HYDROCLIMATE VARIABILITY IN SNOW-FED RIVER SYSTEMS

Local Water Managers' Perspectives on Adapting to the New Normal

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In the snow-fed Truckee-Carson river system, northern Sierra Nevada, water managers are adapting to the "new normal" climate inclusive of increased hydroclimate variability, warmer temperatures, and drought and flood extremes.

Snow-fed river system communities are highly sensitive to climate change (IPCC 2014; USGCRP 2017) because the majority of their water supply is derived from snow (Barnett et al. 2005; Mankin et al. 2015; Li et al. 2017). A warmer climate shifts precipitation phase from snow to rain (Knowles et al. 2006), altering snowpack dynamics, shifting peak streamflow timing, reducing groundwater recharge, and increasing winter and spring flooding (Mote et al. 2005; Stewart et al. 2005; McCabe et al. 2007; Jasechko et al. 2014; Trujillo and Molotch 2014; Dettinger et al. 2015; Harpold et al. 2017a). Warmer spring and summer temperatures further compound these "snow droughts" (Harpold et al. 2017b; Hatchett and McEvoy 2018) by increasing evapotranspiration rates and irrigation water demand (Hatchett et al. 2015). This presents critical challenges in managing seasonal water supply and demand engineered for stationary climate patterns (Milly et al. 2008; Georgakakos et al. 2014).

Conducting case study research in snow-fed river systems offers a unique opportunity to examine how hydroclimate variability alters water supply and influences local climate adaptation across diverse and competing water-use communities (McNeeley et al. 2016; Mills-Novoa et al. 2017; Sterle and Singletary 2017; Mostert 2018). Such climate adaptation

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