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Decline of the world's saline lakes

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Abstract

Many of the world's saline lakes are shrinking at alarming rates, reducing waterbird habitat and economic benefits while threatening human health. Saline lakes are long-term basin-wide integrators of climatic conditions that shrink and grow with natural climatic variation. In contrast, water withdrawals for human use exert a sustained reduction in lake inflows and levels. Quantifying the relative contributions of natural variability and human impacts to lake inflows is needed to preserve these lakes. With a credible water balance, causes of lake decline from water diversions or climate variability can be identified and the inflow needed to maintain lake health can be defined. Without a water balance, natural variability can be an excuse for inaction. Here we describe the decline of several of the world's large saline lakes and use a water balance for Great Salt Lake (USA) to demonstrate that consumptive water use rather than long-term climate change has greatly reduced its size. The inflow needed to maintain bird habitat, support lake-related industries and prevent dust storms that threaten human health and agriculture can be identified and provides the information to evaluate the difficult tradeoffs between direct benefits of consumptive water use and ecosystem services provided by saline lakes.