Impacts of Climate Change on Two High Elevation Systems

John A. Dracup
Professor of the Graduate School
Department of Civil and Environmental Engineering.
University of California, Berkeley

CEC June 8th Workshop
Sacramento, CA.

DOCKET
09-IEP-1P
DATE JUN 08 2009
RECD. JUN 12 2009

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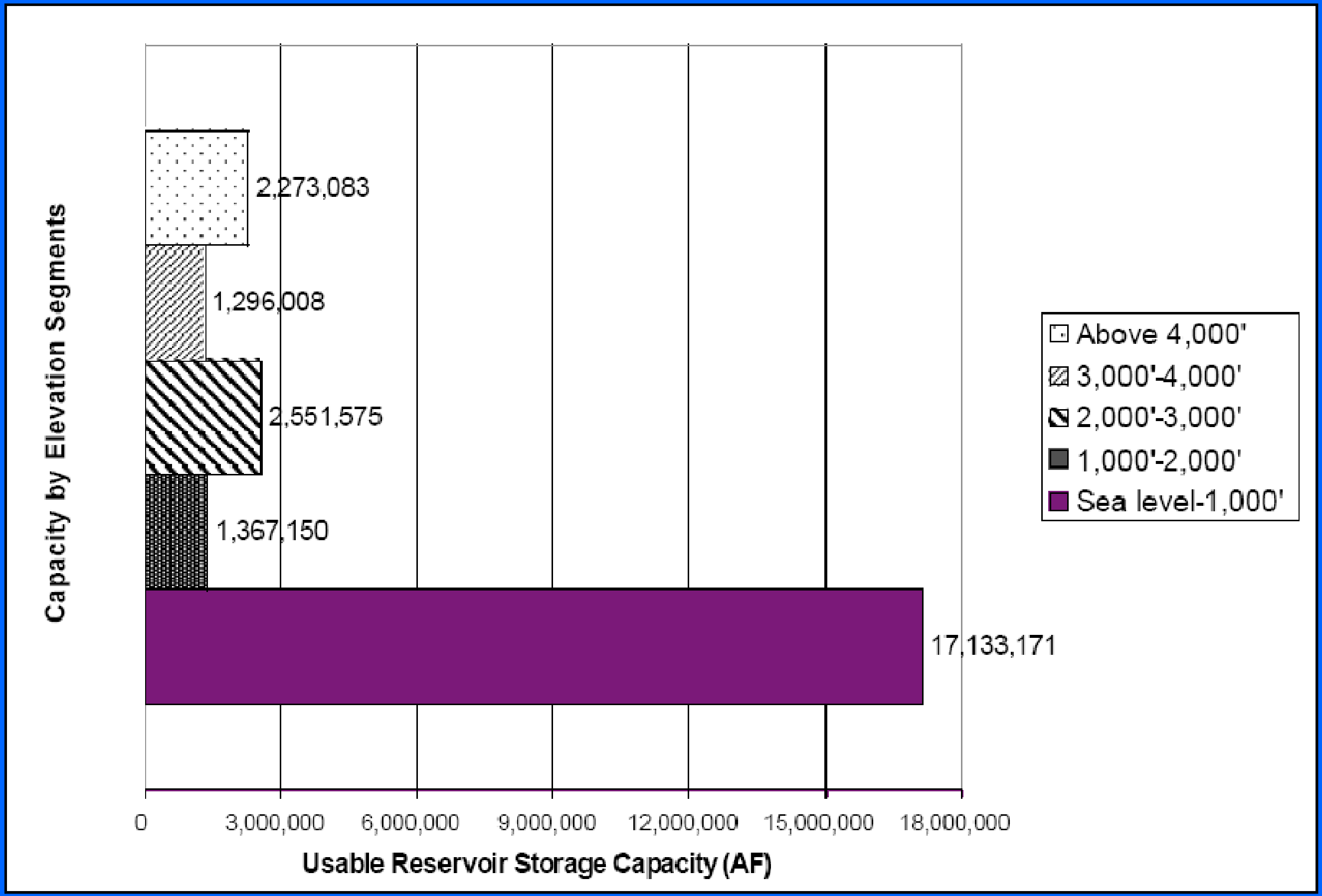
"Research Powers the Future"

