Impacts of Climate Change on Two High Elevation Systems

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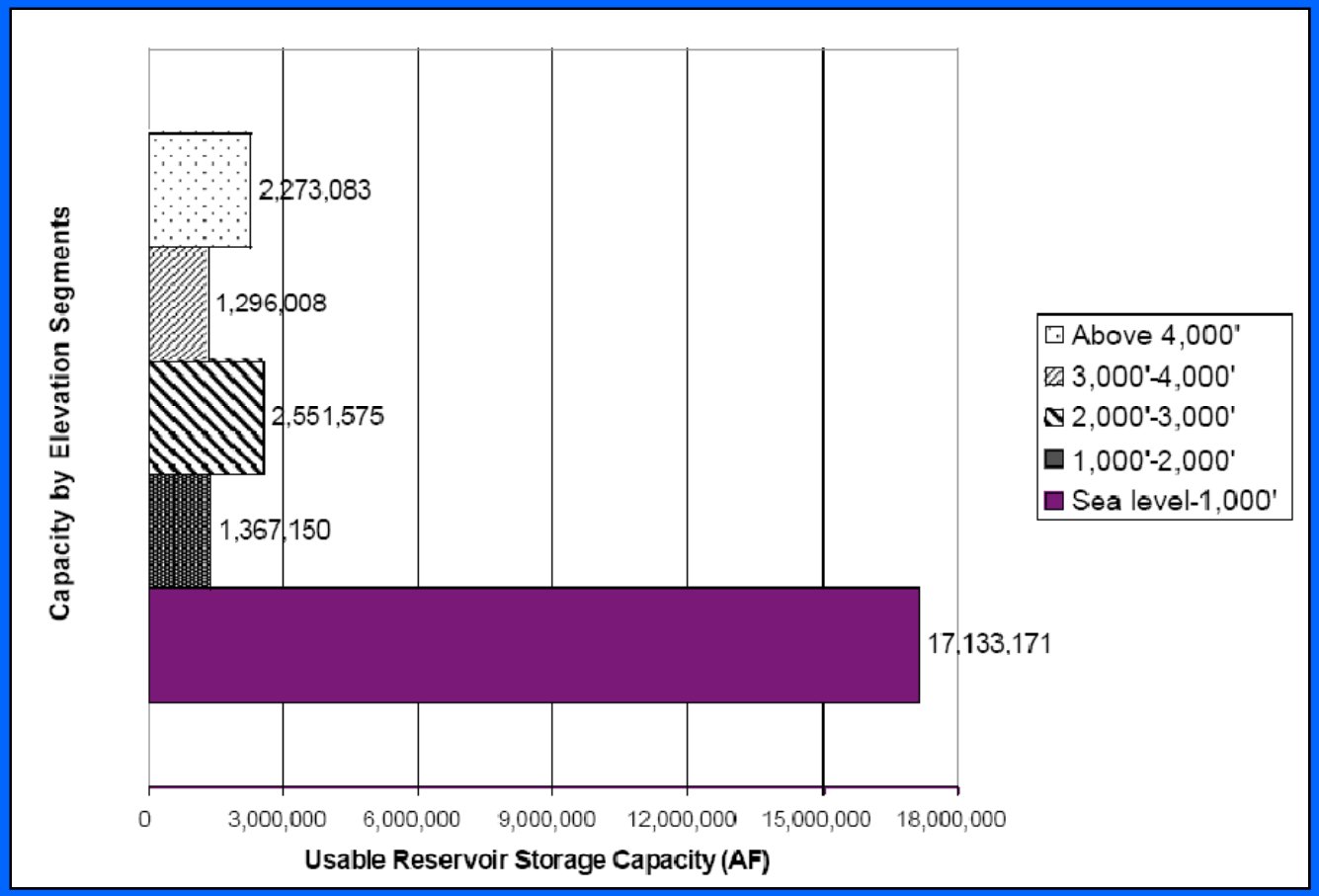
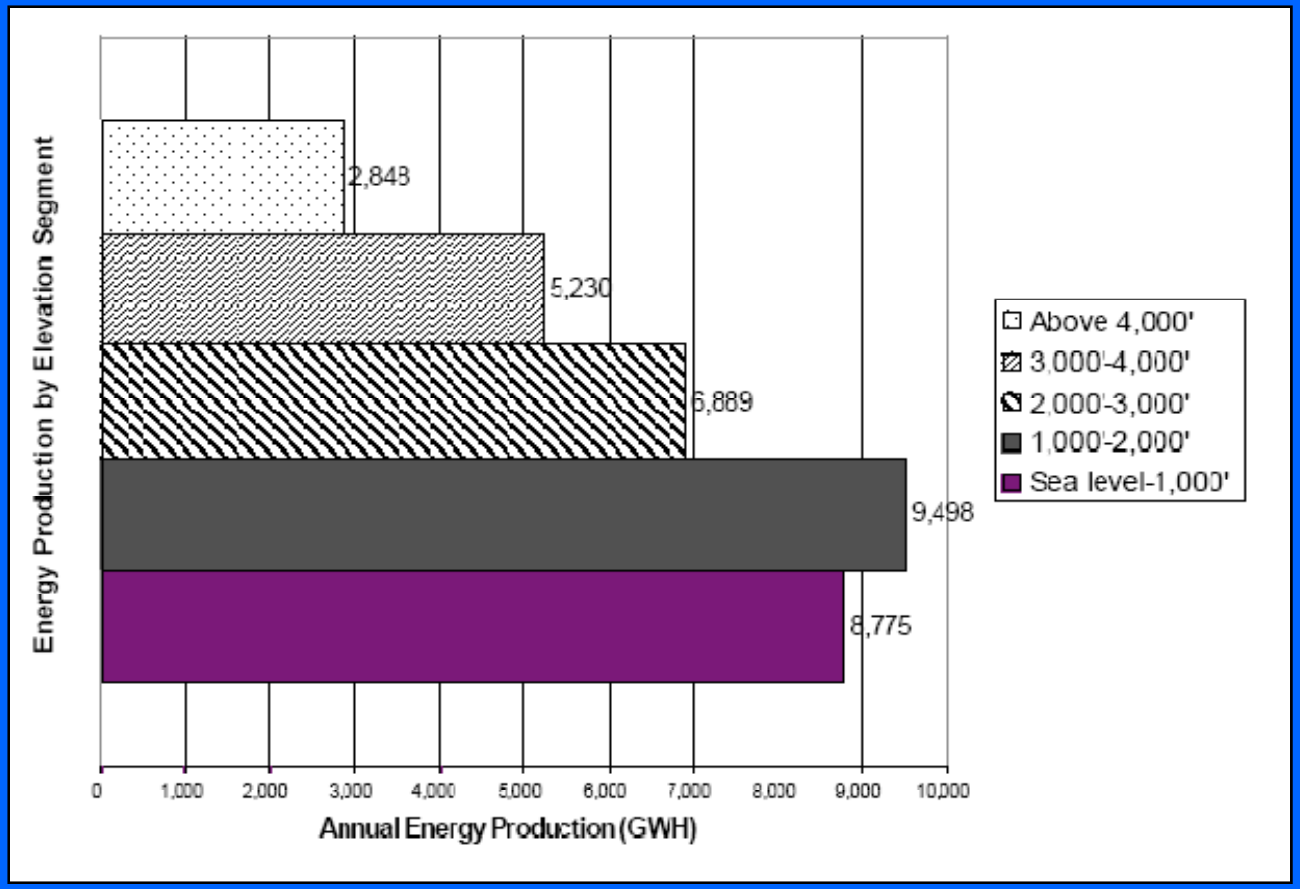
Difference between high and low elevation hydropower systems



