



Concrete Consequences

How Highway 413 would put
GTA watersheds at risk

September 19, 2024



environmental
defence

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EXECUTIVE SUMMARY

Low-density suburban sprawl is a growing concern in southern Ontario. The Ontario government is proposing Highway 413 as a way to prioritize and accelerate this type of growth onto farms, forests and wetlands.

If constructed, Highway 413 will cut through three of Greater Toronto Area's watersheds: the Humber River, Etobicoke Creek and the Credit River. All three of these watersheds have already experienced significant urbanization over many decades and continue to be threatened with the pressures of urban development and its impacts on corresponding natural systems.

Highway 413 will impact all three watersheds by reducing natural cover and water quality levels. These negative impacts will lead to further ecological degradation through biodiversity loss, habitat destruction and fragmentation, increased impervious surface area and elevated concentrations of chloride in waterways due to enhanced road salting activity.

Key findings

- Chloride levels are trending upwards throughout each watershed. Due to increased road salt runoff, Highway 413 would transform freshwater habitats within the three watersheds into unlivable, salty waters which would be toxic for many freshwater species such as the critically endangered redbreasted dace, atlantic salmon, chinook salmon, coho salmon, and popular fishing species like the brook trout, rainbow trout, and smallmouth bass.
- The highway would destroy natural areas that are home to 65 provincially and/or federally at risk species of plants and animals in the Credit River watershed, 51 species of regional conservation concern* and at least eight endangered or threatened terrestrial species in the Etobicoke Creek watershed, as well as over 500 species of plants and animals of regional conservation concern in the Humber River watershed.
- Highway 413 would cut through high priority wildlife habitat connectivity areas within the Humber River and Etobicoke Creek watersheds. Maintenance of these critical areas help prevent biodiversity loss.
- Building a new highway through portions of the Humber River watershed will dramatically and permanently decrease natural cover over the next few decades and make achieving Toronto and Region Conservation Authority's restoration goals as well as the federally recommended objectives impossible.

** A species, other than a federally or provincially recognized species at risk, that is known to occur in an area, and for which the region has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area.*

REPORT RECOMMENDATIONS

- **Cancel Highway 413.** Congestion on Highway 401 can be reduced immediately and at a lower cost by subsidizing truck tolls on the underused Highway 407.
- **Accelerate the creation and maintenance of natural heritage systems in watersheds** by:
 - Implementing policies that require long-term protections of natural features and their functions.
 - Undertaking projects (i.e. native planting projects, land acquisition) to help grow and strengthen the amount of natural area. This would make more habitat available for wildlife and improve climate resiliency within watersheds.
 - Improving environmental monitoring and reporting processes throughout the province (i.e. more frequent water sampling and testing, ongoing wildlife population monitoring)
- **Build homes within existing city boundaries.** Evidence shows there is enough land already approved for development in existing urban neighbourhoods to build all the homes we need until 2040.
- **Invest in building more connected public transit.** Constructing Highway 413 is currently estimated to cost upwards of \$10 billion. These funds could be used to help build out and improve public transit throughout the GTHA.

\$10 B

**could be saved by canceling Highway 413
and used to help support better public
transit throughout the GTHA**

INTRODUCTION

Environmental Defence reviewed reports completed by Toronto and Region Conservation Authority and Credit Valley Conservation to identify the impacts that the proposed Highway 413 would have on three important Greater Toronto Area watersheds; the Humber River, Etobicoke Creek and the Credit River.

A watershed is a large area of land that is drained by a river, stream, or a combination of them into a common larger water body. Everything in a watershed is connected, meaning that any type of activity upstream will influence the conditions downstream. Watersheds are environmentally, economically and socially significant because they provide numerous ecosystem services that are essential components to the well-being of humans and the environment as a whole. A healthy watershed supports habitat for many species, protects the quality of our water, provides us with natural areas for recreation and improves climate resiliency. Protecting the natural resources that watersheds provide is crucial to help maintain and improve the current and future health of all living things.

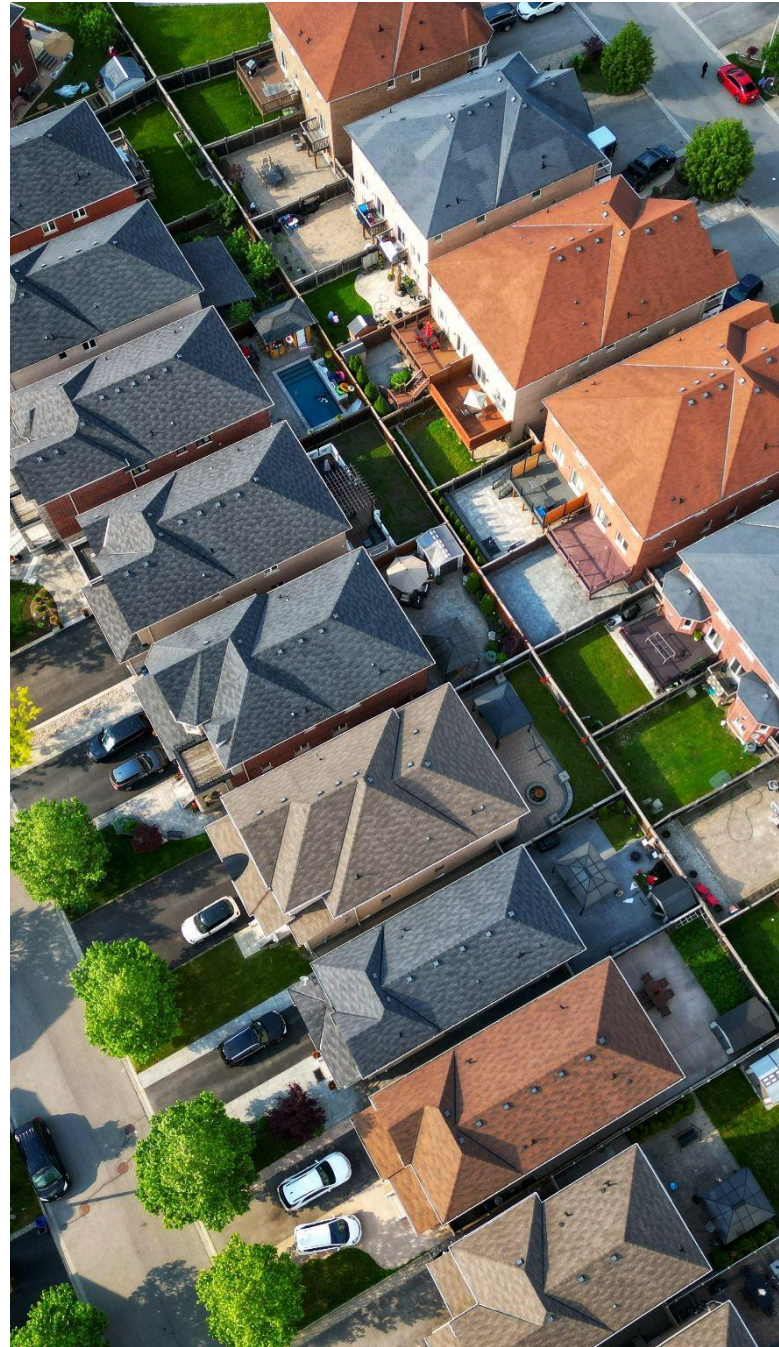
Everything in a watershed is connected, meaning that any type of activity upstream will influence the conditions downstream. Watersheds are environmentally, economically and socially significant because they provide numerous ecosystem services that are essential components to the well-being of humans and the environment as a whole.

