Ontario's *More Homes Built Faster Act* and its Impacts on Conservation and the Grand River Watershed

Elizabeth Colmenar, Arianah Dreise, Emily Ford, Ethan McGraw, Andrew White

University of Guelph, School of Environmental Sciences

ENVS*4001 and ENVS*4002

Dr. Adam Gillespie & Dr. James Longstaffe

April 4th, 2025

Land Acknowledgments

The Region of Waterloo is situated on the lands within the Haldimand Tract of 1784, a formally ratified agreement acknowledging six miles on either side of the Grand River as treaty territory belonging to Six Nations of the Grand River. The Region of Waterloo serves an area within the traditional territories of the Anishinaabe, Chonnonton and Haudenosaunee peoples. This territory is within the lands protected by the Dish with One Spoon wampum - which calls upon us to share the land and its resources fairly, represented by a shared dish and spoon, and to keep the dish clean by caring for the land and ensuring peace among all who share it. We acknowledge the enduring presence, knowledge, and philosophies of Indigenous Peoples. We acknowledge the continuing accomplishments and contributions Indigenous Peoples make in shaping Waterloo Region.

Region of Waterloo Land Acknowledgement (Region of Waterloo, 2023)

The County of Wellington is situated on multiple Treaties within the traditional territory of the Anishinaabeg. Historic agreements also include those made with the Haudenosaunee.
We acknowledge this land has and continues to be, inhabited by other nations throughout time such as the Attawandaron, Métis and the Inuit.
We acknowledge we are not the original stewards of these lands but have the responsibility of caring for this land and its people, and to ensure that future generations are able to thrive here.
The County of Wellington remains dedicated to a better understanding of past, present, and future as a gesture of commitment to the process of ongoing and meaningful Reconciliation.

Wellington County Land Acknowledgement (Wellington County, 2015)

The watershed includes 39 municipalities and two First Nations territories. In some cases, only a portion of the municipality is within the Grand River watershed.

The Grand River watershed is home to the Six Nations of the Grand River Territory and the Mississaugas of the Credit First Nation. Six Nations is the most populous First Nation in Canada, with about 13,000 residents living on an 18,800-hectare territory near Brantford. A similar number of members live "off reserve". The Mississaugas of the New Credit First Nation have a population of about 2,500 people, many living "off reserve".

Grand River Conservation Authority (GRCA, 2020)

Acknowledgements

We would like to thank Ontario Headwaters Institute for providing information and the opportunity to partake in their efforts to improve watershed security by formatting a report focusing on recent policy changes within Ontario and its impacts on watershed integrity.

We would also like to thank the Grand River Conservation Authority for their ongoing efforts in protecting the Grand River Watershed, ensuring that watershed integrity can be maintained.

TABLE OF CONTENTS

INTRODUCTION

Since the inception of Ontario's provincial Housing Action Plan, changes made in support of the Plan have negatively impacted watershed security, core planning legislation, and legislation concerning conservation authorities, environmental assessments, species at risk, wetlands, and the public's right to appeal planning decisions in the Waterloo Regional Municipality and Wellington County. Per the Ontario Headwaters Institute ("OHI") (2024), *Watershed security* refers to when a watershed is healthy, resilient, and capable of supporting a region's ecological integrity, social well-being, and economic vitality. Both land use planning and watershed planning measures are integral to protecting watershed security (Ontario Headwaters Institute [OHI], 2024). These planning measures should also be supported by sound stewardship practices (OHI, 2024). However, due to poor planning and land occupancy practices as a result of prioritizing landscape features over the protection of ecosystems, watershed security in many municipalities is ignored (OHI, 2024).

As the OHI is concerned with the provincial government's recent efforts to implement the Housing Action Plan, this report will provide a comprehensive summary of provincial policy changes in South-Central Ontario, and local ecological impacts to the Waterloo Regional Municipality and Wellington County. The first part of the report will discuss policy changes, including topics such as overall changes to provincial policy, changes to funding and costs across all levels of government, changes to conservation authorities, cutting red tape, and the effects of these changes on the Waterloo Regional Municipality and Wellington County. The second part of the report will discuss various aspects of watershed ecology, such as water quality, erosion and flooding, water management practices, and discuss potential similarities between the Grand River Watershed and the Don River Watershed. The final part of the report will analyze these two

elements together. This section will first discuss what policies are related to what impacts in conservation areas around the Waterloo Region and how these areas will be affected by changes to conservation authorities. We will then discuss the reduction in funding from developers to municipalities and conservation authorities, the reduced monitoring for sewage and water treatment, and how they pose risks to public safety and watershed security. Lastly, the report will end with a discussion about urban development and how it will put pressure on watersheds and watershed security.

