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General Information

Cougar Creek runs through Surrey and North Delta and then into the Fraser River (Figure 1). This creek has three main sections, the Surrey Catchment area that includes Cougar Creek Park, Cougar Canyon Environmental Reserve, and Lower Cougar Creek. The starting water source that gives rise to the creek are two ponds located in the West Newton area of Surrey. These ponds help mitigate flood and drought, the stormwater pipes directly into the creek can cause high flow periods, which means that in cases of high rainfall, the creek will have high levels of water, and in hot periods, the creek levels are much lower. The water from these ponds flows between houses and past Khalsa School Newton until it reaches the ponds located in Cougar Creek Park. These ponds release water through a single outlet, where the creek winds through North Delta. In Surrey and North Delta, excess water is added to the creek from storm sewers that bring in water from houses and businesses. A huge amount of water enters from the highly urbanized Scott Road (120th Street) stormwater outfall, including oil drips and litter. From here, the creek continues to flow along its natural path until it reaches a point around Westview Drive in Delta, where human influence rerouted the creek at an approximate 90-degree angle in the 1970s. This new path the creek takes—through Delta Nature Reserve instead of Burns Bog—was named Northeast Interceptor Canal (NEIC) until 2017 when it was renamed Lower Cougar Creek. Lower Cougar Creek then continues along its man-made channel until it empties into the Fraser River in an opening near the Alex Fraser Bridge.

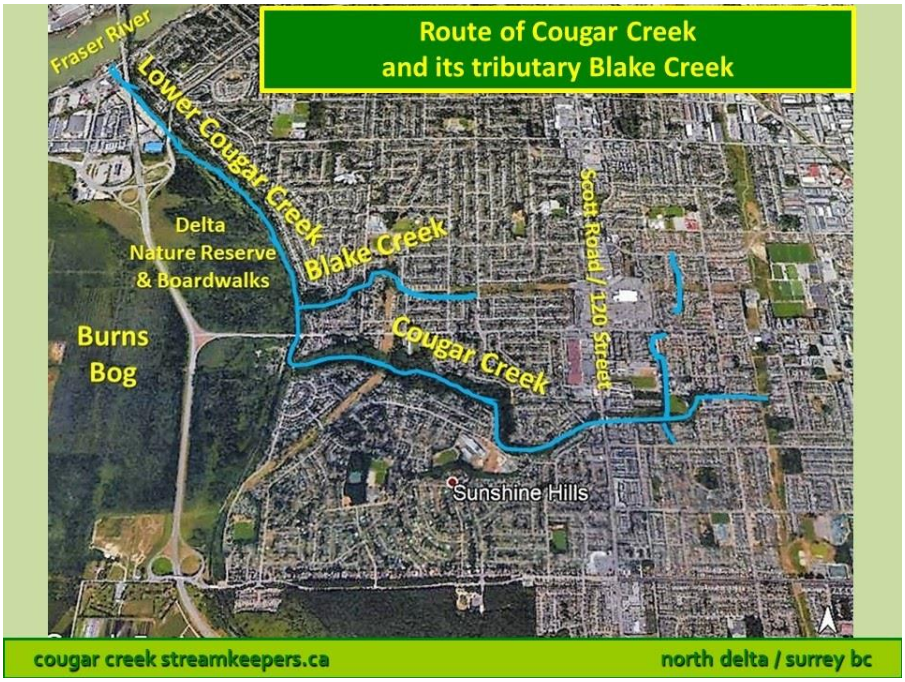

Figure 1. Outline of Cougar Creek and Lower Cougar Creek from its starting points in Surrey to its end point of the Fraser River.

Source: https://cougarcreekstreamkeepers.ca/wp-content/uploads/2019/09/Slide2.jpg

Prior to the 1970s creek diversion, Cougar Creek flowed through the neighbouring Burns Bog and emptied into Boundary Bay. The human interference to redirect the creek was deemed necessary due to many years of gradual obstruction, such as development of railroad tracks, sewage pipelines, and Highway 91. A large beaver pond existed up until 1926 when it was dynamited to make way for more human settlement.