Highway 413 would be a 59 kilometer 400-series highway. It is proposed by the Ontario government with an underlying purpose to accelerate suburban sprawl in the Halton, Peel and York region. The government's preferred route of Highway 413 will cut through the northern and western parts of the Greater Toronto Area, linking Highway 400 and Highway 401. It would pave over large natural areas of forest, meadow, river and wetland habitat within the Humber River, Etobicoke Creek, and the Credit River watersheds. The lower and mid reaches of all three of these watersheds have already been significantly urbanized over the past six decades in a manner that has negatively impacted their natural heritage systems and water quality. The watersheds are threatened with further degradation from this highway and the urban sprawl it will enable.

The role of expanding suburban development in degrading watersheds

Watersheds in southern Ontario have become heavily urbanized over the years as urban sprawl has transformed large portions of the province's natural areas into vast areas of impervious surfaces, such as buildings, paved roads and parking lots. Poorly planned, and sometimes unnecessary, infrastructure development outside of existing cities and towns has damaged ecological systems and continues to be a concern throughout watersheds as the government of Ontario pushes for more unnecessary and environmentally harmful development projects, such as Highway 413.

Habitat loss and fragmentation resulting from human activity is one of the leading causes of species loss in Ontario and currently the province is losing more species than they are conserving.¹ Breaking natural areas into smaller pieces and destroying areas critical to maintaining habitat connectivity reduces the amount of suitable habitat for species and undermines the functionality of whole ecosystems, negatively impacting the ability to sustain critical processes and services such as food production, water, climate resiliency, and natural hazard regulation. This is why understanding the state of the quality and quantity of natural cover is important for watershed management. Further degrading remaining natural cover within the watersheds is especially concerning for vulnerable species at risk found throughout them.





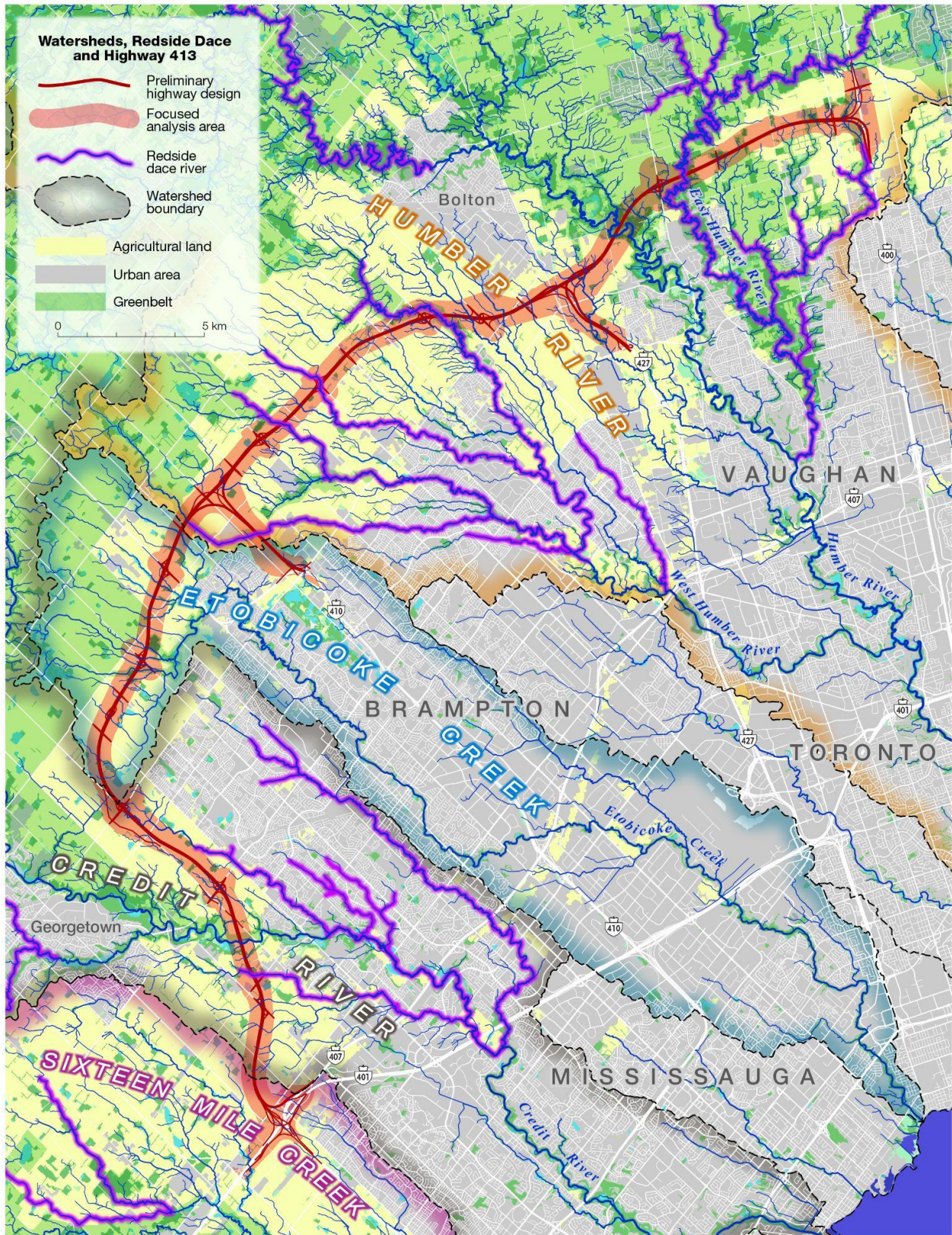
QEW bridge over the Credit River

The increase in urbanization throughout all three of the watersheds has transformed natural spaces once occupied by a wide variety of plant and animal species into smaller, less suitable or uninhabitable patches divided by infrastructure and housing development.

There have also been notable changes in water quality within highly urbanized watersheds. Water quality health is linked to the health of aquatic habitats and its dependent aquatic life. In general, watersheds with poor water quality have a higher percentage of urbanized (e.g. roadways, residential, industrial) land. This is because a higher level of urbanization results in more contaminant runoff, including chlorides from road salts.² Chloride concentrations are a growing concern in the three studied watersheds and have already affected waterway environments and have negatively impacted the aquatic species that can be found within each.³ When snow and ice melts, the excess salt runs off roads, sidewalks and parking lots into surrounding watercourses. The lack of forest or other natural cover near streams also makes them warmer, a condition that negatively impacts many aquatic species. Together the salt and lack of natural cover transforms cool, freshwater ecosystems into those that are warmer and saltier. The impact that increasing chloride concentrations has on freshwater fish species can be seen through population declines of vulnerable, cool, clear water dependent species like the endangered redbside dace. If Highway 413 is developed, the need for road salt application will massively expand within the relatively cleaner headwater areas and will directly increase the chloride levels in adjacent waterways and negatively impact the sensitive species that live downstream.

The impact that increasing chloride concentrations has on freshwater fish species can be seen through population declines of vulnerable, cool, clear water dependent species like the endangered redbside dace.

