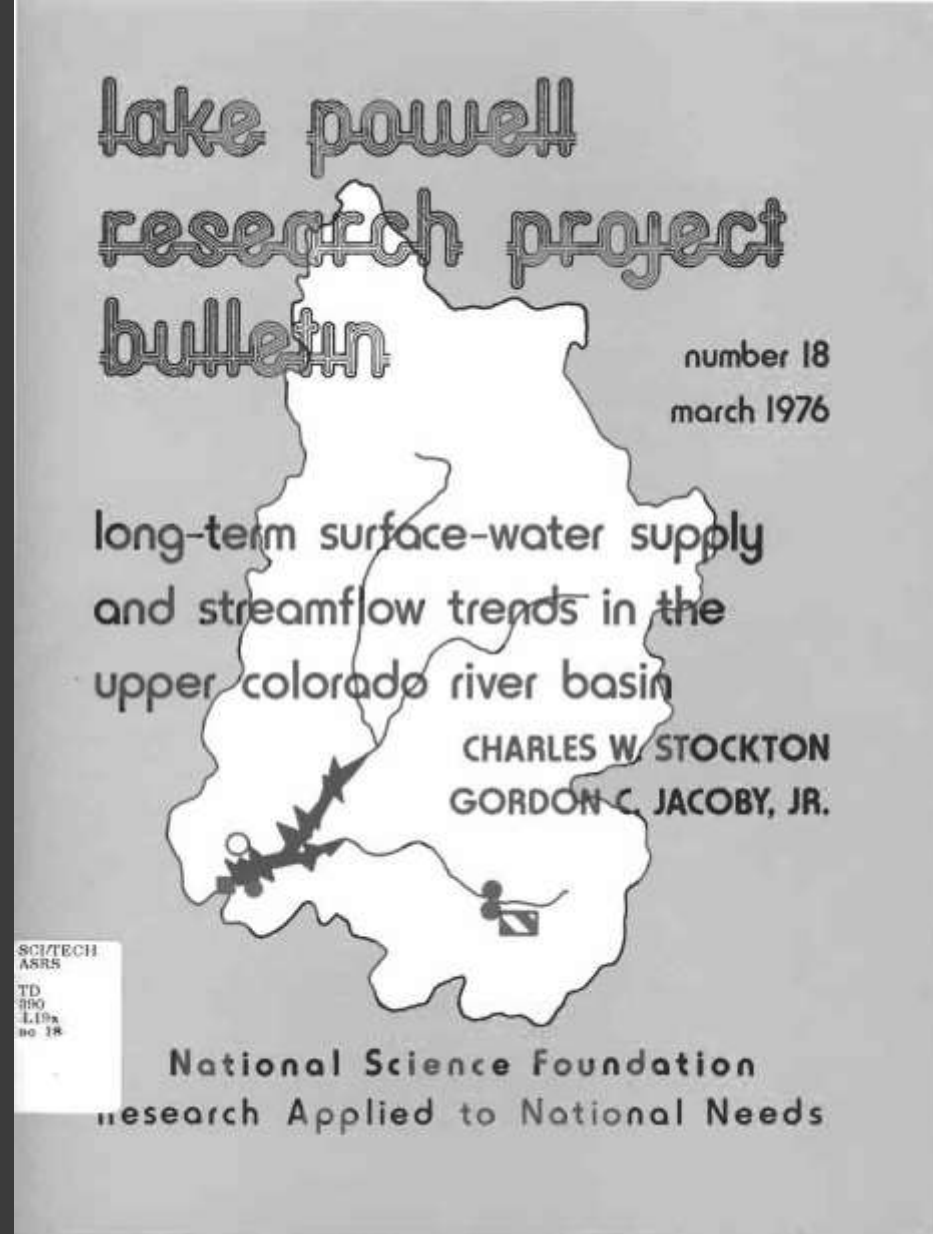
Floyd Dominy, USBR

- During 1960s Congressional debate over the Central Arizona Project, drops years prior to **1906**
- Effectively “increases” supply for CAP by 200kaf