1. OVERVIEW OF POLICY CHANGES

1.1 Background

Historically, many of the decisions around Ontario's housing plans, conservation efforts, and the intersections between the two, have been left up to municipal and county boards, with consultation from conservation authorities (Eby, Thomason, & Reusser, 2023). To dictate goals and projections for municipalities and counties to take into consideration, the provincial government would put forward a Housing Action Plan, with county board municipal leaders meeting to review the provincial plan and decide how to meet their obligations to the province, the county and individual municipalities (Eby, Thomason, & Reusser, 2023). A regional official plan would then be produced, which would be sent to the provincial government for approval (Eby, Thomason, & Reusser, 2023). Common practice was that these approvals would come back with a few minor changes, but overall, the spirit of the plan would be left intact (Eby, Thomason, & Reusser, 2023). This trend held true for the Waterloo Regional Municipality and County of Wellington when they first submitted their regional official plan amendment No. 6.

Until November 2, 2023, when the Minister of Municipal Affairs and Housing rescinded the previous approval (Eby, Thomason, & Reusser, 2023).

In addition to reversing the approval, the ministry also proposed an expansion to urban boundaries which did not have supporting engineering studies on the usefulness of the land for their intended population densities (Eby, Thomason & Reusser, 2023). They also failed to consult with citizens, stakeholders and First Nations groups involved in developing the areas (Eby, Thomason & Reusser, 2023). In their summary report to the local and regional councils, Eby, Thomason and Reusser argue that these urban expansions were entirely unnecessary to meet the province's 2031 and 2051 housing targets (2023). They also point out that if more land were needed, the mandated five-year reviews of the regional plan would leave plenty of opportunity to accommodate that (Eby, Thomason & Reusser, 2023).

This fell in line with a number of changes that have occurred since Bill 23, *More Homes Built Faster Act*, was introduced in 2022. It turned much of provincial housing plans and conservation policy on its head, leaving many planning boards, conservation authorities and others on unsteady footing. Among many broad changes to provincial planning, they made bold moves to cut red tape and reduce administration and approval delays for housing development (Government of Ontario & Malik, 2024a). This included changes to funding at the provincial and municipal levels, as well as reorienting a great deal of the *Conservation Authorities Act*.

This chapter will review many of these changes and discuss how they apply to the Waterloo Regional Municipality and County of Wellington.

1.2 Overall Changes to Provincial Policy

There have been many cases where the Ontario government has tried to reduce inefficiencies and redundancies in urban development planning and approvals. For example, the *Conservation Authorities Act* was changed in 1998 as part of the *Red Tape Reduction Act* to ensure greater consistency among provincial regulations (Grand River Conservation Authority [GRCA], 2021). In this case, the changes gave conservation authorities greater influence over construction in places that could disturb flood control, erosion, dynamic beaches, pollution and the conservation of land (GRCA, 2024). This change was intended to prevent the development of new hazards and the exacerbation of existing ones (GRCA, 2024).

The purpose of more recent changes to provincial policy has been described similarly, with an emphasis on directing municipalities and conservation authorities back towards their core responsibilities and mandates (Government of Ontario, 2024). This included removing the words “pollution” and “conservation of land” from conservation authorities’ influence and replacing them with “unstable soils and bedrock” to focus their approvals on public safety (Government of Ontario, 2024).