Figure 1: Proposed Highway 413 route through the the Credit River, Etobicoke Creek and Humber River watersheds



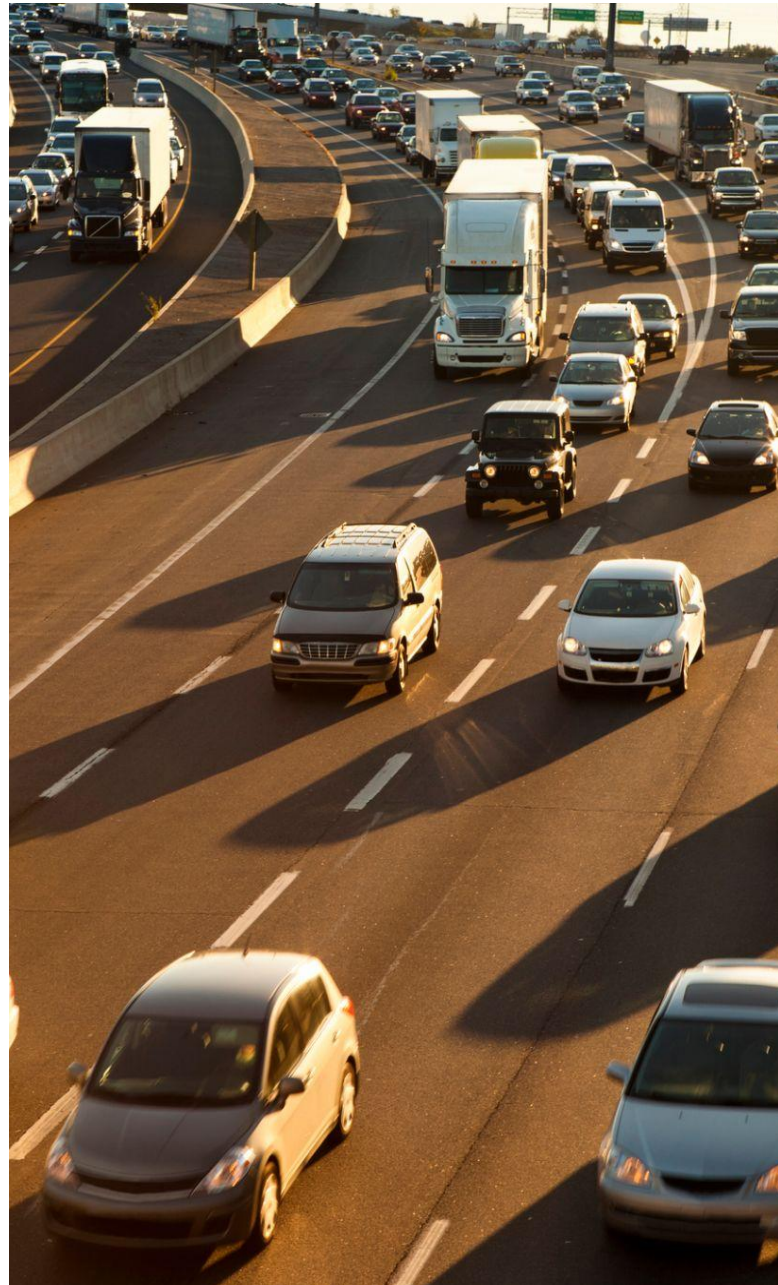
Chris Brackley, CEO and Project Manager, As the Crow Flies Cartography

Projected impacts of Highway 413

The proposed Highway 413 is a prime example of unnecessary development that has an underlying purpose to accelerate urban sprawl in Ontario by pushing development (e.g. roadways, residential, and industrial) onto remaining natural areas. The proposed Highway route would directly pave over 2,000 acres of farmland, 400 acres of Greenbelt land, cross approximately 132 streams and rivers and threaten the ecological integrity of three watersheds.

Each watershed has a corresponding Conservation Authority watershed plan and/or characterization report that can be used to describe current watershed conditions, inform municipal partners about land use and infrastructure planning and provide best practices to help improve conditions.⁴ After analyzing the reports produced by Toronto and Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC), and reviewing the documented existing conditions of the three watersheds, it is evident that Highway 413 and related urban development, would have severe impacts on the natural values of each of the watersheds due to the considerable effects on natural cover and water quality levels.

Highway 413 would impact terrestrial and aquatic habitat of at least 29 federally listed species including: the redbside dace, rapids clubtail, jefferson salamander, eastern meadowlark, bobolink, and blanding's turtle.⁵ The development of Highway 413 and related sprawl would contribute to the biodiversity crisis by further pushing these species closer to the brink of extirpation from Canada and toward complete extinction.



The table on the following page is an overview of current natural cover and water quality conditions within each of the three studied watersheds along with the potential future impacts that the proposed Highway 413 would have on each.

Table 1: Current natural cover and water quality conditions and the future impacts that Highway 413 would have on each

Watershed	CURRENT CONDITIONS <i>Natural Cover & Terrestrial Habitats</i>	CURRENT CONDITIONS <i>Water Quality & Aquatic Habitats</i>	PROJECTED IMPACTS <i>Highway 413</i>
Humber River Watershed (HRW)	<ul style="list-style-type: none"> • 28,326 ha (31.4 per cent) natural cover area (2023)⁶ • Between 2002 and 2020, 1,289 ha (4.4 per cent) of natural cover was lost due to urban development.⁷ • The highest amount of remaining natural cover is located in the Main Humber subwatershed which Highway 413 would cut through. • The existing quality of terrestrial habitat is considered “poor” across the entire watershed.⁸ 	<ul style="list-style-type: none"> • Chloride from road salts is an increasing concern throughout the entire watershed • Chloride concentrations are particularly elevated in the West Humber, East Humber, Black Creek, and Lower Humber subwatersheds. Highway 413 would cross over the West and East Humber subwatersheds.⁹ • Over 50 per cent of water samples collected in 2018 had chloride concentrations that were higher than recommended federal guidelines.¹⁰ • Aquatic habitats are slowly deteriorating as urban development increases. Without proper management they will become uninhabitable for many species. 	<ul style="list-style-type: none"> • Would destroy the habitats of many species at risk such as the rapids clubtail, redbreast dace, western chorus frog, blanding’s turtle, Jefferson salamander, eastern wood-pewee, little brown myotis and butternut tree. • Negatively impact wildlife movement by fragmenting high priority connectivity areas in the East, Main, and West subwatersheds.¹¹ • Elevate chloride concentrations in watercourses through use of road salt, in turn, destroying aquatic habitats and killing sensitive species.
Etobicoke Creek Watershed (ECW)	<ul style="list-style-type: none"> • With 3,024 ha (about 12 per cent) natural cover, Etobicoke Creek is one of the most urbanized watersheds in TRCA’s region and sits well below recommended federal guidelines for natural cover.¹² • Between 2005 and 2019, about 400 ha of natural cover was lost due to urban expansion.¹³ • Upper regions of the watershed contain areas important for wildlife movement and crucial habitat for species at risk such as the eastern meadowlark and bobolink.¹⁴ • Urban expansion is the biggest threat to remaining natural cover areas. 	<ul style="list-style-type: none"> • Surface water quality is generally poor compared to other TRCA watersheds • Chloride concentrations are concerning and will trend further upwards due to future development plans and enhanced road salt use.¹⁵ • Several sensitive and coldwater species (e.g. american eel, slimy sculpin, and redbreast dace) are likely no longer present due to aquatic habitat change from urbanization and contaminant runoff (eg. road salts). 	<ul style="list-style-type: none"> • Would destroy remaining natural cover areas located in the upper watershed. • Threaten approximately 51 species of conservation concern, such as the threatened Eastern Meadowlark and Bobolink, through habitat loss and fragmentation.¹⁶ • Highway 413 will lead to a change in water quality of approximately 49 per cent** with excess use of road salt.¹⁷

