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Ecosystem responses to substantial channel flow changes of the Tarim River (NW China)

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The channel flow respectively the discharge of the Tarim River has strongly seasonal differences, and has been changed from time to time since many centuries. Distinct fluctuations of the channel flow are characteristic even for the lower section of the Tarim River. River network changes, including changes of the terminal lake(s) have been occurred there in consequence of this. Historical documents from Sven Hedin show such changes. Extensive water consumption especially in the upper and middle reaches of the Tarim since the 1950s has not only lead to a drying-out of the terminal Taitema Lake from 1972 to 2010, but also to a broad range of ecological disasters. Among them the disturbance of the Populus euphratica floodplain forests caused by deficit water availability is one of the strongest problems. Water transfer from the Boston Lake via the Konqe River channel and from the upper Tarim has been taken place between 2000 and 2012 for improving the water availability situation at the lower Tarim section. The ecosystem response there is quite different from site to site. Besides the water availability and the Populus euphratica's vitality soil and sediment conditions, such as sediment layer thickness, grain sizes and porosity, humus content, clay minerals and salt content, has been identified as essential factors influencing the trees restoration ability, because they determine surface and subsurface water passage and water storage features of the Populus euphratica stands.