The Ontario government has prioritized a fast-paced expansion of urban development and housing in much of its policy changes over the last few years (Syed & McIntosh, 2022). These plans have drawn concerns from conservation authorities, Indigenous communities and farmers about the impacts on parks, wetlands, conservation areas and their own territories and lands (Syed & McIntosh, 2022). The Ford government has reduced developers’ obligations to leave space for parks, land feature protection and concessions to Indigenous communities and farmers (Syed & McIntosh, 2022). Conservationists, government planners and municipal staff have reported that these changes would more or less allow for unrestricted development, regardless of the consequences (Syed & McIntosh, 2022). Some key stakeholders and rights holders would be

allowed to appeal planning and development projects, including Indigenous and utility groups (Syed & McIntosh, 2022). However, conservation and environmental groups are not allowed to appeal, and the legislature is very vague about whether neighbourhood groups could appeal (Syed & McIntosh, 2022). They eliminated municipalities' ability to regulate architecture and aesthetics of new builds, including the enforcement of municipal green standards and sustainability practices (Syed & McIntosh, 2022). They also cut the extent to which municipalities can enforce park development, including size and location. In line with this decision, they expanded the definition of parkland to include parks built above infrastructure, like underground parking garages and utility lines (Syed & McIntosh, 2022). Additionally, species-at-risk habitat is no longer to be considered a concern when deciding what wetlands should be conserved (Syed & McIntosh, 2022). Developers will be allowed to build near, on and around protected areas in exchange for replacing any damaged habitat or paying damages (Syed & McIntosh, 2022). This "offer" of course brings into question the success of these replacement habitats and to whom those damages would be paid (Syed & McIntosh, 2022). Indigenous communities in particular objected to these aspects of the policy changes, but there was no indication that they would be consulted about or compensated for these situations (Syed & McIntosh, 2022). While some responsibilities that have traditionally been held by conservation authorities are being passed to the Ministry of Natural Resources and Forestry ("MNRF") (like the development of soil aggregates, including sand, gravel and other rocks quarried for use in cement), others are being given to municipalities (Syed & McIntosh, 2022). This presents a challenge, as municipalities often lack the expertise needed for many of these responsibilities (Syed & McIntosh, 2022). Conservation authorities are well-practiced in water protection, environmental engineering and conservation oversight, and are therefore often the best equipped

to issue development reviews and permits where conservation efforts are a concern (Syed & McIntosh, 2022). That said, if the provincial government wants to insist that a project goes through, they need only use a Minister's Zoning Order ("MZO"), which can override both conservation authorities and municipalities (Syed & McIntosh, 2022). The Ford government has been particularly fond of issuing these orders (Syed & McIntosh, 2022).

1.3 Funding and Costs

Alongside the changes to provincial and municipal policies in support of Bill 23, the question of how these developments will be funded must be considered. How will the costs be imposed on taxpayers and lower levels of government, subjected to the demands of Doug Ford's Progressive Conservative government? To better understand the various sources of funding and their intended use, the federal and provincial funding programs have been broken down below.

1.3.1 Federal

Although the Government of Ontario has put a high emphasis on building more homes, the Government of Canada is also concerned with the country's housing supply and has engaged in providing funding to the provinces and territories to meet the needs and goals of their local communities (Government of Canada, 2024). To do so, the Canada Community-Building Fund ("CCBF") has been created to provide provinces and territories with upfront funding for them to allocate to areas in need of infrastructure investments (Government of Canada, 2024). As of April 1, 2024, the Government of Canada collaboratively came to an agreement with the provinces and territories regarding the administration and distribution of the CCBF (Government of Canada, 2024). The money from the CCBF has initially been advertised for crucial

infrastructure investments that are vital to a community's well-being, like public transit, roads and bridges, or drinking water and wastewater infrastructure (Government of Canada, 2024). However, it has also been made clear that provincial and territorial governments may distribute the money as they see fit to support the development of infrastructure projects that align with regional housing goals that will ultimately help to achieve Canada's overall housing supply goals (Government of Canada, 2024). An emphasis has been placed in the CCBF agreement on these infrastructure projects being tied to affordable housing, but there are no contractual obligations or requirements that say the money must go to these types of projects (Government of Canada, 2024).