Table 1 (CONT'D): Current natural cover and water quality conditions and the future impacts that Highway 413 would have on each

Watershed	CURRENT CONDITIONS <i>Natural Cover & Terrestrial Habitats</i>	CURRENT CONDITIONS <i>Water Quality & Aquatic Habitats</i>	PROJECTED IMPACTS <i>Highway 413</i>
Credit River Watershed (CRW)	<ul style="list-style-type: none"> • 11,980 ha (35 per cent) of the total watershed area is natural cover.¹⁸ • The highest amount and quality of natural cover can be found in the middle and upper portions of the watershed within Ontario’s Greenbelt. • Natural cover in the upper and middle portions of the watershed provide habitat for many species at risk.¹⁹ • Habitat degradation and fragmentation area concern due to CRW being the most rapidly urbanizing area in Ontario.²⁰ 	<ul style="list-style-type: none"> • Water quality conditions range from excellent to poor throughout the CRW.²¹ • Areas with more urbanization have higher amounts of chloride concentrations. • Areas with that ranked good to excellent were mostly found in rural tributaries in the upper and middle watershed zones. • The pressure of urbanization is the main threat to water quality in the CRW due to the increase in chlorides from road salt application.²² 	<ul style="list-style-type: none"> • Threatens approximately 65 species at risk through habitat loss and fragmentation.²³ • Would degrade the watershed’s climate resiliency through destruction of wetlands and forests. Two ecosystems that are considered vital nature-based climate solutions due to their ability to store carbon.

*It is important to note that percent change in TRCA’s Future Analysis Report is identified by the thresholds listed solely based on watershed conditions and not whether the report value is a positive or negative number. The percent in the report is represented in a negative number but holds a positive value. For example, a decrease in chloride concentrations or peak flows is a good thing from a hydrological or ecological perspective and would be presented as a positive percent change (TRCA, 2021)

WATERSHED RESEARCH & INSIGHTS

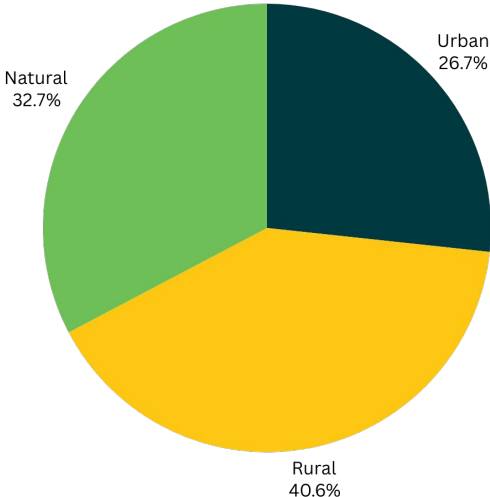
HUMBER RIVER WATERSHED

The Humber River watershed is the largest watershed in Toronto and Region Conservation Authority’s (TRCA) jurisdiction and covers a total area of 90,258 hectares.²⁴ The headwaters originate from the Niagara Escarpment and Oak Ridges Moraine and extend south to where the Humber River’s mouth meets Lake Ontario. The Humber River was designated as a Canadian Heritage River in 1999 based on its outstanding human heritage and recreational values.²⁵

The watershed faces significant urban growth pressure which threaten:

- Natural cover levels: Natural cover currently sits at 32.7 per cent throughout the entire watershed. The TRCA target established in 2008 target was 39 per cent.²⁶
- Quality of habitat: approximately 61 per cent of the watershed is a priority for maintaining regional habitat connectivity.
- Biodiversity levels: Vulnerable species like the endangered redbreasted dace have critical habitat in waterways throughout the watershed.
- Water quality: chlorides are a rising concern throughout the watershed.
 - Sixty-five per cent of samples from the Main, East, and West Humber subwatersheds meet the Federal Water Quality Guidelines for chronic chloride levels (120 mg/L). The 2008 target states that at least 85 per cent of samples should meet federal guidelines. Only 15 per cent of samples met the objective during the 2006-2011 period.²⁷
 - Nineteen per cent of samples taken from the Lower Humber and Black Creek subwatersheds meet the Federal Water Quality Guidelines for chronic chloride levels. The 2008 target states that at least 75 per cent of samples should meet the federal guidelines. 3 per cent less samples meet the objective compared to the baseline subset (2006-2011).²⁸

Figure 2: Distribution of land cover in the Humber River watershed





The Humber River

Projected Impacts: Natural Cover and Terrestrial Habitat

There is declining quality, distribution and quantity of natural cover within the Humber River watershed.²⁹ The proposed route of Highway 413 is set to run through three subwatersheds: the East Humber, Main Humber and West Humber. These three subwatersheds contain the majority of remaining high quality natural areas in the watershed. Highway 413 would have harmful impacts on the natural cover levels within the watershed and corresponding subwatersheds due to land use changes and the increase of urban area. The increase in urban development will push back progress on achieving specific targets related to habitat quantity and quality and threaten local species populations and ecological systems that provide essential services (i.e. clean air, water filtration, erosion prevention, etc).

Currently, the Humber River watershed does not meet the recommended federal guidelines for natural cover.³⁰ Natural cover targets proposed by Toronto and Region Conservation Authority (TRCA) have also not been met within their proposed timeline.³¹ Building a new highway through portions of the watershed with the highest amount of natural cover would dramatically and permanently decrease the amount of natural cover over the next few decades and make achieving TRCA's restoration goals as well as the federally recommended objectives impossible.

Highway 413 would destroy ecologically significant areas located in the East Humber, Main Humber, and West Humber subwatersheds. Large portions of land in these subwatersheds have been identified as important for both local and regional habitat connectivity.³² Habitat connectivity is a crucial component to help maintain healthy species populations and boost biological diversity and resilience especially in degraded ecosystems.³³ The West Humber subwatershed has many priority areas for wildlife movement through ravines or streams.³⁴ However, these connectivity corridors are faced with barriers due to the amount of east-west roadways that cross through them. Habitat barriers such as roadways reduce access to habitat and reduce the total area of available habitat for species. Highway 413 would further fragment existing patches of natural cover into smaller, more isolated areas and act as another large barrier to wildlife movement that would prevent the maintenance of local and regional biodiversity levels. Eliminating or blocking these areas of connectivity through development would further threaten the ecosystem integrity and biodiversity in the Humber River watershed. The construction of Highway 413 would also increase instances of wildlife road mortality which is a concern as wildlife-vehicle collisions pose safety issues to both animal and human lives. Loss of biodiversity within the Humber River watershed will lead to the breakdown of critical ecological systems that strengthen the health and well-being of local species and the people in surrounding communities.