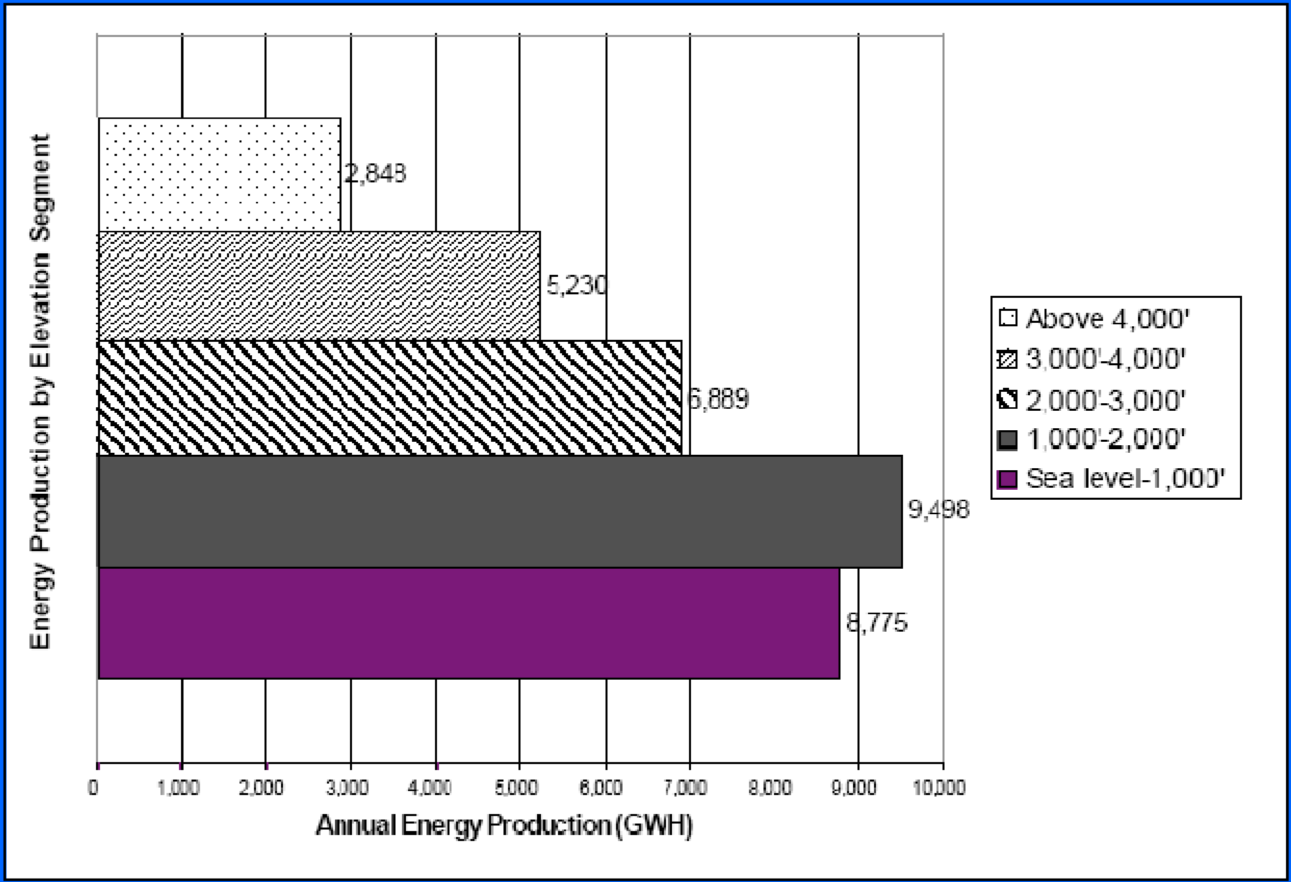
Difference between high and low elevation hydropower systems



