From ponds to pondscapes: habitat characteristics influencing the abundance of the threatened yellow-bellied toad (*Bombina variegata*).

Abstract from Cyann Winkler's master's thesis, carried out at the University of Neuchâtel and accepted for publication in the journal *Amphibia-Reptilia*.

Amphibians are the most endangered class of vertebrates globally, with approximately 40% of species threatened with extinction. Among them, the yellow-bellied toad (*Bombina variegata*) has experienced significant population declines due to habitat destruction, fragmentation, and the disappearance of dynamic aquatic environments. To provide effective insights for conservation practitioners, this study examines the ecological requirements of *B. variegata* by analysing habitat characteristics influencing the species presence and abundance across two spatial scales: pond clusters and ponds. Using generalized linear mixed models, we assessed the presence and abundance from 518 ponds spread across 33 pond clusters located in four regions of western Switzerland.

Our results emphasize the importance of pond network density, with species presence and abundance increasing in pond clusters containing at least eight ponds. At the pond scale, occupancy was highest in sunlit ponds with sand/gravel or silt/clay substrates, while abundance was positively associated with populational connectivity and the availability of mineral shelters in the direct proximity of the breeding site.

By integrating our finding with existing conservation guidelines, we recommend the creation of multiple small ponds within 150 m of occupied sites, ensuring high connectivity and maximising sun exposition. Terrestrial habitat management should incorporate structural refuges near breeding sites to enhance habitat suitability. Additionally, regular habitat renewal is crucial to sustaining dynamic breeding conditions. These insights reinforce the need for targeted habitat restoration to support *B. variegata* populations in human-dominated landscapes and, more generally, stress the importance of maintaining well-connected pond clusters with high-quality terrestrial habitat for spatially-structured populations of pond-breeding amphibians.