In total, the CCBF will invest $26.7 billion over the next ten years (until March 31, 2024), providing over $2.4 billion per year across the country to communities in need (Government of Canada, 2024). These investments are to be indexed at 2% and delivered in $100 million increments (Government of Canada, 2024). Funds are also to be dispersed to the provinces and territories on a per-capita basis, which will be adjusted every five years when new census data is available (Government of Canada, 2024). Funding dispersal for the fiscal years of 2024-25 through 2028-29 are based on 2021 consensus data, while the dispersal for 2029-30 through 2033-34 will be based on 2026 consensus data (Government of Canada, 2024). Provinces' and territories' plans for funding dispersal and the measures to be taken to address the needs of local communities are to be confirmed annually with a letter by the Minister of Housing, Infrastructure, and Communities ("HICC") (Government of Canada, 2024). While it is great there is some quality assurance on how this money is being used, the process of communicating plans through a letter once a year lacks visual elements that could be achieved

through physical, on-site inspections to ensure an accurate portrayal of regional needs and development standards.

Based on current consensus data, approximately $12.6 billion will be distributed across Canada between 2024 to 2029, with Ontario receiving over $4.7 billion (Table 1.1) (Government of Canada, 2024). In a joint statement from the HICC, Ontario's Minister of Municipal Affairs and Housing ("MMAH"), the Mayor of Toronto, and the President of the Association of Municipalities of Ontario ("AMO"), it has been made clear that Ontario's portion of the funding will entirely go towards projects that will be increasing Ontario's housing supply (Ministry of Housing, Infrastructure and Communities [HICC], 2024).

1.3.2 Provincial

Even though housing supply is a concern across the country, addressing these needs is ultimately up to the provincial government. Given that Doug Ford's government has focused many of its recent efforts and campaigns around this issue, it is unsurprising that they have directed billions of dollars towards funding initiatives that incentivize municipalities and developers to build more homes. Many of these initiatives are notably based on encouraging municipalities to change their processes regarding planning applications and updating local infrastructure such that they will be able to speed up the rate of construction.

In January 2022, the Government of Ontario announced three funding programs for municipalities to modernize and streamline their land-use planning processes (Office of the Auditor General of Ontario, 2023). These programs are referred to as the Streamline Development Approval Fund, the Municipal Modernization Program, and the Audit and Accountability Fund (Office of the Auditor General of Ontario, 2023). The Streamline

Development Approval Fund was set up to provide $45 million to Ontario's 39 largest municipalities to help them amend their processes for managing and approving housing applications so that they were more streamlined and accelerated to match the current needs of their communities (Office of the Auditor General of Ontario, 2023). The Municipal Modernization Program was created to provide $28 million to small and rural municipalities to help them find more efficient strategies for delivering local services to their residents and businesses (Office of the Auditor General of Ontario, 2023). Lastly, the Audit and Accountability Fund allotted $8 million to urban municipalities to aid in utilizing third-party reviews of their procedures to identify areas that could be updated to increase efficiency (Office of the Auditor General of Ontario, 2023).

In August 2023, the Ontario government launched another funding program called the Building Faster Fund, which would reward municipalities for meeting their assigned housing targets (Government of Ontario et al., 2023). In other words, this fund would incentivize municipalities not meeting their assigned targets to try and do so, while also rewarding the municipalities that already are. Over three years, this fund will provide $1.2 billion to municipalities that reach their goals and help them access the tools needed to build even more homes (Government of Ontario et al., 2023). If a municipality reaches at least 80% of their annual target, they will then be qualified for a portion of the funding, based on the number of homes they built (Government of Ontario et al., 2023). If a municipality exceeds their target, they will receive a bonus on top of their portion of the funding (Government of Ontario et al., 2023). To meet the specific needs of their communities, some of the funding will also be distributed to smaller, rural, and northern municipalities that do not have a housing target assigned to them (Government of Ontario et al., 2023).

In March 2024, the Government of Ontario announced it would be investing an additional $1.8 billion into housing funding programs already established (Government of Ontario & Office of the Premier, 2024). This is on top of the previously mentioned programs, as well as the Ontario Community Infrastructure Fund that was announced in 2021, which had $2 billion invested into it (Government of Ontario & Office of the Premier, 2024). According to Premier Doug Ford, this funding is to help address the infrastructure barriers that municipalities are claiming prevent them from building more homes (Government of Ontario & Office of the Premier, 2024).