Usable Reservoir Capacity by Elevation Segments

Aspen Environmental and M-Cubed, 2005

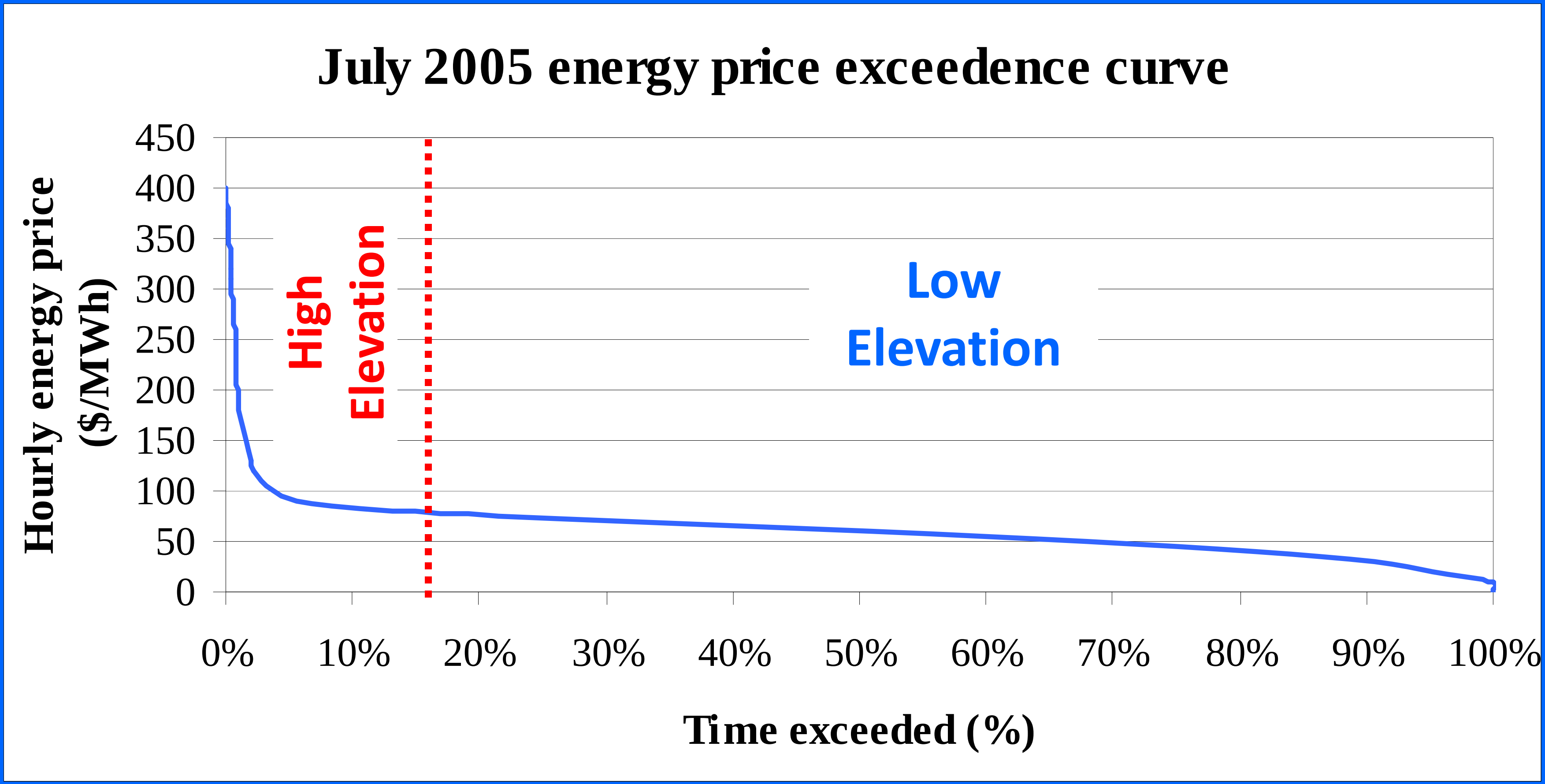
Difference between high and low elevation hydropower systems