Figure 3: Total wetland and forest cover vs. Federal guidelines

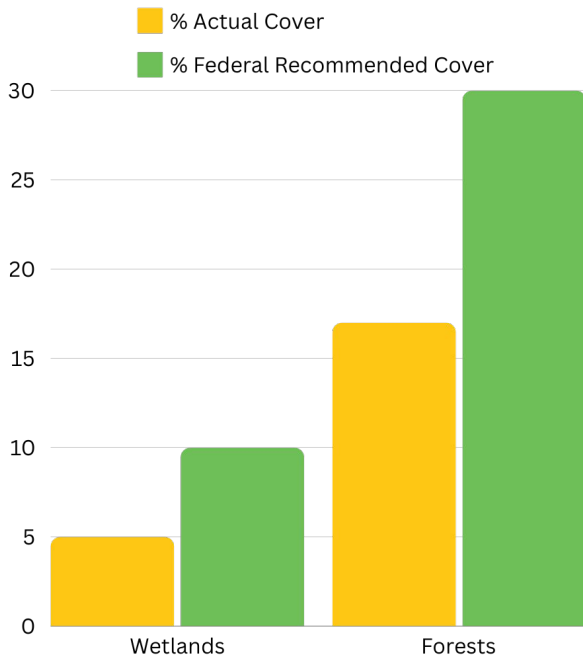


Figure 4: Natural cover loss (%) from 2002-2020

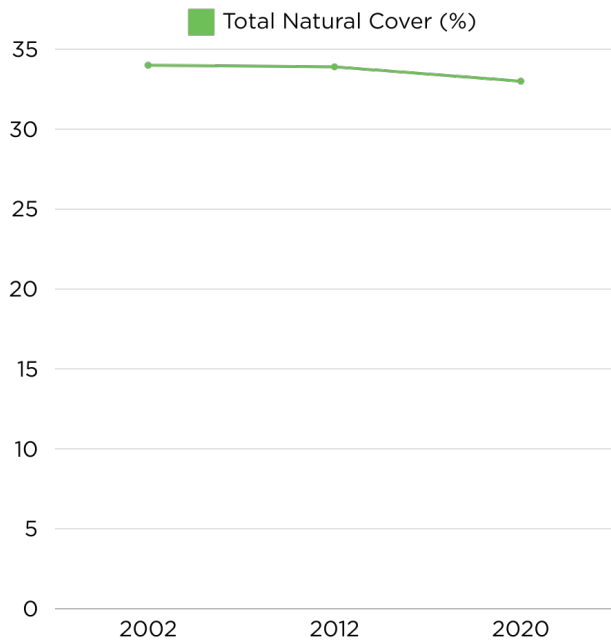
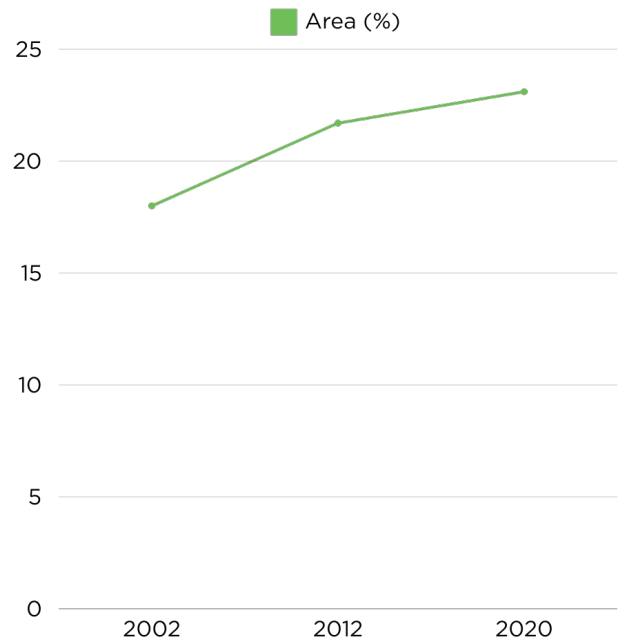


Figure 5: Impervious cover change (%) from 2002-2020



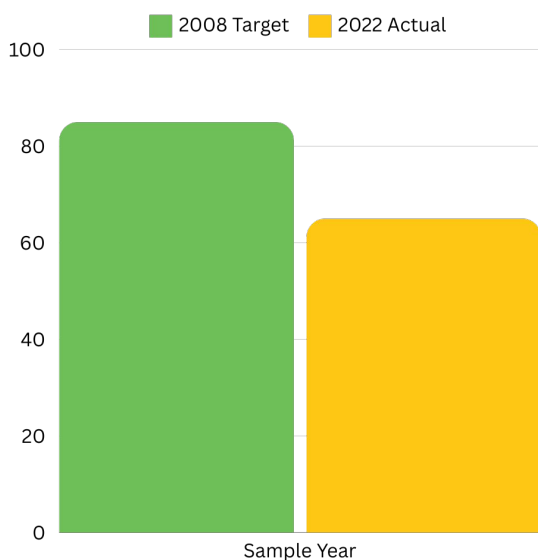
Projected Impacts: Water Quality and Aquatic Habitat

Chloride levels are the greatest water quality concern throughout the Humber River watershed. Watercourses located throughout the three portions of the Humber River watershed that the proposed Highway 413 route would cut through will see much higher concentrations of chloride immediately during and after the first winter season of highway operation due to road salting activity and road run-off. This will continue on to be an ongoing and permanent problem as years go on and urban areas develop and the need for road salt continually increases.

The Main, West, and East Humber subwatersheds are already trending in a direction of increased chloride concentrations over time throughout all of TRCA's water sampling stations.³⁵ The target established in 2008 by TRCA states that at least 85 per cent of samples from the West, East, and Main subwatersheds should meet federal guidelines. Currently, 65 per cent of water samples taken from the West, East, and Main Humber subwatersheds meet the federal water quality guidelines for chronic chloride levels (120 mg/L).³⁶ Highway 413 and associated development would worsen, rather than improve, these conditions with a corresponding decline in the health of aquatic habitats and their dependent species. Enhanced concentrations of chloride is toxic for many aquatic organisms and can stunt growth and reproduction rates, and increase species mortality.³⁷ One specific species of concern found in the Humber River watershed that would be impacted is the endangered redbside dace. Redside dace presence is strongly linked to water quality and are key indicators of the overall health of aquatic ecosystems within the areas that they have historically occupied. The species has declined throughout the Humber River watershed and TRCA jurisdiction over the past 20 years due to the decline in water quality due to urbanization and road run-off. The redbside dace has occupied and contributing habitat in cool water streams in the Main, West, and East subwatersheds within areas that would be paved over by Highway 413 construction.³⁸

The change in habitat and higher chloride levels will transform the external and internal environments of the redbside dace and push the species further towards extinction.³⁹

Figure 6: % of water samples that meet federal guidelines (120 mg/L): 2008 target vs. 2022 actual



ETOBICOKE CREEK WATERSHED

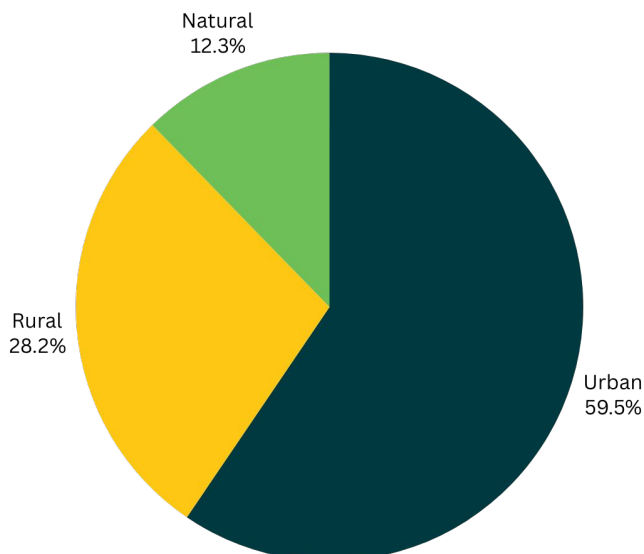
The Etobicoke Creek watershed covers approximately 21,100 ha and forms the western end of TRCA’s jurisdiction.⁴⁰ Etobicoke Creek originates south of the Oak Ridges Moraine in the Town of Caledon and flows through the cities of Brampton, Mississauga, and Toronto, where it enters Lake Ontario.