1.3.3 Municipal

While these programs appear to be increasing the funding municipalities will be receiving to aid in the development of more homes and improve crucial infrastructure, many remain concerned about whether this is truly the case. The majority of this money is intended to go directly into supporting the enhancement of infrastructure, which will allow housing developments to be created with fewer barriers. It is unlikely that the municipalities will see any of this money go towards supporting other areas of their communities that will need updating to support an influx of residents or be used for supporting municipal governments themselves in handling an increased load of development applications. These possibilities imply that municipalities will need to reallocate or find other financial resources to properly support the various provincial policy changes that are bearing down on them (Jacek, 2022).

One of the main sources of concern for municipalities is the changes to the *Development Charges Act* and the *Planning Act* that have been brought on by Bill 23 (Jacek, 2022; Clark, 2022). These changes involve absolving or reducing the costs and fees developers usually pay to

municipalities, as long as they are meeting provincial requirements for including a certain number of affordable homes or units in their developments (Jacek, 2022; Clark, 2022). The loss of this income leaves the municipal government to carry the burden of these costs, which will likely fall on taxpayers (Jacek, 2022). Based on these changes and development projections, some municipalities are anticipating severe revenue losses and warning community members of potential tax increases (Northumberland County: Planning and Development, n.d.; Town of East Gwillimbury & Jackson, 2023). The Town of East Gwillimbury has estimated their potential loss in revenue to be anywhere from $40 to $70 million over the next ten years due to the lack of development charges (Town of East Gwillimbury & Jackson, 2023). They have also warned residents that as of 2024, property taxes would be increasing by 3-5% to account for the loss in revenue and that these increases could continue for the next ten years, or until other sources of revenue are identified (2023). Similarly, Northumberland County, which includes seven municipalities, has estimated a loss of $17.4 million in revenue from the loss of development charges and has also warned their residents of an increase in taxes by 27% over the next two to seven years (Northumberland County: Planning and Development, n.d.).

While there appear to be many programs set up for funding housing development projects and supporting municipalities from upper levels of government, the exact allocation of these funds is questionable and whether municipalities are benefiting from them is unclear. It is likely that the provincial government has failed to consider the bigger picture of what their housing supply goals mean for municipal governments and how these demands can impact previously existing residents.

1.4 Changes to Conservation Authorities

The introduction of Bill 23, the *More Homes Built Faster Act, 2022* has brought abundant changes to critical provincial policies. All of these changes have been made to reduce the barriers that are preventing housing developments from proceeding at the rapid pace Doug Ford's government desires, and to meet the supposed needs of the province. Although Bill 23 has led to multiple Acts being altered, one of the biggest and most polarizing alterations has been the changes made to the *Conservation Authorities Act*, and other environmentally driven legislation. The environmental protections the government previously had in place posed a great threat to Ford's plans for building 1.5 million homes within the next ten years and abolishing them was the only way around it (The Narwhal, 2023). Despite pushback from conservation and environmental experts, municipal governments, public servants, and even some developers, the Ford government has decided to stand firm on the changes and emphasize the prioritization of urban sprawl over protecting the environment from the unnerving impacts of climate change (Syed & McIntosh, 2022; The Narwhal, 2023).

The *Conservation Authorities Act* was originally put into effect in 1956, to give conservation authorities the power to create regulations regarding development projects filling in floodplains (GRCA, 2024). Between 1960 and 1998, the *Act* was amended three times to give authorities further control over development projects that could alter lands or waterways in a way that would increase their vulnerability to flooding, erosion, and pollution, or lead to irreversible alteration (GRCA, 2024). In 1998, more amendments were made under the *Red Tape Reduction Act*, which was created to establish consistency across provincial regulations and legislation (GRCA, 2024). These amendments were significant as they gave conservation authorities the most control they ever had over developments that could create environmental hazards or intensify the hazards that had already been created (GRCA, 2024). Despite the regulations of the

