

Effects of Glen Canyon Dam Discharges on Water Velocity and Temperatures at the Confluence of the Colorado and Little Colorado Rivers and Implications for Habitat for Young-Of-Year Humpback Chub (Gila Cypha-: Open-File Report



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U.S. Department of the Interior, United States Geological Survey (USGS), et al., Frank R. Protiva

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EFFECTS OF GLEN CANYON DAM DISCHARGES ON WATER VELOCITY AND TEMPERATURES AT THE CONFLUENCE OF THE COLORADO AND LITTLE COLORADO RIVERS AND IMPLICATIONS FOR HABITAT FOR YOUNG-OF-YEAR HUMPBACK CHUB (GILA CYPHA-: OPEN-FILE REPORT)

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Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book ***** Print on Demand *****. Water velocity and temperature are physical variables that affect the growth and survivorship of young-of-year (YOY) fishes. The Little Colorado River, a tributary to the Colorado River in Grand Canyon, is an important spawning ground and warmwater refuge for the endangered humpback chub (*Gila cypha*) from the colder mainstem Colorado River that is regulated by Glen Canyon Dam. The confluence area of the Little Colorado River and the Colorado River is a site where YOY humpback chub (size 30-90 mm) emerging from the Little Colorado River experience both colder temperatures and higher velocities associated with higher mainstem discharge. We used detailed surveying and mapping techniques in combination with YOY velocity and temperature preferenda (determined from field and lab studies) to compare the areal extent of available habitat for young fishes at the confluence area under four mainstem discharges (227, 368, 504, and 878 m³/s). Comparisons revealed that the areal extent of low-velocity, warm water at the confluence decreased when discharges exceeded 368 m³/s. Furthermore, mainstem fluctuations, depending on the rate of upramp, can affect velocity and temperature dynamics in the confluence area within several hours. The amount of daily fluctuations in discharge can result in the loss of approximately 1.8 hectares of habitat favorable to YOY humpback chub. Consequently, flow fluctuations and the accompanying changes in velocity and temperature at the confluence may diminish the recruitment potential of humpback chub that spawn in the tributary stream. This study illustrates the utility of multiple georeferenced data sources to provide critical information related to the influence of the timing and magnitude of discharge from Glen Canyon Dam on potential rearing environment at the confluence area of the Little Colorado River.

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