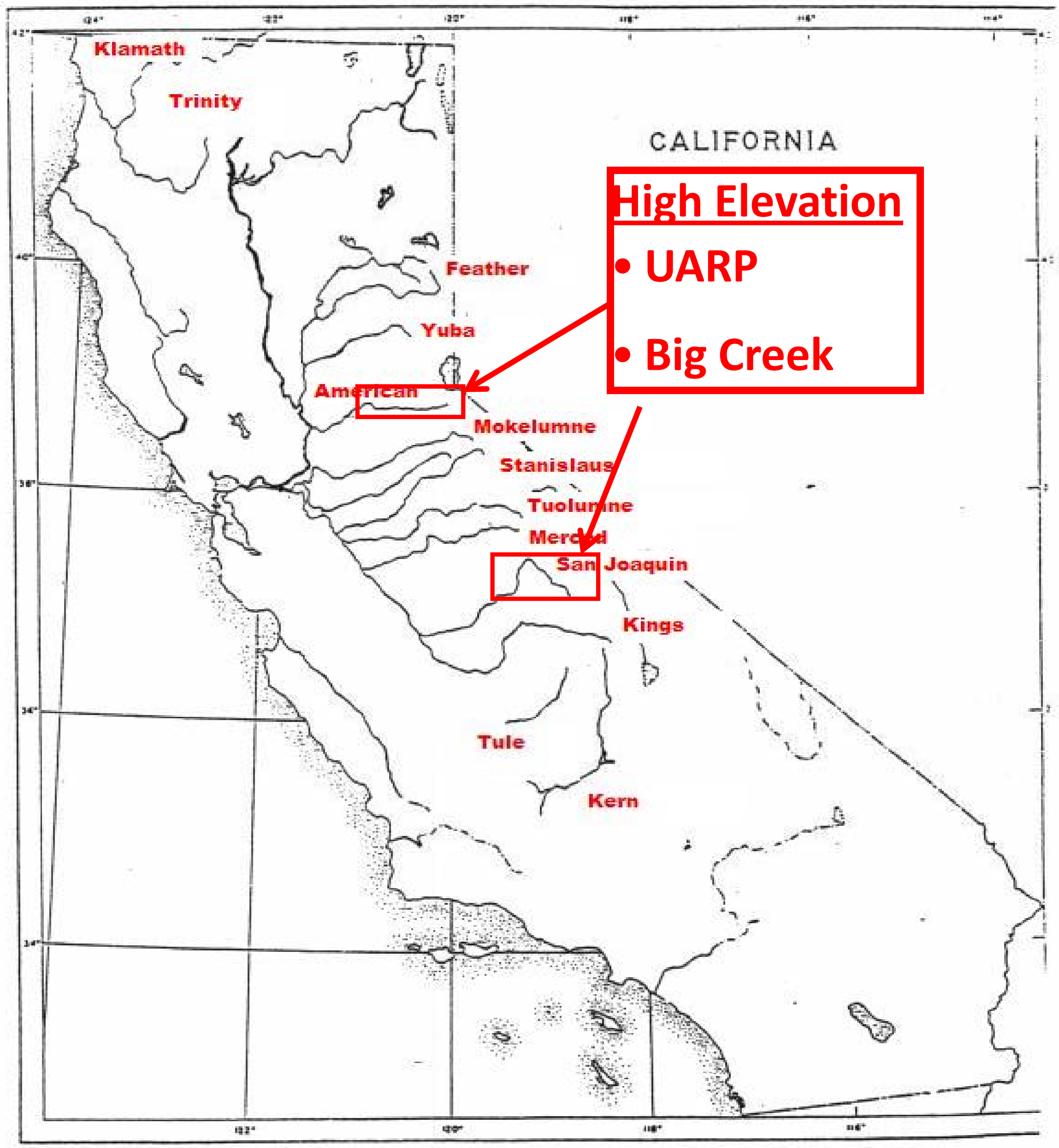
Average Annual Energy Production by Elevation Segments