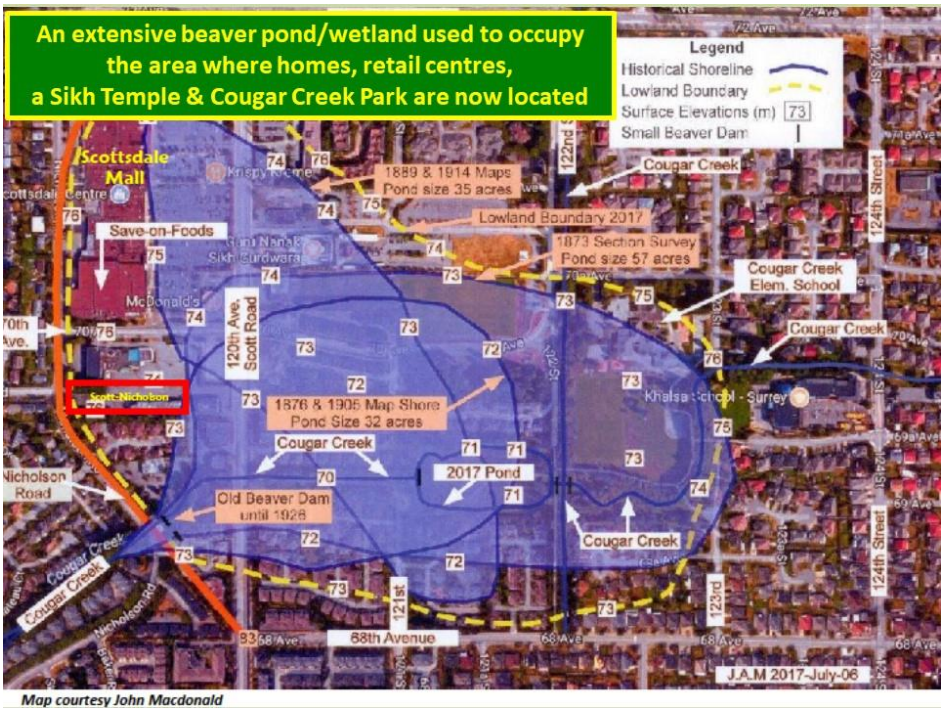

Figure 2. The shrinking shoreline of the Cougar Creek wetland.
Source: https://cougarcreekstreamkeepers.ca/wp-content/uploads/2019/09/Slide12.jpg

Along the entire creek path is a considerable amount of urbanization. The creek's starting location is in the center of a neighbourhood beside a frequently walked path. It then quickly flows past two schools, Cougar Creek Elementary School and Khalsa School. Further down, before passing into North Delta, the creek flows between condo buildings. In Delta, various amounts of urbanization surround the creek, including malls such as Scottsdale Centre, medical buildings, parking lots, neighbourhoods, a church, and more schools, such as Cougar Canyon Elementary and Seaquam Secondary. Of the medical buildings surrounding the creek, the Rai Medical Clinic and the Soh Site (duplex just south Rai's/Scott Road), due to their proximity, have been identified as important to maintaining Cougar Creek. Along Lower Cougar Creek, there is a railroad track, human walking trails, sewage pipes, ice rinks, lumbar yards, and a storage shipping container lot. This high level of urbanization harms the creek and therefore continued maintenance is required.

Species Present

Cougar Creek is home to an abundance of both animals and plants. In the creek itself, many fish species are present, including coho salmon (*Oncorhynchus kisutch*) which have a self-sustaining run, chum salmon (*Oncorhynchus keta*) which, despite annual fry releases, do not have a self-sustaining run, cutthroat trout (*Oncorhynchus clarkia*) that reside in the creek year-round as self-sustaining population. Non-salmonids include peamouth chub (*Mylocheilus caurinus*), sculpin, and threespine stickleback (*Gasterosteus aculeatus*). Although chinook salmon (*Oncorhynchus tshawytscha*) are mentioned in the literature as being present, they have not been sighted in Cougar Creek for the past 40 years. Besides fish, the creek is also home to BC's only native crayfish species, the Signal Crayfish (*Pacifastacus leniusculus*). Other common fauna include the red-legged frog, blue heron, barred owl, muskrat, mallard and other ducks. Over the years, there's even been the occasional river otter sighting!