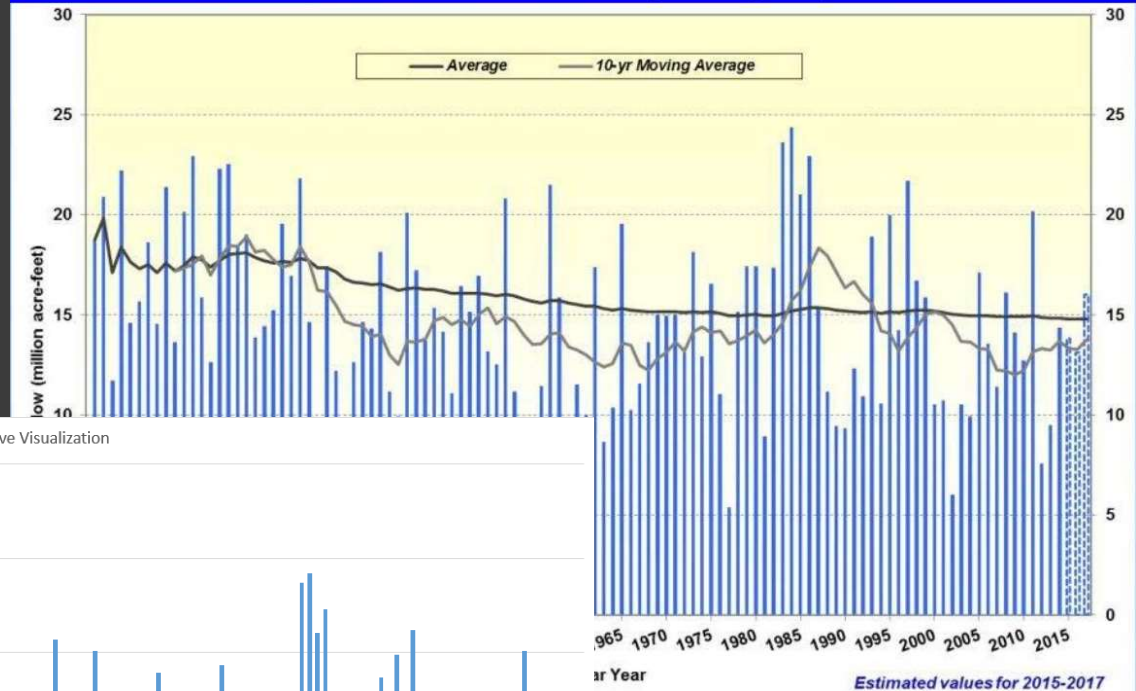


Stockton and Jacoby, 1976

- Based on tree ring records, 1906 – 1930 was the wettest period in the last 450 years
- "Periods of record which include this interval **tend to be inflated.**"