Usable Reservoir Capacity by Elevation Segments

Aspen Environmental and M-Cubed, 2005

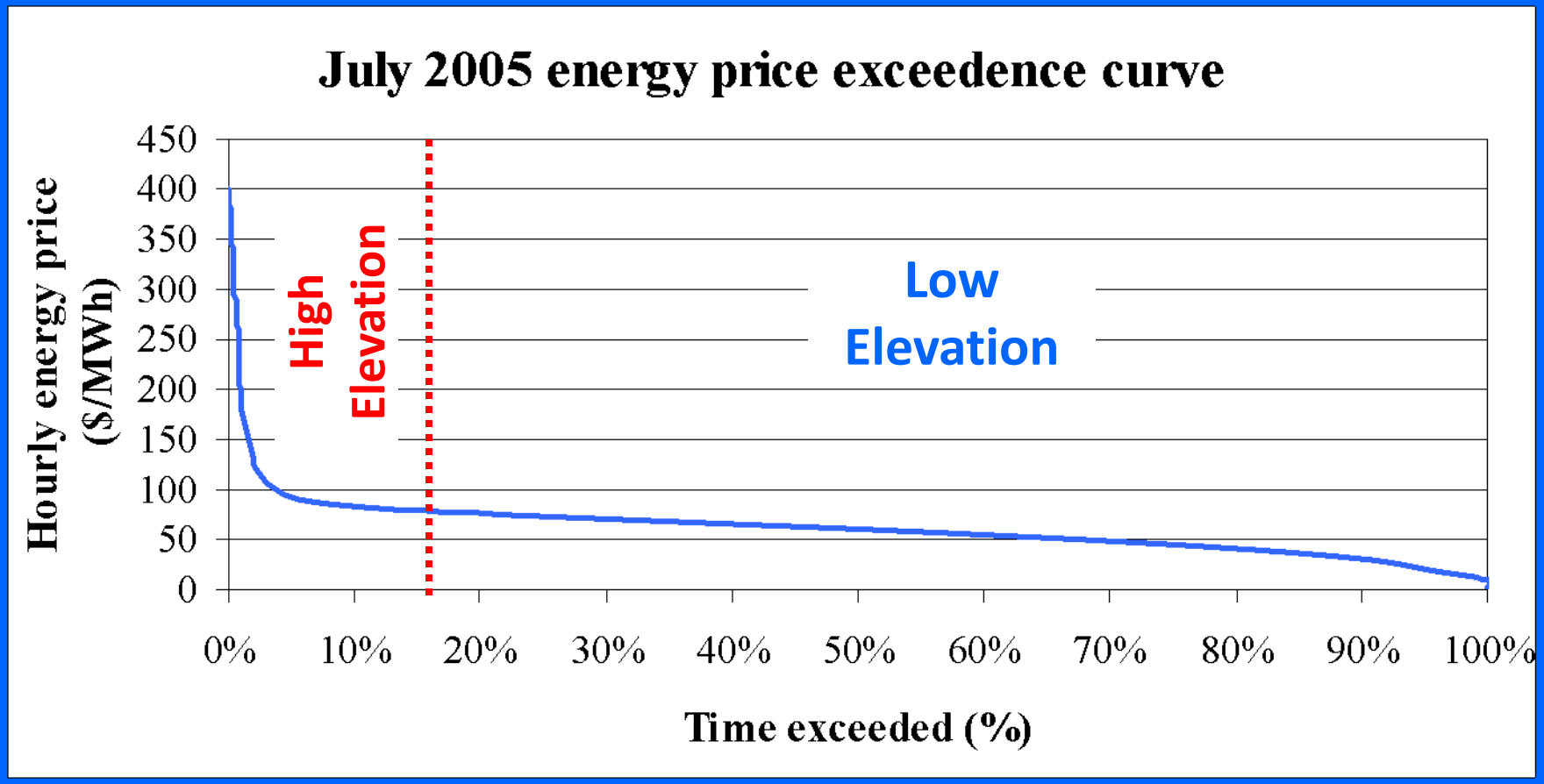
Difference between high and low elevation hydropower systems



