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Effects of hot ground water on a small swamp-stream in Nova Scotia, Canada

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We examined the effects of anthropogenically heated spring water (35-45^{o}C) on the ecology of a small, fishless, swamp-stream in Nova Scotia, Canada. Temperatures diminished quickly with distance downstream from the hot spring because of abundant inflow of cold ground water ($<10^o$C), but elevated temperature effects were detectable 130 m downstream. The brook below the hot spring supported a dense mat of the cyanobacterium *Oscillatoria* (10 m) followed by the green alga *Vaucheria taylorii* (40 m). Herbaceous vegetation below the algal zones was also altered by the hot water inflow, even where the temperature increase was slight.

The structure of the sparse community of aquatic invertebrates was sharply different at sites of different stream temperature: only oligochaete worms, seed shrimps (ostracods), midge larvae (chironomids), and a single species of snail thrived at the warmest sites; the coldest downstream site supported a typical headwater-stream community. Mass loss from decomposing leaves of *Alnus incana* (speckled alder) was strongly correlated with water temperature; rates near the hot spring were three times those at colder downstream sites. Higher current velocity and the presence of leaf-shredding insects at the farthest downstream site increased mass loss rates there despite the low temperatures.

The changes in community composition and decomposition rate in response to the added heat are similar to those observed in response to other disturbances such as organic pollution; these changes persisted even where the temperature increase was very small, indicating a tight coupling of ecosystem structure and function with the thermal environment.