As one of TRCA’s most urbanized watersheds, the Etobicoke Creek watershed faces many threats such as:

- Low natural cover and poor terrestrial habitat quality*. Natural cover levels are far below recommended federal guidelines for natural cover, specifically wetland and forest cover.
 - Habitat quality has an average LAM score of 7.51 “poor”, the majority of the habitat patches in the watershed are considered “poor” in terms of quality. Targets that have been set for 2025 state that there should be an increase in the amount of patch scores that are “good” and “fair”. This will be next to impossible to achieve if remaining natural areas are destroyed for Highway 413 development.⁴¹
 - Currently, wetlands cover just 2.3 per cent (509 ha) of the entire watershed.⁴² The federal guidelines state that >10 per cent of wetland cover is required in any major watershed. Total forest cover sits at 3.9 per cent (882 ha). The federal guidelines state that the minimum forest cover threshold at the watershed scale is 30 per cent.⁴³
- Water quality issues, particularly high levels of chlorides from road salts and high levels of impervious surface.
 - Currently, just 7 per cent of water samples meet the federal chronic water quality objective (120 mg/L). Six per cent fewer samples met the objective from 2015-2019 since the baseline period (2003-2007). The target for 2025 states that 75 per cent of samples should meet water quality objectives.⁴⁴

** Terrestrial habitat quality is defined by patch size, shape and surrounding land influences of a natural area. In this case, the quality is measured using a Landscape Analysis Model (TRCA). This combines the metrics of patch size (larger patches support larger populations), patch shape (habitat fragmentation), and matrix influence (influence of surrounding land uses) to determine an average score. LAM has a rating scale of excellent (13-15), good (11-12), fair (9-10), poor (6-8), or very poor (0-5).*

Figure 7: Distribution of land cover in the Etobicoke watershed





Etobicoke Creek

Projected Impacts: Natural Cover and Terrestrial Habitat

The Etobicoke Creek watershed is one of the most urbanized watersheds within TRCA's jurisdiction and has very limited remaining natural cover. The high levels of urbanization and low amounts of natural cover are key factors contributing to the watershed's overall poor health.⁴⁵ According to Environment and Climate Change Canada's framework of guidelines in the publication: [*How Much Habitat is Enough?*](#), even with optimal natural cover enhancements the Etobicoke Creek watershed would remain below minimum recommended federal guidelines for total natural cover quantity.⁴⁶ (Figure 7)

The Etobicoke Creek watershed is currently home to at least eight endangered or threatened terrestrial species.⁴⁷ These species are found within the headwaters of the watershed where there is a larger quantity of open meadow habitat and areas that provide habitat to habitat connections. Open land areas are especially important to Etobicoke Creek's eastern meadowlark and bobolink populations, two threatened bird species in Ontario that are likely to become endangered if Highway 413 development moves forward and destroys their habitat, which is currently the main threat to both species.⁴⁸

Development will also have a considerable impact on habitat connectivity due to highway construction potentially causing significant valleyland fragmentation in the watershed. Valleylands are ecologically valuable systems that connect headwater areas to other significant systems such as wetlands.⁴⁹ The habitat connectivity that is provided through the valleylands help to maintain species diversity, natural processes and environmental resiliency, which is especially important in heavily degraded ecosystems like the Etobicoke Creek watershed. When these areas are fragmented, habitat connection is lost and natural processes slowly collapse. Due to the highly urbanized nature of the Etobicoke Creek watershed, the watershed can not afford to lose more of its natural area. Further loss of natural cover will lead to an ecological breakdown of the entire watershed. Pushing development up into natural areas within the headwaters of the Etobicoke Creek watershed will reduce the already small amount of habitat that is available for wildlife and lead to decreasing numbers, form, and function of the Etobicoke Creek watershed's natural areas and their dependent species.

Figure 8: Total wetland and forest cover (%) vs. Federal guidelines (%)

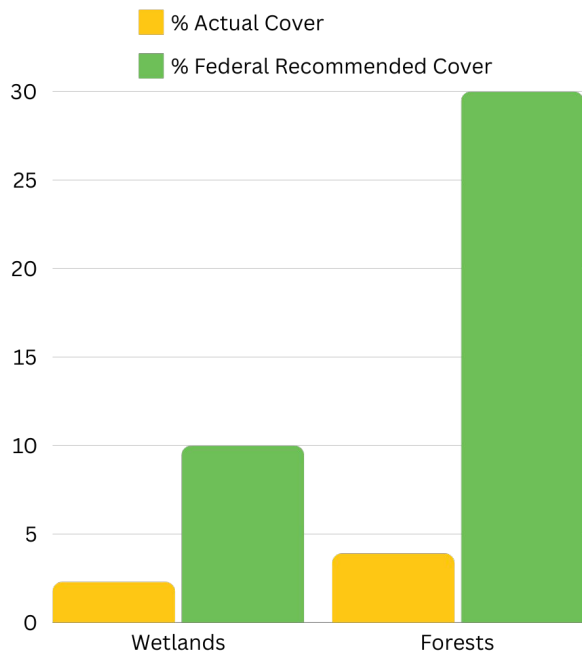


Figure 9: Natural cover loss (%) from 2002-2019

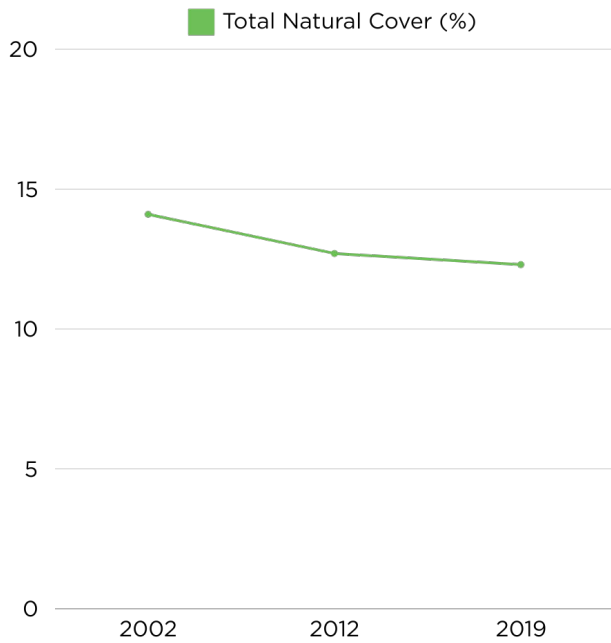
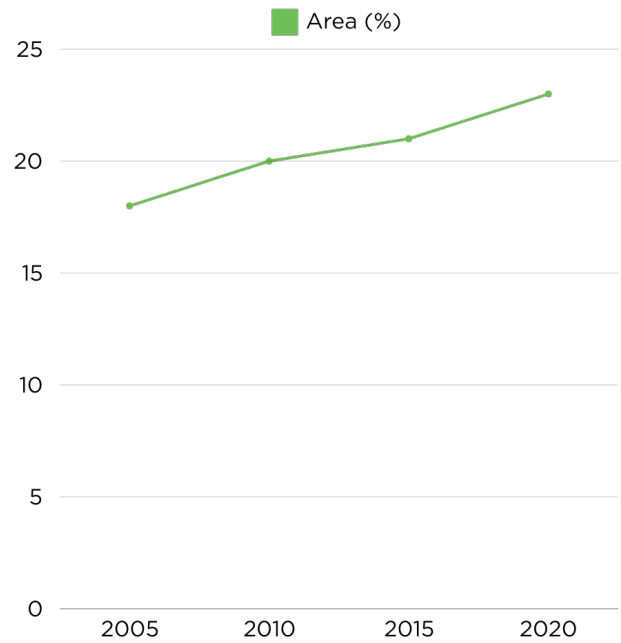