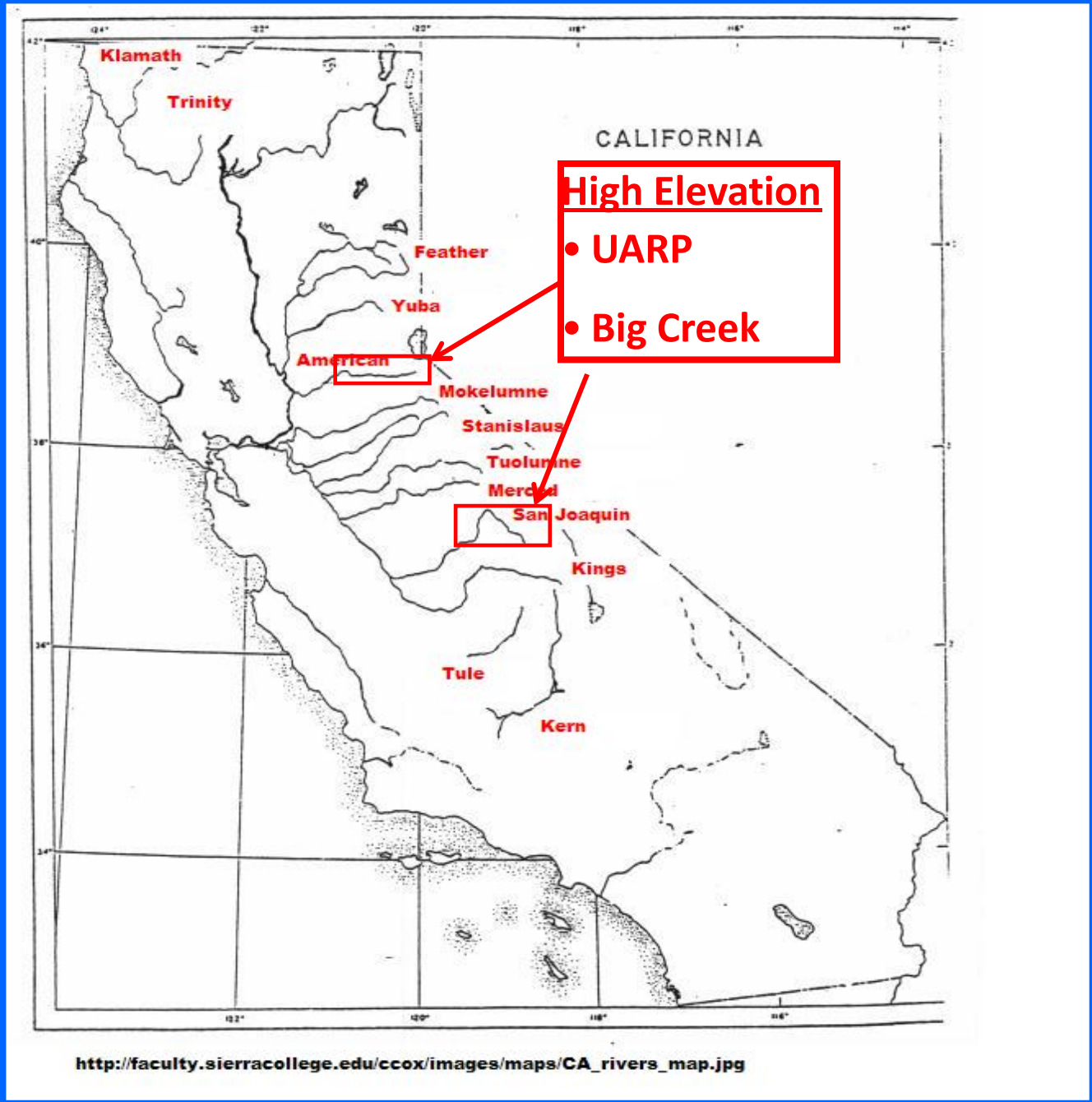
Average Annual Energy Production by Elevation Segments