Conservation Authorities Act allowing individual conservation authorities to effectively manage and monitor projects posing a threat to the environment within their jurisdictions, it was announced in October 2022 by the MNRF, which governs the *Act*, that changes would be made to help streamline project approvals to support Bill 23 (Ministry of Natural Resources and Forestry [MNRF], 2024). On April 1, 2024, the final changes were announced, with the most pivotal change being that the existing 36 conservation authority-specific regulations for governing their zones were being revoked (MNRF, 2024). These conservation authorities lost their governing power, and it is now up to individual municipalities to approve and regulate projects typically handled by them (MNRF, 2024). The jurisdiction of the conservation authorities governing powers was replaced by a newly created minister who will govern prohibited activities, exemptions and permits under the *Conservation Authorities Act* (MNRF, 2024). The *Act* has also changed the emphasis of the regulations from being focused on environmental concerns and conservation to being centered around human life and needs (GRCA, 2024). While the limitations and removals of conservation authorities are undoubtedly concerning and likely putting the environment, as well as human lives, at greater risk of being irreparably damaged by natural hazards, the provincial government has continued to add constraints to the current environmental protections established to support housing development (MNRF, 2024). These key changes have been highlighted by the MNRF, (2024), and broken down as follows:

"1. Prescribing Areas Where Development is Prohibited by Updating Definitions" (MNRF, 2024)

They are updating the terms and technical descriptions related to prohibited development activities within rivers and stream valleys to support the new Minister's regulations of where

these activities can occur (MNRF, 2024). The two major changes involved changing the definitions of what a “watercourse” is and where “other areas” occur concerning the prohibition of development activities near wetlands (MNRF, 2024). The “watercourse” definition refined the details of what a “watercourse” must be identified by, making the requirements harder to match compared to the previous definition (MNRF, 2024). On the other hand, the terms of what “other areas” include have now been weakened, allowing development activities to occur much closer to all wetlands than they have been in decades (MNRF, 2024). The previous term prohibited activities related to wetlands that were Provincially Significant or greater than two hectares in size and required a 120-metre buffer area to be regulated around the wetland (MNRF, 2024). The updated term now includes all wetlands, however, the buffer area to be regulated has been reduced to 30 metres, regardless of size or significance (MNRF, 2024).

“2. Exempting Low-Risk Activities from Conservation Authority Approval” (MNRF, 2024)

With what little control conservation authorities have left over permits and development on lands within their jurisdictions, the government has further reduced that based on the “risk” the development activities may have (MNRF, 2024). It has been determined that any “low risk” development activities may proceed, despite any prohibitions set by the authorities, and may occur without obtaining a permit from the conservation authority (MNRF, 2024). These activities do not have exact definitions and may be interpreted differently by the government, the developer, or the conservation authority.

“3. Limiting the Conditions a Conservation Authority May Attach to a Permit” (MNRF, 2024)

Similar to allowing “low risk” activities to occur on prohibited land without a permit, conservation authorities are now also being implored to issue permits for activities that will occur on prohibited land and are allowed to attach conditions to the permit and the terms of

development (MNRF 2024). However, the conditions they are allowed to add are limited to only involving those that would aid in the mitigation and control of any natural hazard or public safety risks due to the effects of natural hazards (MNRF, 2024). They are also permitted to add conditions on the administration or implementation of the permit, which arguably is not a condition, but a guideline to help the activity take place (MNRF, 2024).

Under this change, the Lake Simcoe Region Conservation Authority ("LSRCA") has additional regulatory actions they can apply in permit decisions under the Lake Simcoe Protection Plan (MNRF, 2024). The new conservation authority regulations brought on by Bill 23 will support the LRSCA's implementation of the Protection Plan under the *Lake Simcoe Protection Act, 2008*, which requires any permit decisions, or attached conditions, to obey the relevant policies in the Plan (MNRF, 2024).

"4. Streamline and Clarify Rules for Development" (MNRF, 2024)

As with many of the policy changes taking place because of Bill 23, the changes to the *Conservation Authorities Act* also have the end goal of ensuring that issuing permits is streamlined and that they are transparent and consistent across Ontario (MNRF, 2024). Along with all the other conditions in place as to when conservation authorities are allowed to issue a permit, there have also been new rules added to ease the process for developers (MNRF, 2024). These rules require the authorities to create publicly accessible maps and documents about where permits are required, as well as the process of obtaining one (MNRF, 2024). Along with these items, they are required to annually publish a report on their permitting statistics for the public to see, which must include their level of compliance with the new regulations placed on conservation authorities (MNRF, 2024). The rules also place a 21-day time limit on when applicants must be notified of their application being received and require the authorities to

accept requests for application reviews (MNRF, 2024). Applicants may request a review if they have not been notified of receipt within 21 days or if they disagree with the decision on the application (MNRF, 2024). If an application is confirmed as completed and a permit is issued, the authorities are not allowed to request that the applicants provide additional technical information or perform new studies (MNRF, 2024). Lastly, the rules will require authorities to be more flexible in issuing permits up to the maximum 60-month limit, to allow developers more time to complete their projects (MNRF, 2024).