Figure 10: Impervious cover change (%) from 2002-2019

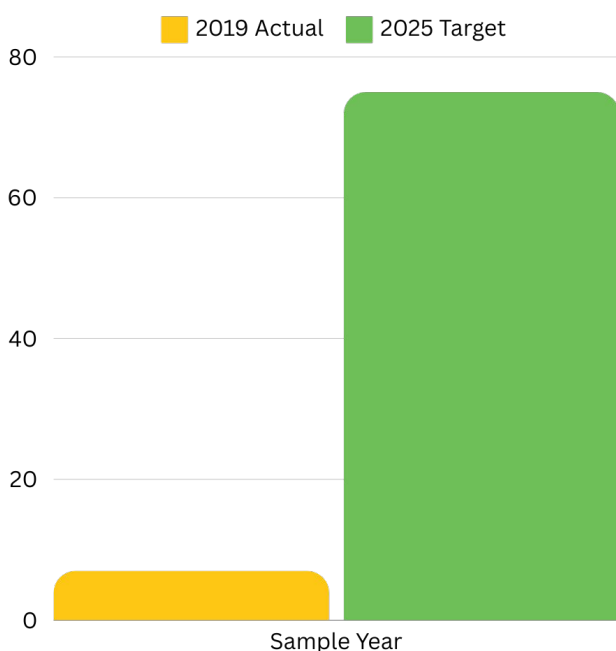


Projected Impacts: Water Quality and Aquatic Habitat

Based on key findings from TRCA’s future scenario analysis of the Etobicoke Creek watershed, Highway 413 is expected to increase impervious cover and impact chloride concentrations in all eight water quality stations in the watershed.⁵⁰ The current conditions within the Etobicoke Creek watershed are classified as non-supporting due to the total amount of impervious cover throughout the watershed (47.9 per cent).⁵¹ Analysis results show that Highway 413 will lead to an increase of impervious cover by more than double within the watershed’s headwaters and impact the quality of surrounding waterways. The highway will also play a large role in the degradation of water health through the increase in road salting activity. It is predicted that the highway will lead to a change of approximately 49 per cent* in chloride concentration over current levels, even if mid-range enhancements to water management were made.⁵² This percent change was determined by assessing a future scenario that included Highway 413 construction and urban expansion around it and comparing it to a second scenario that included urban expansion without Highway 413. Any percent change greater than ten means that the watershed conditions will deteriorate significantly. The extent of approximate change varied throughout different portions of the watershed and showed the strongest impacts in areas that were on or near the future site of Highway 413.⁵³ Increasing the already very high levels of chloride and impervious cover in the Etobicoke Creek watershed will affect the quality of life for aquatic species.⁵⁴

** It is important to note that percent change in TRCA’s Future Analysis Report is identified by the thresholds listed solely based on watershed conditions and not whether the report value is a positive or negative number. The percent in the report is represented in a negative number but holds a positive value. For example, a decrease in chloride concentrations or peak flows is a good thing from a hydrological or ecological perspective and would be presented as a positive percent change (TRCA, 2021)*

Figure 11: % of water samples that meet federal guidelines (120 mg/L): 2019 results vs. 2025 target



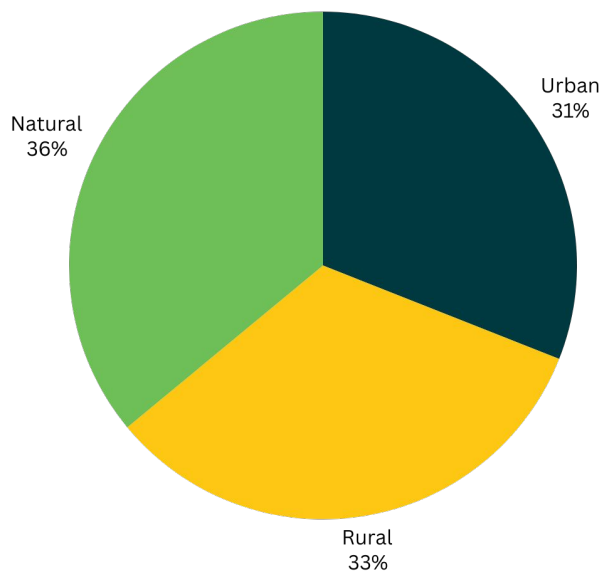
CREDIT RIVER WATERSHED

The Credit River watershed is located in the heart of the Greater Golden Horseshoe and covers approximately 95,000 ha of land. From its headwaters near Orangeville, the Credit River flows about 100 kilometers to Lake Ontario. More than 1,800 species of plants and animals live in the Credit River watershed. Sixty-five species are at risk of extinction.⁵⁵ The Credit River watershed is one of the most rapidly urbanizing areas in Ontario.

The watershed faces a variety of local and regional pressures such as:

- **Habitat loss and fragmentation:** With the current levels and trendlines of natural cover, it is expected that the health of aquatic and terrestrial ecosystems and species will be impacted, and the watershed will face species loss. Habitat and natural cover conditions in the lower watershed are poor due to urbanization. The ecosystem integrity is damaged and requires immediate conservation action and restoration.⁵⁶
- **Increase in contaminants such as chlorides in waterways:** Chloride concentrations have increased by about 18 per cent (35.7 mg/L) across the watershed between 1999 and 2016. 74 per cent of monitoring sites have a significant trend towards increased salinity.⁵⁷
- **Concentrations of chloride consistently exceed the federal objective of 120 mg/L across the watershed.⁵⁸**

Figure 12: Distribution of land cover in the Credit River watershed





The Credit River

Projected Impacts: Natural Cover and Terrestrial Habitat

The Credit River watershed is divided into three zones: the upper, middle, and lower. The upper and middle portions of the watershed lie within Ontario's Greenbelt land and contain a high amount of natural cover (43 and 47 per cent respectively).⁵⁹ The watershed's lower portion is the most urbanized of the three with 63 per cent of urban land cover, 17 per cent natural cover, and 20 per cent open agricultural space.⁶⁰ Urbanization is a growing concern throughout all levels of the Credit River watershed. Between 2002 and 2013, total impervious cover throughout the entire watershed increased by two per cent (13 per cent to 15 per cent). The rate of impervious cover growth differed throughout each watershed zone with larger rates of increase in the lower most urbanized zone. The lower portion of the watershed experienced a six point (27 per cent to 33 per cent) increase between 2002 and 2013, whereas the upper and middle portions saw an increase of one per cent within that same time period.⁶¹ Trend analysis of land cover and land use within the Credit River watershed show that conditions in the lower portion are a large concern and are threatening ecosystem integrity and need immediate conservation action. Recommended actions include preserving existing natural features, protecting and restoring natural heritage systems and implementing Low Impact Development and other green infrastructure initiatives.⁶²

