
Banff Thermal Spring Ecosystems—Where Rarity is Common

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Abstract: One of the recovery actions identified in the Parks Canada approved Resource Management Plan for the Recovery of the Banff Springs Snail (see related abstracts by first two authors) was to document the flora and fauna of the thermal spring ecosystems as a means of understanding the ecosystems' dynamics. In 2001 and 2002, several resource reconnaissances were conducted with the objective of identifying vascular plants, bryophytes and mosses, and algae, and odonates and other invertebrates that occupy the thermal springs. Concurrently, several conceptual models were developed which identified and explained the interactions of the various abiotic and biotic components of the ecosystems, including humans. These models ranged in scale from 1 m² to the ecosystem level. The various resource reconnaissances found protozoa and 6 metazoan phyla including at least 1 endemic species, the endangered Banff springs snail (*Physella johnsoni*), and the Alberta-listed damselflies, *Argia vivida* (S1) and *Amphiagrion abbreviatum* (S2/S3). Additionally, 78 species and 3 intraspecific taxa (including a new provincial record and 28 'rare' S1–S3 species) of moss, 13 species of liverworts (including 3 S1 and 3 S2 species), and 26 algae genera (representing 40–50 species) were found. A least two vascular plant species appear to have been extirpated as they have not been seen at the thermal springs since the 1890s. The high level of taxa rarity combined with human-caused alterations to the quantity and quality of thermal spring water plus introductions of exotics have already lead to extinctions (including a fish, the Banff longnose dace [*Rhinichthys cataractae smithi*]). This suggests that the thermal spring ecosystems themselves may be at risk and in need of further protection.

Key Words: Banff springs snail, *Physella johnsoni*, thermal springs, species at risk, conservation, Banff National Park, Alberta