On top of all these constraints being placed on authorities for when they are allowed to perform their roles, they have also been told to identify any conservation land under their jurisdictions that may be suitable for housing so that the province can streamline the severance of this land and clear cut the pathway to speedy development (Government of Ontario, 2024).

In addition to being stripped of their roles as protectors of people and the environment from natural hazards, it should be noted that the amendments to the *Conservation Authorities Act* under Bill 23 have halted the conservation authority fees that developers are meant to pay when conducting projects on conservation land (Government of Ontario, 2024). These are similar to the fees that have been halted or reduced for municipalities to collect from development projects, where both groups are now left to make up for this loss of revenue to maintain their other services provided (Government of Ontario, 2024; Jacek, 2022; Clark 2022). Once again, the freezing of fees is to help lessen the financial burden being placed on developers, with the intent that the reduced fees allow for construction to accelerate and, hopefully, increase the affordability of these homes (Government of Ontario, 2024).

1.5 Cutting Red Tape

In November 2024, the Ministry of Red Tape Reduction ("MRTR") introduced changes to the *Modernizing Ontario for People and Businesses Act, 2020* alongside a new act, the *Cutting Red Tape, Building Act, 2024*. Since 2018, 550 red tape reduction measures have been introduced, to improve the province's productivity, economic development, and domestic and international growth. As part of Ontario's 14th reduction package, this new bill aims to modernize previously outdated and inefficient legislation, regulations, and policies (Government of Ontario & Malik, 2024a; Government of Ontario & Malik, 2024b; Ministry of Red Tape Reduction [MRTR], 2024). Ontario is one of the top three provinces known for reducing red tape, and the *Cutting Red Tape, Building Act, 2024* will continue to do so by strengthening the way they measure and report on government impacts on individuals, and simplifying and improving service processes (Government of Ontario & Malik, 2024a; MRTR, 2024). Across 19 ministries, the *Cutting Red Tape, Building Act, 2024* will amend various legislation, regulations and policies (Government of Ontario & Malik, 2024a). However, since this report primarily focuses on the environmental and housing policy impacts, changes within the Ministry of the Environment, Conservation and Parks ("MECP") and the MMAH will be highlighted.

With respect to the MECP, the Government of Ontario and Malik (2024a) state that the *Act* will reduce requirements for Brownfield redevelopment through amendments to the *Environmental Protection Act* and O. Reg. 153/04, remove barriers for reuse of excess soil through amendments to Soil Regulation (O. Reg 406.19) under the *Environmental Protection Act,* streamline environmental approvals for fruit and vegetable growers, and streamline the distribution of sewage and water for transit projects through regulatory changes under the *Environmental Protection Act* (O. Reg. 208/19) and the *Safe Drinking Water Act* (O. Reg 172/03). Additionally, it will balance streamlining permissions and environmental standard

protections related to housing and infrastructure projects by allowing ministries and businesses to self-register projects on the Environmental Activity and Sector Registry, in place of applying for traditional environmental permission, which takes longer to obtain (Government of Ontario & Malik, 2024a).

Concerning the MMAH, the Government of Ontario and Malik (2024a) state that the *Act* will streamline the qualification process for building officials through regulatory changes that allow officials to work between different provinces, remove barriers to building additional residential units, and streamline discretionary municipal third-party reviews of engineering and architectural stamp designs for building permit applications. It will also allow wider use of pay-on-demand surety bonds used for investment funding in new housing projects and financial security for local governments involved in approvals for new housing-enabling infrastructure (Government of Ontario & Malik, 2024a).

