STUFFIES, BEAVERS AND EUTROPHICATION IN THE SHICKASHEEN WATERSHED

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ABSTRACT

Trained water quality volunteers have monitored numerous pond and stream sites in the Pawcatuck (RI) watershed since 1988. By 1990 significant water quality deterioration was documented in two monitored ponds in the Shickasheen sub-watershed, Yawgoo and Barber ponds, with clarity declining from ~3m to ~0.5m and chlorophyll increasing to hypereutrophic levels. The 1991 closure of upstream stuffed clam producers in the wake of investigations by state regulatory agencies initially led to significantly improved water quality. Water clarity improved and chlorophyll content plummeted. This successful recovery was celebrated for several years. By 1997 a decline in water quality was again evident, even worse than before, despite no commercial or residential development. Site investigations revealed the presence of a sizable beaver dam on Shickasheen Brook, flooding upstream Arrow Swamp, principal receiving water from the former shellfish plants. Removal of the beaver dam and the beavers returned Arrow Swamp to it previous regime of periodic flooding and draining. After several years in-stream phosphorous concentrations declined, eventually decreasing ten-fold to near-background levels. Hypolimnetic phosphorus loads in the downstream ponds remained excessive through 2005. In 2007 the downstream ponds began showing recovery from the phosphorus inputs. This decades-long situation provides valuable lessons on unintended consequences from the intersection of commercial site selection, waste treatment, water quality standards, citizen activism, wildlife, external and internal phosphorus loading and the exemplifies importance of long-term volunteer monitoring.

KEYWORDS

Water quality, monitoring, phosphorus, internal phosphorus loading, water quality stressors, watersheds, volunteer monitoring.