Aspen Environmental and M-Cubed, 2005

Difference between high and low elevation hydropower systems



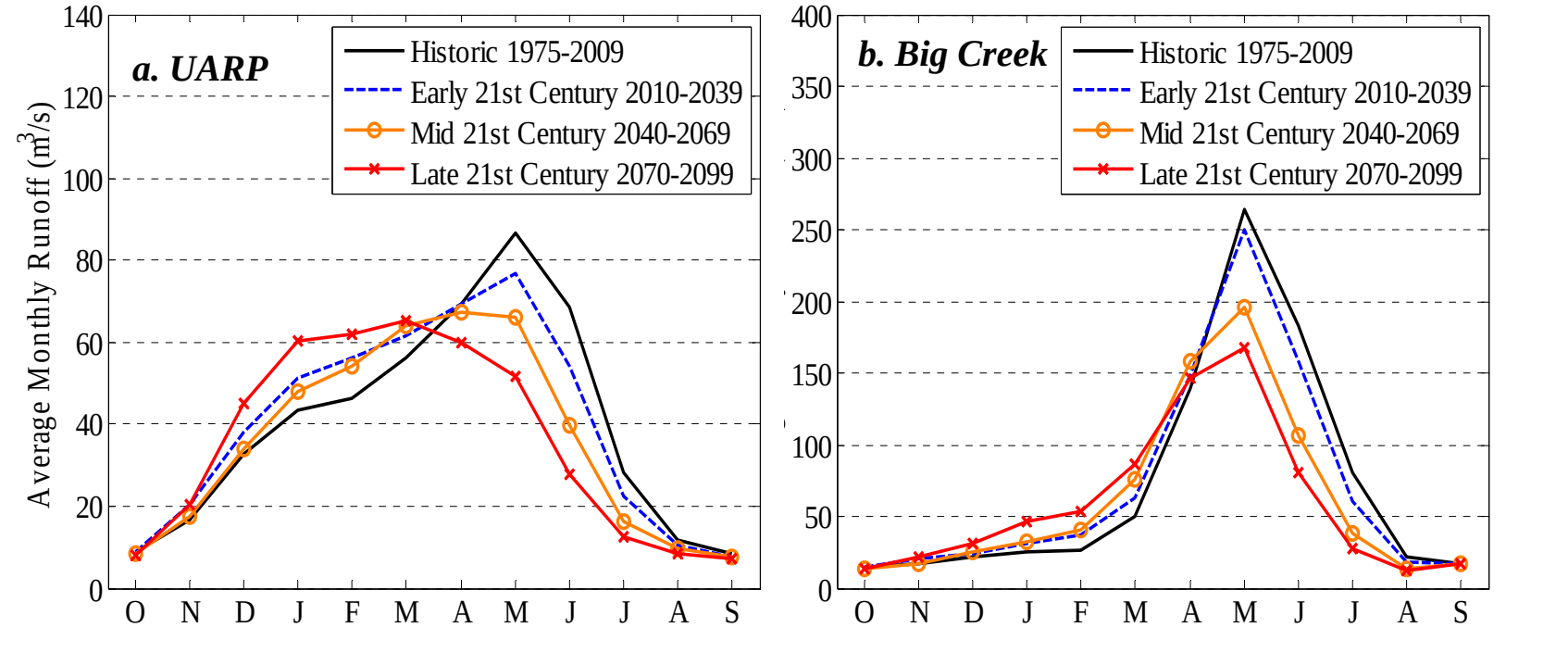
Two case studies



