

Beaver Effects on Trout and Salmon - Wikipedia



Salmon (*Oncorhynchus nerka*) jumping beaver dam

Beaver ponds have been shown to have a beneficial effect on trout and salmon populations. Many authors believe that the decline of salmonid fishes is related to the decline in beaver populations. Research in the [Stillaguamish River](#) basin in [Washington](#) found that extensive loss of beaver ponds resulted in an 89% reduction in [coho salmon](#) (*Oncorhynchus kisutch*) smolt summer production and an almost equally detrimental 86% reduction in critical winter habitat [carrying capacity](#).^[94] This study also found that beaver ponds increased smolt salmon production 80 times more than the placement of large woody debris.^[94] Swales and Leving had previously shown on the [Coldwater River](#) in [British Columbia](#) that off-channel beaver ponds were preferentially populated by coho salmon over other salmonids and provided overwintering protection, protection from high summer snowmelt flows and summer coho rearing habitat.^[95] The presence of beaver dams has also been shown to increase either the number of fish, their size, or both, in a study of [brook trout](#) (*Salvelinus fontinalis*), [rainbow trout](#) (*Oncorhynchus mykiss*) and [brown trout](#) (*Salmo trutta*) in [Sagehen Creek](#), which flows into the [Little Truckee River](#) at an altitude of 5,800 feet in the northern [Sierra Nevada](#).^[96] These findings are consistent with a study of small streams in [Sweden](#), that found that brown trout were larger in beaver ponds compared with those in [riffle](#) sections, and that beaver ponds provide habitat for larger trout in small streams during periods of drought.^[97] Similarly, brook trout, coho salmon, and [sockeye salmon](#) (*Oncorhynchus nerka*) were significantly larger in beaver ponds than those in unimpounded stream sections in [Colorado](#) and [Alaska](#).^{[98][99]} In a recent study on a headwater Appalachian stream, brook trout were also larger in beaver ponds.^[100]

Contrary to popular myth, most beaver dams do not pose barriers to trout and salmon migration, although they may be restricted seasonally during periods of low stream flows.^[101] In a meta-review of studies claiming that beaver dams act as fish passage barriers, Kemp et al. found that 78% of these claims were not supported by any data.^[102] In a 2013 study of radiotelemetry-tagged [Bonneville cutthroat trout](#) (*Oncorhynchus clarki utah*) and [brook trout](#) (*Salvelinus*

fontinalis) in Utah, both of these fish species crossed beaver dams in both directions, including dams up to 2 metres (6.6 ft) high.^[103] Rainbow, brown, and brook trout have been shown to cross as many as 14 consecutive beaver dams.^[96] Both adults and juveniles of coho salmon, [steelhead trout](#), [sea run cutthroat](#) (*Oncorhynchus clarki clarki*), [Dolly Varden trout](#) (*Salvelinus malma malma*), and sockeye salmon are able to cross beaver dams.^[101] In southeast Alaska, coho jumped dams as high as two meters, were found above all beaver dams and had their highest densities in streams with beaver.^[104] In Oregon coastal streams, beaver dams are ephemeral and almost all wash out in high winter flows only to be rebuilt every summer.^[105] Migration of adult Atlantic salmon (*Salmo salar*) may be limited by beaver dams, but the presence of juveniles upstream from the dams suggests that the dams are penetrated by [parr](#).^[106] Downstream migration of Atlantic salmon smolts was similarly unaffected by beaver dams, even in periods of low flows.^[106] Two-year-old Atlantic salmon parr in beaver ponds in eastern Canada showed faster summer growth in length and mass and were in better condition than parr upstream or downstream from the pond.^[107]

The importance of winter habitat to salmonids afforded by beaver ponds may be especially important (and underappreciated) in streams without deep pools or where ice cover makes contact with the bottom of shallow streams. Enos Mills wrote in 1913, "One dry winter the stream...ran low and froze to the bottom, and the only trout in it that survived were those in the deep holes of beaver ponds."^[108] [Cutthroat trout](#) and [bull trout](#) were noted to overwinter in Montana beaver ponds, brook trout congregated in winter in New Brunswick and Wyoming beaver ponds, and coho salmon in Oregon beaver ponds.^[106] In 2011, a meta-analysis of studies of beaver impacts on salmonids found that beaver were a net benefit to salmon and trout populations primarily by improving habitat (building ponds) both for rearing and overwintering and that this conclusion was based over half the time on scientific data. In contrast, the most often cited negative impact of beavers on fishes were barriers to migration, although that conclusion was based on scientific data only 22% of the time. They also found that when beaver dams do present barriers, these are generally short-lived, as the dams are overtopped, blown out, or circumvented by storm surges.^[102]

By creating additional channel network complexity, including ponds and marshes laterally separated from the main channel, beavers may play a role in the creation and maintenance of fish biodiversity.^[109] In off-mainstem channels restored by beaver on the middle section of Utah's [Provo River](#), native fish species persist even when they have been extirpated in the mainstem channel by competition from introduced non-native fish.^[110] Efforts to restore salmonid habitat in the western United States have focused primarily on establishing [large woody debris](#) in streams to slow flows and create pools for young salmonids. Research in Washington found that the average summer smolt production per beaver dam ranges from 527 to 1,174 fish, whereas the summer smolt production from a pool formed by instream large woody debris is about 6–15 individuals, suggesting that re-establishment of beaver populations would be 80 times more effective.^[94]

Recently, beaver have been discovered living in brackish water in estuarine tidal marshes where [Chinook salmon](#) (*Oncorhynchus tshawytscha*) densities were five times higher in beaver ponds than in neighboring areas.^{[42][111]}

20 □ ^ a b c P. Collen & R. J. Gibson (2001). ["The general ecology of beavers \(*Castor* spp.\), as related to their influence on stream ecosystems and riparian habitats, and the subsequent effects](#)

[on fish – a review](#)" (PDF). *Reviews in Fish Biology and Fisheries* **10** (4): 439–461. doi:[10.1023/A:1012262217012](#).

21 □ [^](#) Howard Park & Øystein Cock Rønning (2007). "Low potential for restraint of anadromous salmonid reproduction by beaver *Castor fiber* in the Numedalslågen river catchment, Norway". *River Research and Applications* **23** (7): 752–762. doi:[10.1002/rra.1008](#).

22 □ [^](#) Barry A. Taylor, Charles MacInnis, Trevor A. Floyd (2010). "Influence of Rainfall and Beaver Dams on Upstream Movement of Spawning Atlantic Salmon in a Restored Brook in Nova Scotia, Canada". *River Research and Applications*: 183–193. doi:[10.1002/rra.1252](#).

23 □ [^](#) Douglas B. Sigourney, Benjamin H. Letcher & Richard A. Cunjak (2006). "Influence of beaver activity on summer growth and condition of age-2 Atlantic salmon parr". *Transactions of the American Fisheries Society* **135** (4): 1068–1075. doi:[10.1577/T05-159.1](#).