

Large woody debris structures and their influence on Atlantic salmon spawning in a stream in Nova Scotia, Canada

Charles MacInnis, Trevor A. Floyd and Barry R. Taylor

Abstract

Large woody debris from streamside vegetation has profound influences on channel morphology and habitat for salmonid fishes, but has often been depleted by channelization or deforestation of the riparian zone. We installed artificial structures mimicking naturally fallen trees in a third-order stream in northern Nova Scotia from 1992 to 2004 to determine if the structures enhanced spawning success of Atlantic salmon *Salmo salar*. A total of 250 digger logs (which mimic fallen tree trunks and stimulate formation of pools) and bank deflectors (which encourage meandering) were constructed in degraded reaches of Brierly Brook, beginning at the downstream end. We monitored spawning each year by counting redds during the fall spawning season. Spawning rates (redd counts) in the whole brook increased exponentially for the first four years after restoration work began, from 43 in 1992 to 592 in 1996. By 1996, the entire length of Brierly Brook contained redds, and Atlantic salmon were using gravel that accumulated behind digger logs to build redds. Thereafter, redd counts remained high (502-605) but no longer increased, suggesting that restoration near the mouth of the brook removed an impediment to upstream migration. In 2004, reaches with artificial structures had significantly more redds (336) than reaches without them (280). In reaches with artificial structures, 48% of the redds were associated with gravel pool-tails or the heads of riffles, 44% were near artificial structures, and 7% were near natural large woody debris. In reaches without artificial structures, almost 89% of the redds were associated with pool tails, and the remainder with natural large woody debris. It appears that large woody debris, whether natural or artificial, is an important source of spawning habitat for Atlantic salmon. Artificial structures mimicking naturally fallen wood are effective in the restoration of spawning habitat.