

## Henderson River Fence Questions & Answers

**Q:** Does the fence block or delay migration of salmon trying to enter Henderson Lake?

**A:** No, the fence does not block migration but it can slow migration of salmon entering Henderson Lake. We have counts of salmon through the counters which tells us that the salmon are passing through. The fence was built to accommodate the natural migration that salmon tend to travel in Henderson River. In the warmer days, salmon tend to stage in deeper areas such as pools which provide a cooler environment until optimum conditions such as cooler temperatures or an increase in precipitation permit migration. When migrating upriver they are more attracted to areas that have an increase in flow and are deeper. This environment is also cooler compared to other sections of the river that may be warm and shallow.

The fence is built in the middle portion of Henderson River and the fish passage sections with the counters are situated in the deeper part of the river along the fence. Because of the angle and position of the fence, there is more flow and deeper water traveling through the fish passage section which attracts the salmon towards that general area. Not all salmon follow this pathway and when they encounter the fence they start searching for an exit to the other side which they eventually find. If a certain portion of salmon were not able to pass the fence, we believe that we would be observing a lot more mortality below the fence throughout this project, and especially at the peak of the run, besides the odd carcass that has been observed throughout the years of operation which were caused mainly from predation or being trapped under the fence because of not being properly rocked on the bottom.

In regards to the delayed migration of salmon, this occurs because fish are restricted on passing only through the counters at the fish passage sections. The delayed migration is more an issue when there are large amounts of salmon encountering the fence at the same time. To minimize this problem we can and have installed more passage sections in the past to ensure a quicker exit route for salmon passing the fence. Right now we have one section designated for passage that has five tunnels open for salmon to pass. In the past, we have had up to four passage sections each with four tunnels but problems with vandalism and theft has prevented us in setting these in place. In the end, we continue to observe the sockeye in Clemens Creek every year. Because of this, we don't believe the delayed migration, if any, has very little or no effect on the population as a whole on successfully making it to the spawning grounds at a reasonable timeframe.

**Q:** Do the salmon swim back out of Henderson River because of the fence?

**A:** No. When salmon return to freshwater to spawn, their bodies have to change from keeping salt out (when in saltwater) to keeping salt in (in freshwater). They do this by undergoing osmosis which is the diffusion of molecules from a semipermeable membrane to an area of high concentration to an area of low concentration until the concentration is equal on both sides. In other words, salmon use energy to adjust to their environment whether they are in the ocean or river. Salmon have a body composition of approximately 17‰ which is not equal to seawater (30‰) or freshwater (0‰) so they need to maintain a constant balance. When salmon enter the ocean as smolts, the water loss caused by being in a saltwater environment is countered by drinking seawater and excreting the excess salt content through its gills. When they return to the river as adults, salmon experience a water gain by being in a freshwater environment and excrete excess water through the kidneys by urinating and any salt content in the surrounding environment is absorbed through the gills to maintain that balance. Once adult salmon have made this change from saltwater to freshwater, they cannot go back (unlike steelhead and sea run cutthroat trout). The fence is situated in the middle portion of Henderson River to ensure an optimal freshwater environment unlike further down river near the estuary where the water may be brackish (mixture of freshwater and seawater) where the salmon have not transitioned to a full fresh water environment.

**Q:** Does the fence increase predation?

**A:** It can, but because of past experiences we have changed procedures to minimize it. In the past, the main problem we have encountered were bears breaking into the trap boxes to capture salmon that have been trapped for biosampling. This can be prevented by closing the trap box during work hours and workers being present or away a short period of time and reopen the trap box so salmon can pass through after samples have been collected. Sampling the salmon at the dock instead of on-site would also not attract predators to that general area. Seals are a common predator for salmon and may chase salmon up to the fence. Seals have also been known to take fish from people's nets. Overall, predation is natural and occurs throughout a salmon's lifecycle from eggs to adults. There are always ways to minimize predation at the fence site such as increasing fish passage sections or sampling fish off-site. In the end, we believe the value of the information obtained from the fence outweighs the natural predation of Henderson sockeye. Predation doesn't seem to have a significant impact on the population as a whole considering we are still seeing fish make it to the spawning grounds. Seals are a natural predator of salmon and have even been seen from Henderson Lodge in the past, as they followed the salmon migration to Clemens Creek.