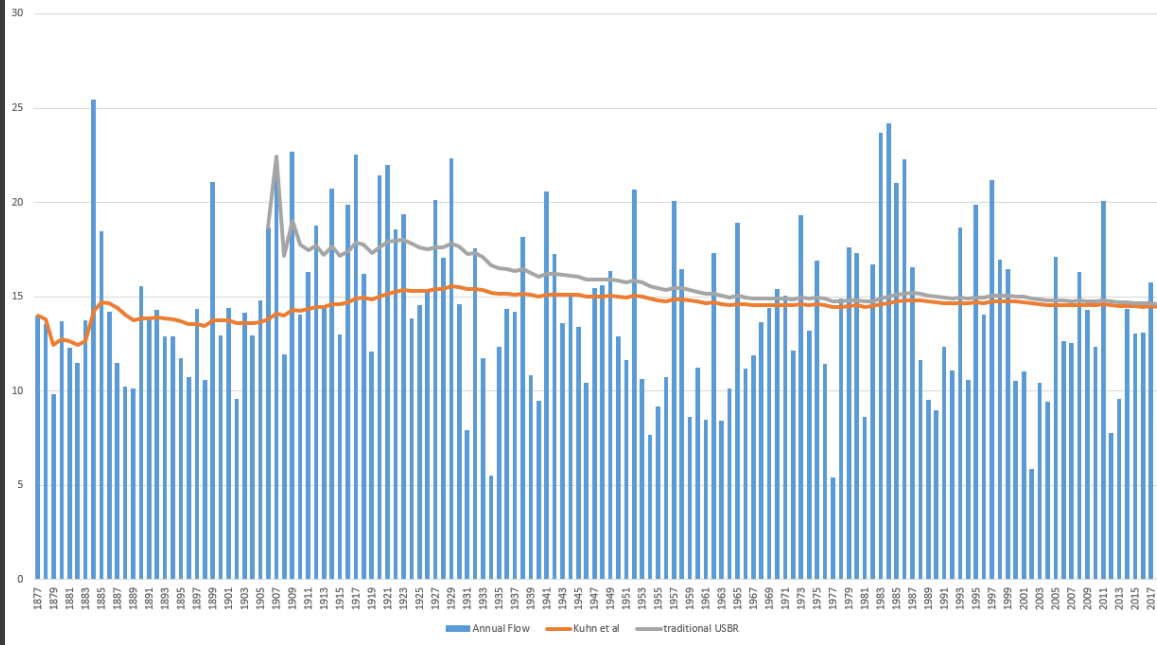


Natural Flow Colorado River at Lees Ferry Gaging Station, AZ



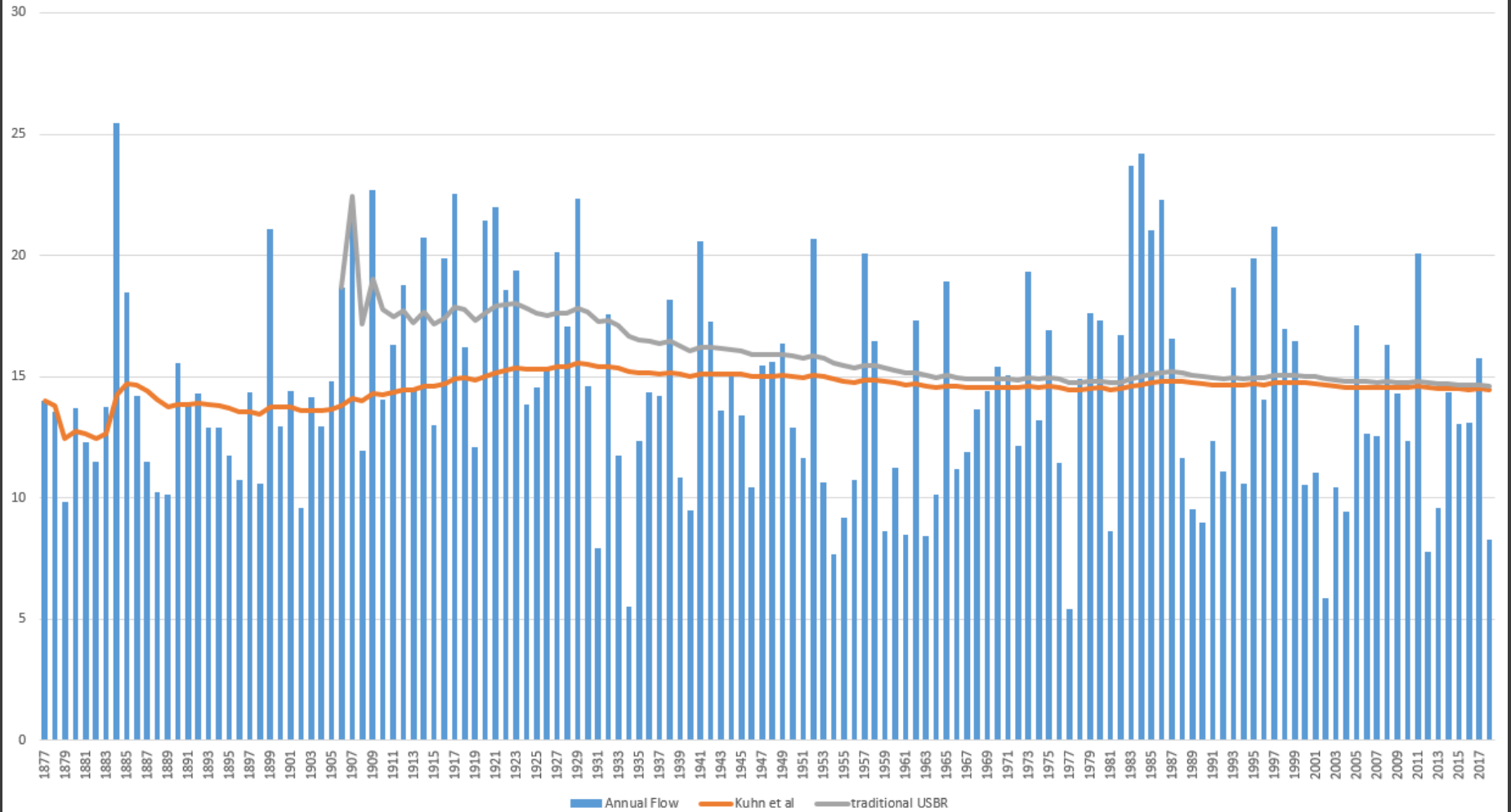
Estimated values for 2015-2017
Courtesy of the Bureau of Reclamation

An Alternative Visualization



The Colorado River: the traditional view

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A better way?