Aspen Environmental and M-Cubed, 2005

Difference between high and low elevation hydropower systems



Two case studies

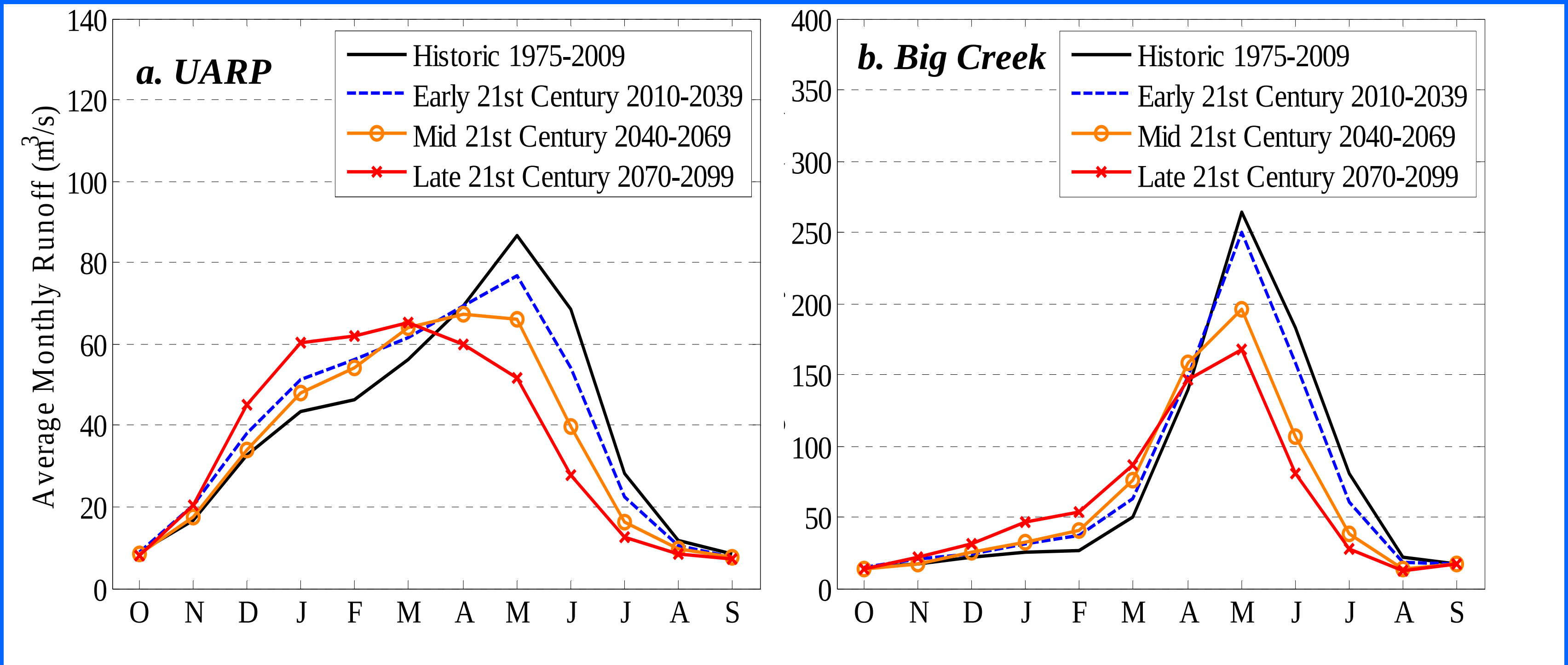


http://faculty.sierracollege.edu/ccox/images/maps/CA_rivers_map.jpg

Climate change hydrology

Inflows to UARP and Big Creek

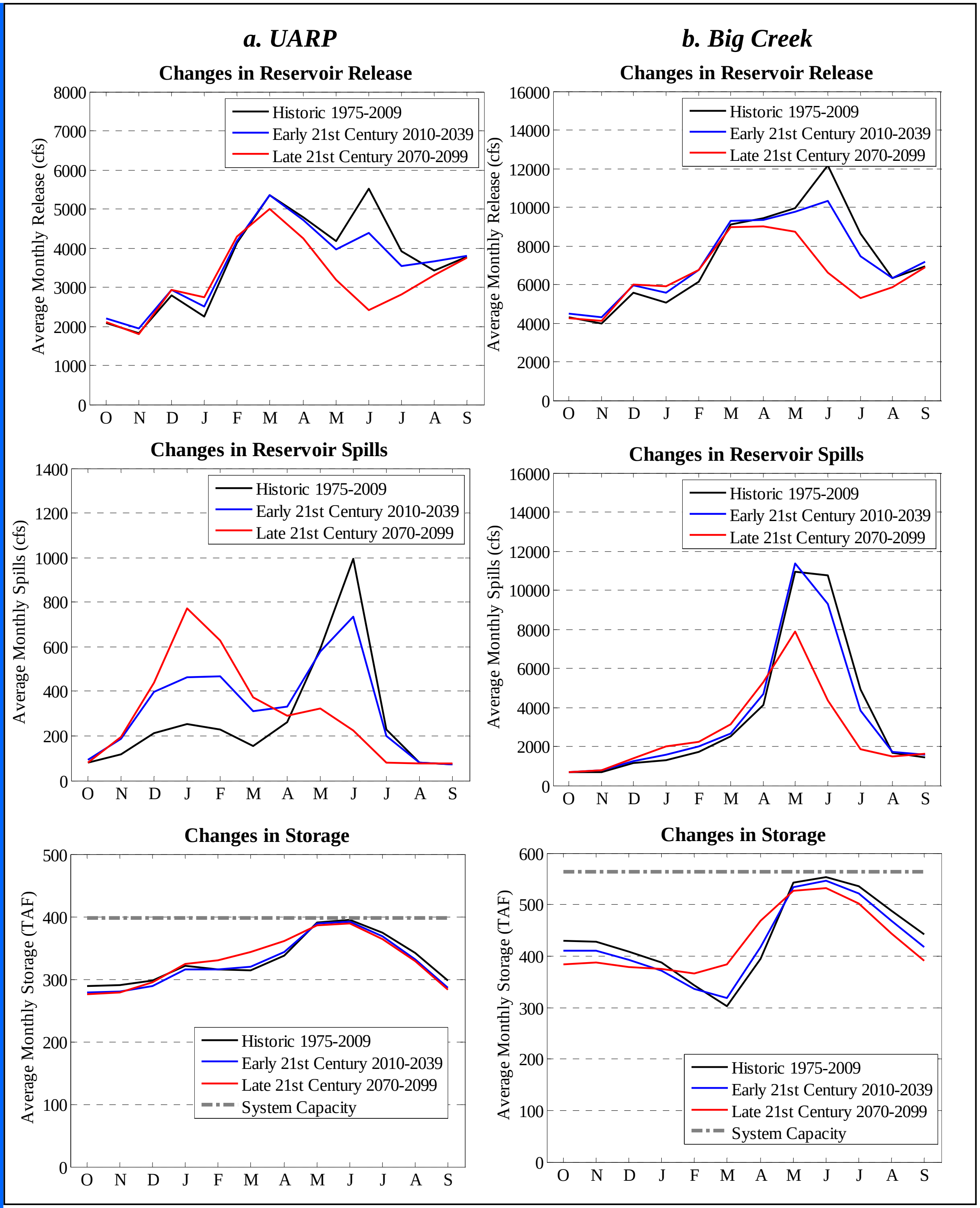
- In average annual runoff is reduced (especially for Big Creek) but with large uncertainty
- Earlier center of mass (especially for UARP)
- Larger floods in winter



• Reduction in release in summer

• Increase in spills in winter in UARP; Reduction of spills in Big Creek

• Summer storage mostly unaffected



Conclusions: High Elevation Hydropower

- **Hydropower generation drops** under most of climate change scenarios as a consequence drier hydrologic conditions (especially Big Creek) and increased spills (especially UARP)

- Impact due to **earlier inflows** associated with increase in temperature is more evident in lower elevation systems (UARP)

- Under most circumstances these high elevation systems are able to keep their **power capacity** close to maximum levels during late spring and summer months

Acknowledgments

- Larry Dale
- Sebastian Vicuna
- SCE/SMUD
- CEC/PIER