

TAMARISK FLOWERING AND SEED RELEASE PHENOLOGY IN RELATION TO
COLORADO RIVER HYDROGRAPHY AND CLIMATE, SOUTHWESTERN USA

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ABSTRACT

Non-native tamarisk (*Tamarix ramosissima*) colonized riparian habitats and reservoir shorelines throughout the western United States during the 20th Century; however, basic life history and regeneration requirements information are still lacking. We compiled elevation, date, and phenological data from 609 tamarisk specimens in southwestern herbaria to relate its reproductive phenology across elevation to hydrography and flow management in the Colorado River basin. We calculated the percentage of specimens releasing seed as a function of elevation and Julian day in three elevation belts: low (300-600 m), middle (1200-1500 m), and high (1800-2100 m) elevation. We compiled field observations on its distribution and phenology from 1984-2006, and monitored recruitment on several debris-fan complexes. We compared recruitment responses in the pre- and post-dam Colorado River mainstream, Lake Mead and Lake Powell reservoirs, and in tributaries with low- or high-elevation headwaters. Flooding timed with seed release may result in tamarisk germination events. Conversely, planned floods that specifically avoid the May-June peak tamarisk seed release period permit little tamarisk recruitment. Failing recruitment in the post-dam Colorado River in Grand Canyon has occurred because the spring-summer hydrograph is generally unsuitable for tamarisk seedling establishment and mean sand particle size has coarsened. Hydrograph management may be used to manage tamarisk recruitment; nonetheless, flow

regimes coupled with poorly-timed planned or unplanned floods can quickly reverse long-term trends in reduced tamarisk recruitment in the Colorado River.

Key words: Colorado River, germination, hydrograph, nonnative species, phenology, regeneration niche, riparian, Tamarix