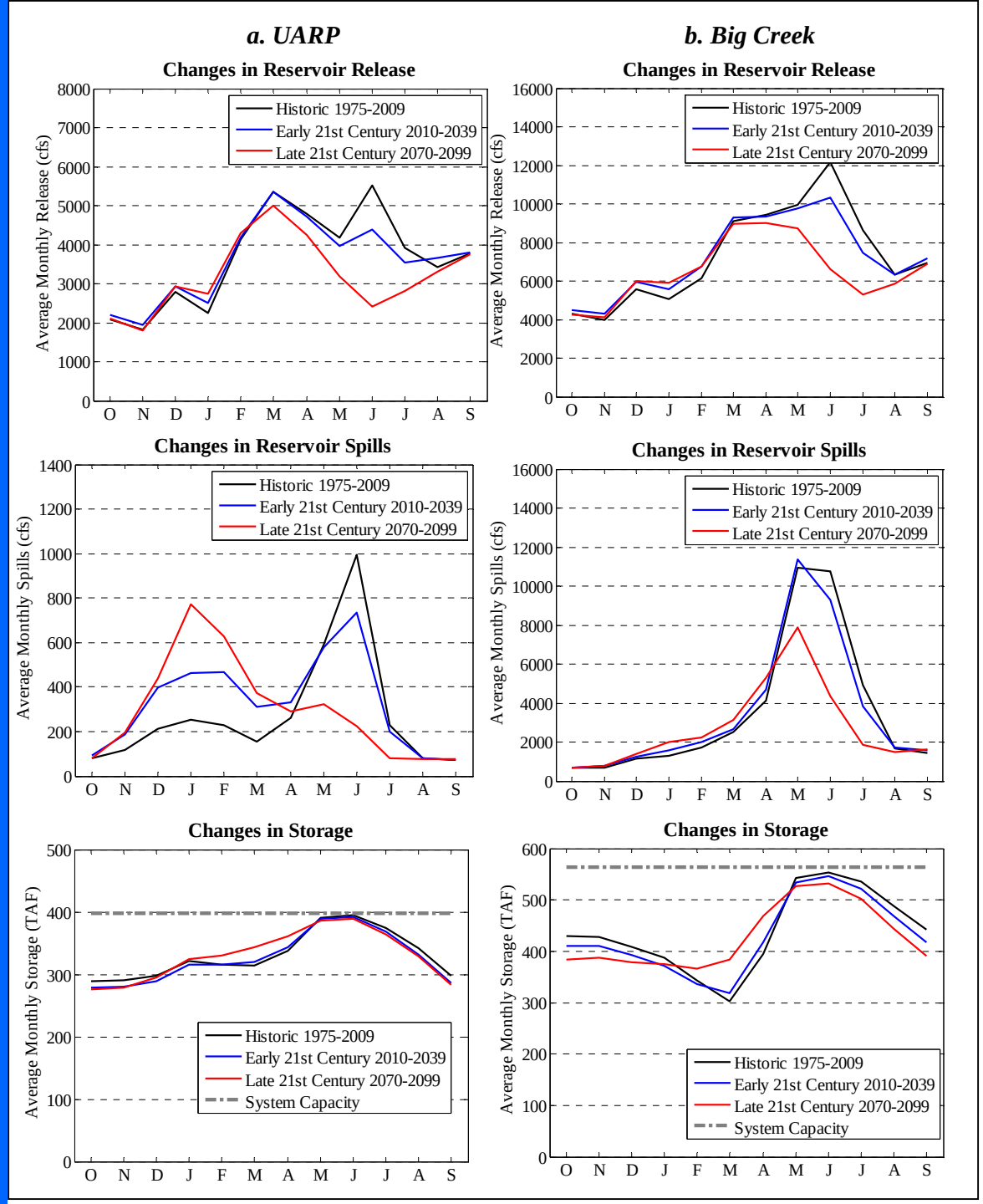
Climate change hydrology

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

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