Beavers are also found throughout the creek, their presence evident by the cut-down trees and the dams built. These beaver dams are incredibly important to the ecosystem of the creek, as they cause build ups of water, creating habitats for many organisms, including frogs, fish, and herons. As such, they are considered ecosystem engineers for their contribution in providing others with these beneficial wetland habitats. However, their dams have caused flooding concerns to the humans surrounding the creek, which, in the past, has caused removal of dams and relocation of beavers to wilderness areas. The City of Surrey were granted a permit to trap beavers, and one was killed when its head was crushed in the trap (CBC News, 2008). To help alleviate this problem, the Cougar Creek Streamkeepers constructed two pilot project beaver pond levellers (pipe through beaver dam) in 2020-2021, to see if this technique can reduce the frequency of trail flooding caused by dams.

Despite being named 'Cougar Creek,' cougars do not actively inhabit the region, with the last cougar being spotted in august of 2011. No additional information regarding the population of cougars around the creek has been found, but it is likely that due to the high human presence and urbanization cougars have been extirpated from this area.

Surrounding the creek are a wide variety of plant species. These include tree species, such as Douglas-fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata***)**, hemlock (*Tsuga* spp.), mountain ash (*Sorbus aucuparia*), dogwood (*Cornus* spp.), the occasional birch (*Betula* spp.), and sitka spruce (*Picea sitchensis*). There are also many native shrub/small tree species, such as vine maple (*Acer circinatum*), Oregon grape (*Mahonia aquifolium*), salmonberry (*Rubus spectabilis),* sword ferns (*Polystichum munitum*), and snowberry (*Symphoricarpos albus)*. Other common deciduous trees and shrubs include alder, cottonwood, bigleaf maple, vine maple, Indian plum, and spirea. As well, there have been intrusions of invasive species at certain points along the creek, which includes English ivy (*Hedera helix*), giant knotweed (*Reynoutria sachalinensis*), Himalayan balsam (policeman's helmet), Old Man's Beard clematis (*Clematis drummondii*). Other invasives include lamium, occasional daphne, English laurel, English holly, and Himalayan blackberry (*Rubus armeniacus*) which does provide habitat and food for local bird species.

Harms to Cougar Creek

Human activity and urbanization surrounding this natural space is detrimental to Cougar Creek. Human interference, such as exploration through the surrounding forests and in the creek itself, compacts the soil and erodes the streambank. Foot traffic disturbs plant life in many areas. Animals, such as dogs, frequently enter salmon-spawning beds. From November to May Cougar Creek is essential for the continued reproduction of salmon species.

Littering is another major concern. Common items left by humans include general garbage, such as food wrappers, tires, sport equipment, and cigarettes. As well, pollutants are sometimes released into the creek itself, which can cause mass die offs of fish and other species. Various unfiltered solutions from residential and business spaces such as oils, soaps, and suspected sewage, as well as excess water from pools/hot tubs, further deteriorate the stream's health.

Erosion is a significant issue. Although erosion is a natural process, the excessive amount of rainwater brought into the creek every year through drains in urbanized areas exacerbates the problem. For example, Scottsdale Centre alone contributes 80 million litres of rainwater every year, with many other malls and businesses/neighbourhoods contributing more into the creek. This accelerates streambank erosion, causing increased sediment, and therefore creates a decrease in the overall water quality. Besides erosion, this rainwater also brings many harmful pollutants into the creek from the surrounding urbanized locations, which can also have a severe impact on the health of the ecosystem.

The presence of invasive plant species is another problem. Invasive species generally are well-adapted to a wide range of habitats, can out-compete the native species for resources needed to grow, have very successful and efficient reproductive events with large amounts of offspring produced, and can disperse these in an efficient manner. Therefore, invasive plant species can quickly establish themselves in new locations in the creek and quickly outcompete the surrounding plants. Invasive species are also generally challenging to control and completely remove, which can result in detrimental effects to the local plant community.

