

Amphibien, Landnutzung, Klimawandel und Sukzession – vom Niedergang eines artenreichen Westerwälder Sekundärhabitats

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Amphibians, land use, climate change and succession – the decline of an amphibian-rich secondary habitat in the lower Westerwald

Secondary habitats such as the former military training area Schmidtenhöhe (Rhineland-Palatinate, Germany) often harbour a high amphibian diversity promoted by adequate land use. Eleven out of 17 species known to inhabit Rhineland-Palatinate have been recorded in this area. Since 1992, landscape and corresponding amphibian community structure, abundance of species and recruitment of metamorphs were monitored annually in the northernmost section (tank training area, 0.18 km²) using visual and acoustic transects. Ten amphibian species occurred in this small subarea between 1992 and 2020. During the same period the number of suitable breeding ponds (water-filled tank tracks) decreased from 46 to 14 due to successional siltation. In 2020, only two permanently filled tracks were left. Desiccation of ponds was promoted by continuously rising mean air temperatures (+1.4 °C in 28 years), suspension of vehicle training and the increased evaporation by emerging scrubs and trees. Until 2011, the most abundant amphibian was the smooth newt *Lissotriton vulgaris*, replaced by the water frog *Pelophylax esculentus* until present. All local populations recruited offspring in this area until 2017. The dry springs of the past three years with the early desiccation of most breeding ponds prevented successful metamorphosis in five species (*Bombina variegata*, *Bufo bufo*, *Hyla arborea*, *Rana temporaria*, *Salamandra salamandra*). The strong decline of tree frogs from formerly several hundred breeding individuals to now a few individuals migrating to other localities is alarming. The long-term monitoring indicates that the study area has reached a tipping point, at which the still diverse secondary habitat may change within the future 5–10 years to a widely depleted summer home range of forest-associated amphibians.

Key words: Amphibians, Westerwald, breeding pond, habitat change, local climate warming, precipitation regime.

Zusammenfassung

Sekundärhabitats wie der ehemalige Standortübungsplatz Schmidtenhöhe (Rheinland-Pfalz) zeichnen sich bei geeigneter Landnutzung durch eine hohe Amphibien-diversität aus. Elf der 17 rheinland-pfälzischen Amphibienarten kommen in diesem Gebiet vor. Seit 1992 wurden die Amphibienvielfalt, Abundanz, Nachwuchsrekrutierung und Geländestruktur des nördlichen Teilbereichs (Fahrschulgelände, 0,18 km²) jährlich mit visuellen und akustischen Transekten untersucht. Zehn Amphibienarten wurden allein in diesem Teilgebiet zwischen 1992 und 2020 nachgewiesen. Im selben Zeitraum nahm die Anzahl der potenziellen Laichgewässer (staunasse Panzerfahr-