

Reconstructing 20th Century Flood Patterns in Havasu Creek, Arizona, Using Historical and Dendrochronologic Data

Theodore S. Melis and William M. Phillips

Abstract

Havasu Creek is the second largest tributary of the Colorado River in Grant Canyon. Perennial streamflow in the creek seldom exceeds $2 \text{ m}^3/\text{s}$, but it supports an important riparian habitat as well as unique travertine pools and waterfalls that attract over 20,000 tourists annually. Havasu Canyon is also home to over 400 members of the Havasu Tribe. Despite a long history of habitation and recreation in Havasu Canyon, streamflow records for Havasu Creek are extremely limited, making flood prediction difficult. Historical accounts and photographs indicate that Havasu Creek experienced frequent, large floods in both winter and summer during the late 19th and early 20th centuries. The largest flood was in January 1910. Between about 1940 and 1990 mainly smaller summer floods occurred. In September 1990, the largest flood in Havasu Creek since 1935 and possibly 1910 was generated by intense thunderstorms. The 1990 flood had a peak discharge of about $575 \text{ m}^3/\text{s}$, caused severe damage to Supai, Arizona, scoured hundreds of ash trees (*Fraxinus* sp.), and altered many pools and waterfalls along Havasu Canyon. Smaller floods also occurred in July 1992 and February 1993. Dendrochronologic data indicate that most ash trees along Havasu Creek germinated after 1940, with a peak in recruitment during the late 1960s and early 1970s. This recent peak likely reflects disturbance by humans rather than effects of flooding. The recent flood pattern resembles the more dynamic flood regime of the first third of the 20th century. Trends in annual frequency of 24-hour precipitation $>25 \text{ mm}$ within four nearby precipitation records follow the historical pattern of flooding in Havasu Canyon.