Creek-Related Projects

A volunteer group known as Cougar Creek Streamkeepers (CCS) has taken initiative in protecting this natural space by putting various projects together to help conserve and improve the conditions of the creek. Their projects help by working to fix the various harms that have been observed, such as the invasive species at certain locations, the declining salmon population, the erosion and pollution occurring due to rainfall drainage, as well as dealing with human litter. As a volunteer group, they often work with the neighbouring schools, the public, and other community groups.

In order to help with the decreasing salmon populations, the Cougar Creek Streamkeepers acquire 150,000 chum salmon young and 1000 coho salmon young and release them with the help of Fisheries & Oceans Canada Community Advisor, volunteers, and elementary school kids every April, which they have been doing since 2013. However, fish releases are an excellent

opportunity to engage and educate children and the general public, in the importance of maintaining a clean and healthy creek and riparian corridor. The vast majority of adult salmon that return to spawn are wild (not hatchery) coho; thus Cougar Creek has a self-sustaining wild coho run.

To increase the quality of the creek for the salmon, the CCS build weirs during the "fishery window" (late August-September), when juvenile coho are mature enough to cope with any sediments that might be churned up, and before adult salmon have begun returning to spawn. Weirs are barriers that act as a dam to increase the height of the water to allow the fish to occupy a larger area, as well as increase the oxygen levels present in the water, as these barriers cause the water to drop.

Cougar Creek Streamkeepers also have worked to try to limit the presence of invasive plant species wherever they can. They host regular events where they go out as a group and spend time physically removing these plants to try to ensure that the native plants will survive. For example, the Rai medical building and Soh medical building are locations surrounding Cougar Creek that the CCS deemed important for continued maintenance of the creek, but both sites had a large presence of invasive plant species. Through continued removal and monitoring of the invasive species by the CCS, and the replanting of native species, both sites were able to be restored to a healthier state.

Also, the CCS actively work to help reduce the amount of rainfall that gets diverted to the creek in order to help reduce both the streamside erosion and the introduction of pollutants. To do this, they have heavily focused on the creation of rain gardens, which are generally small gardens consisting of a variety of plants that help prevent rainwater from going into surrounding drains and then into Cougar Creek. By doing so, the rainwater instead enters the underground water supply, where it is naturally filtered to remove large amounts of pollutants before it ends up in the creek. This more gradual process helps prevent flooding events and reduces the occurrence of streambank erosion.

References

CBC News. (2008). *Animal activists outraged over beaver killing in Surrey, B.C.* https://www.cbc.ca/news/canada/british-columbia/animal-activists-outraged-over-beaver-killing-in-surrey-b-c-1.763006

Cougar Creek Streamkeepers. (n.d.). *Cougar Creek*. https://cougarcreekstreamkeepers.ca/cougar-creek/

Fish’n BC. (2018). *Signal crayfish*. http://www.fishnbc.com/species/crawfish.html#:~:text=There%20is%20only%20one%20native,to%20that%20of%20nonnative%20species.

Invasive Species Council of BC. (n.d.). *Giant knotweed*. https://bcinvasives.ca/invasives/giant-knotweed/

Kennedy, G. (2017). *Finding crayfish in North Delta's Cougar Creek*. Surrey Now-Leader. https://www.surreynowleader.com/home/finding-crayfish-in-north-deltas-cougar-creek/

Parks Canada. (2019). *Beavers: 5 ways beavers keep our ecosystems healthy*. https://www.pc.gc.ca/en/pn-np/mb/riding/nature/animals/mammals/castors-beavers

Smith, J. (2020). *Beaver pond leveller installed in North Delta's Lower Cougar Creek.* Surrey Now-Leader. https://www.surreynowleader.com/news/photos-beaver-pond-leveller-installed-in-north-deltas-lower-cougar-creek/

Surrey Now-Leader. (2011). *Public warned after cougar sighting at Cougar Creek Park.* https://www.surreynowleader.com/news/public-warned-after-cougar-sighting-at-cougar-creek-park/