OC20 - Restoration of alpine ponds for conserving a biodiversity threatened by warming

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Climate warming is forecasted to be particularly pronounced in some regions of the world, as in the Alps. The biodiversity of alpine freshwater systems is therefore under a high pressure. The boreo-alpine species, linked to cold temperatures, have to move upwards in the mountains for seeking for new habitats. A proactive management strategy is the restoration of freshwater habitats in altitude, for providing new habitats and also stepping stones for assisting species in their upward migration. But how successful is such type of restoration in altitude? Will the boreo-alpine species colonize and establish populations in these new habitats? To investigate these questions, we assessed the biodiversity of 44 ponds (9 to 7500 m^2) created through restoration measures these last 50 years in the Swiss Alps, at elevations comprised between 1250 and 2590 m.a.s.l. Three contrasted taxonomic groups were targeted: aquatic plants (passive colonizers), aquatic beetles and dragonflies (active colonizers). A total of 22 boreo-alpine species was observed for these 3 groups. Linked to high elevation, the pond species richness was low. For boreo-alpine species, the mean richness was highest for aquatic plants (0.9 species per pond), followed by dragonflies (0.4) and aquatic beetles (0.4). Surprisingly, most ponds were rapidly colonized by this biodiversity, and after 10 year its magnitude was already near that of mature ponds. This assessment demonstrates the success of restoration of waterbodies in the alpine landscape. We therefore encourage such actions, especially in the upper elevation boundary of the areas presently occupied by the boreo-alpine species. To assist the managers, we produced also a “best-practice” guide for creating new ponds. For the sensitization of the general public to the impact of warming on biodiversity, we created a pilot alpine pond (Isérables VS; 2200 m.a.s.l.), included in a larger pond network, for the observation of sentinel species by the general public. These topics are developed on a public web site: www.climares.ch .