Constructing Highway 413 through vulnerable natural areas does not align with the recommended conservation actions stated above. The proposed route of Highway 413 will cut through the lowermost section of the watershed's middle zone and the top end of the lower zone. Development will disrupt the limited remaining natural and open agricultural areas within the lower watershed and high quality natural spaces in the watershed's middle portion and push more development up into healthier watershed zones. The potentially impacted areas in the Credit River help maintain biodiversity levels and are extremely important due to the ecological functions that they offer such as providing habitat and habitat linkages for a variety of species, and climate regulation and resiliency.⁶³

Out of the three watersheds examined in this report, the Credit River contains the highest number of species at risk. There are approximately 65 species of plants and animals in the Credit River watershed that are at risk of extinction.⁶⁴ The number of species at risk is much higher than a baseline extinction rate (extinction rate expected due to natural processes) and is a result of the increase in urbanization and other human related activities occurring in the watershed.⁶⁵

Highway 413 and associated urban development will threaten already at-risk species by transforming natural habitats to uninhabitable urban areas and cause populations to decline at a faster rate. An example of a species from the watershed that would be impacted is the endangered Jefferson salamander.⁶⁶ This species has very specific habitat requirements and suitable habitat is often limited. The Jefferson salamander primarily lives in the Credit River's woodlands and is very sensitive to human activity. Highway 413 construction will disrupt known Jefferson salamander habitat through the degradation and fragmentation of high value woodlands and nearby swamp breeding ponds.⁶⁷ This will negatively influence species' survival and recovery and cause disruption within the food web, leading to an imbalance in the Credit River ecosystem. Highway 413 and related development would threaten biodiversity in the Credit River watershed and push threatened and endangered species closer to extinction through the destruction of critical habitat.

More development will also impact climate regulation in the watershed. The construction of Highway 413 through high functioning woodlands and wetlands would degrade the Credit River watersheds overall climate resiliency. These ecosystems are key nature-based solutions and are critical components in mitigating the impacts of climate change. Woodlands and wetlands store vast amounts of carbon. When destroyed, the stored carbon will be released back into the air as carbon dioxide (CO₂). As these natural areas are replaced with Highway development, more harmful emissions will be released during construction, maintenance, and use.⁶⁸ Destroying large amounts of these areas would limit opportunities for natural absorption of carbon and decrease the Credit River watersheds resilience to the impacts of climate change.



A Jefferson salamander



Projected Impacts: Water Quality and Aquatic Habitat

Currently, chloride levels are increasing across the Credit River watershed and surpass the federal chronic level objective (120 mg/L) throughout all three zones.⁶⁹ Water quality throughout the more urbanized lower zone of the watershed is the poorest, further indicating the relationship between urbanization and high chloride levels. Seventy-four per cent of sampling sites that are located throughout the entire watershed exhibit a trend toward increasing chloride levels, generating a growing concern for water quality levels.⁷⁰ Road salt is the primary source of chloride in the Credit River watershed resulting from the increase in development and urbanization in the watershed.

The increase in impervious surface that was determined within the 2002-2013 monitoring period was a direct result of increased amount of roadway, sidewalk, and parking lot development.⁷¹ Increasing impervious surface throughout the watershed not only impacts natural cover but greatly affects the health of surrounding waterways. A rise in the amount of paved areas has resulted in an increase in road salt application during the winter months which has caused a significant increase in chloride concentrations in waterways throughout the entire watershed. The conservation authority's Real Time Water Quality monitoring network examines water quality to determine chloride levels. Studies show that chloride concentrations, especially in urbanized areas, regularly exceed 5,000 mg/L when road salting takes place and some streams never drop to a safe level of chloride due to the accumulation of road salt on road and soil surfaces.⁷²

Highway 413 will require even more road salt application in the watershed which in turn, will further elevate the chloride levels in rivers and streams that flow into the Credit River. The waterways located in the watershed's middle and lower zones will see significant deterioration from chloride due to Highway 413 development in the area. As these smaller waterways flow into the Credit River, chloride from road salts will be transported and concentrations will build up in the Credit River.

The chloride will alter aquatic environments and impact important life processes in freshwater fish species such as the atlantic salmon, chinook salmon, coho salmon as well as popular fishing species like the rainbow trout, brook trout, and smallmouth bass. These species are particularly sensitive to road salts specifically in their early life stages.⁷³ Enhanced road salting activity along Highway 413 will negatively impact critical growth stages in fish and will result in a decline in population numbers. Higher chloride levels would prevent proper egg formation and potentially lead to higher instances of egg mortality and impact the growth of juvenile fish species.⁷⁴

CONCLUSION

Low-density suburban sprawl is a growing concern in southern Ontario. The Ontario government is proposing Highway 413 as a way to prioritize and accelerate this type of growth onto critical natural spaces such as forests, rivers, wetlands, and farmlands, throughout three watersheds in the GTA: The Humber River watershed, Etobicoke Creek watershed and the Credit River watershed. Each of these watersheds have experienced significant urbanization over many decades and continue to be threatened with the pressures of urban development and the related impacts on sensitive natural heritage systems.

Highway 413 is an unnecessary and environmentally harmful project driven by the same destructive planning approach as the Greenbelt removals and the repeal of the Growth Plan for the Greater Golden Horseshoe. If constructed, Highway 413 will impact each watershed by altering the natural cover and water quality levels through the areas where the proposed highway's route will be constructed. These impacts will lead to further ecological degradation in each watershed through biodiversity loss, habitat destruction and fragmentation, increased impervious surface and elevated concentrations of toxic contaminants such as chloride in freshwater rivers and streams due to enhanced road salting activity and run-off.

Remaining natural spaces and critical waterways should have strong legal protections and supportive management due to their role in maintaining and enhancing long-term environmental health and the ecological integrity of each watershed. The governments of Ontario and Canada have responsibilities to protect and recover species at risk and the development of Highway 413, and the suburban sprawl that it would facilitate, is inconsistent with those commitments.

Healthy watersheds are crucial to the health of both people and wildlife. When watersheds are protected, so are the services that surrounding communities heavily depend on. Highway 413 and accompanying sprawl will negatively impact the ecological functionality of these three GTA watershed's and threaten the availability of critical services such as clean water, habitat, flood prevention, and carbon storage.

The governments of Ontario and Canada have responsibilities to protect and recover species at risk and the development of Highway 413, and the suburban sprawl that it would facilitate, is inconsistent with those commitments.



RECOMMENDATIONS

- ➔ **Cancel Highway 413.** Congestion on Highway 401 can be reduced immediately and at a lower cost by subsidizing truck tolls on the underused Highway 407.
- ➔ **Accelerate the creation and maintenance of natural heritage systems in watersheds** by:
 - Implementing policies that require long-term protections of natural features and their functions.
 - Undertaking projects (i.e. native planting projects, land acquisition) to help grow and strengthen the amount of natural area. This would make more habitat available for wildlife and improve climate resiliency within watersheds.
 - Improving environmental monitoring and reporting processes throughout the province (i.e. more frequent water sampling and testing, ongoing wildlife population monitoring)
- ➔ **Build homes within existing city boundaries.** Evidence shows there is enough land already approved for development in existing urban neighbourhoods to build all the homes we need until 2040.
- ➔ **Invest in building more connected public transit.** Constructing Highway 413 is currently estimated to cost upwards of \$10 billion. These funds could be used to help build out and improve public transit throughout the GTHA.

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CONCRETE CONSEQUENCES: HOW HIGHWAY 413 WOULD PUT GTA WATERSHEDS AT RISK

A REPORT BY:



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