1.6 Effects on the Region of Waterloo and Wellington County

The introduction of these changes has significant impacts on the Region of Waterloo and Wellington County's land use planning and conservation processes. Firstly, the *Cutting Red Tape to Build More Homes Act, 2024,* will remove several of the Region of Waterloo's planning responsibilities, which will affect the Region of Waterloo Official Plan ("RWOP") and their local role in subsequent approval planning decisions (Eby, Thomason, & Reusser, 2024). In Ontario, Waterloo was the first regional government to have an official plan approved by the government and was one of the first regional governments to be given the authority to approve applications under the *Planning Act* (Eby, Thomason, & Reusser, 2024). The region's official plan is unique in that it is structured like a policy plan, rather than a typical land use plan. Removing the

region's ability to participate in local planning decisions will increase difficulties in managing growth and long-term infrastructure planning integration, leading to mediocre decision-making and increased costs to taxpayers and businesses (Eby, Thomason, & Reusser, 2024). Without the role of the RWOP, the province will now be responsible for approving seven official plans. Also, per the *Provincial Planning Statement*, certain environmental features and designations in the RWOP will now be under several jurisdictions, with no official regional scale document to coordinate and organize them (Eby, Thomason, & Reusser, 2024).

In Spring 2023, after the first release of Bill 23, the government ordered several municipalities to increase urban boundaries originally set out in their local planning departments to make space for urban development, despite providing little to no information on how much land they would be required to build on (Syed & McIntosh, 2023). These municipalities included the Region of Waterloo, Wellington County, Belleville, and Peterborough (Syed & McIntosh, 2023). According to an anonymous source from Waterloo's regional planning department, the provincial government opened about 2000 ha of greenspace and farmland for development, with no permission for the region to appeal the decision (Syed & McIntosh, 2023). Expansion is of particular concern to Waterloo and Wellington County, as their biodiversity is already threatened due to species depending on the conditions only the region can provide. Losses of these lands will increase dependency on cars, thereby increasing pollution (Syed & McIntosh, 2023). Furthermore, once developed, greenspaces cannot sequester carbon or absorb water to prevent flooding (Syed & McIntosh, 2023). Despite the lack of sewage, energy, and water infrastructure for residential development in the Region of Waterloo, the municipality's growth plan, which was supported by the Six Nations of the Grand River and originally planned over a 30-year

timeframe, must now be accelerated. This calls into question whether the government is properly addressing issues brought on by the housing crisis (Syed & McIntosh, 2023).

Waterloo's population is forecasted to increase by 200,000 people by 2051, and at its current state, it is unknown if the region and its water systems can handle this growth (Syed & McIntosh, 2023). Waterloo relies on the Grand River and its surrounding aquifers for drinking water, and despite developments and funding for the Rural Water Quality Program, which helps farmers implement best management practices that improve and protect groundwater, many wastewater treatment facilities are located along waterways with water quality Policy 2 constraints (Eby, Thomason, & Reusser, 2024). Expanding wastewater treatment facilities that dispose effluent into these areas may be expensive or even impossible, as these constraints apply to waterbodies that have "water quality which presently does not meet the Provincial Water Quality Objectives" and thus "shall not be degraded further and all practical measures shall be taken to upgrade the water quality to the Objectives" (Eby, Thomason, & Reusser, 2024; Ministry of the Environment, Conservation and Parks [MECP], 2016). Additionally, Policy 2 constraints placed on land near the Nith River will also make a large portion of the region's land classified as urban area under Bill 163, the *Relief for Renters Act, 2024*, undevelopable, as sewers to wastewater treatment facilities using other receiving bodies of water cannot be installed (Eby, Thomason, & Reusser, 2024).

In November 2024, MMAH proposed amendments to O. Reg. 525/97 under the *Planning Act* (subsection 1(1)), a regulation that exempts "lower-tier" municipalities in the regions of Durham, Waterloo, and Niagara from requiring to obtain Minister's approval for a majority of their official plan amendments (Dentons, 2024). Under Bill 23, the *Planning Act* was amended to remove planning roles from certain "upper-tier" municipalities. Specifically, the *Act*

distinguished between an “upper-tier municipality with planning responsibilities” and an “upper-tier municipality without planning responsibilities” and removed the requirement for upper-tier municipalities to approve official plans and plan amendments of their lower-tier municipalities (Dentons, 2024). Bill 185 proposed to spread out the implementation of these changes, and on January 1, 2025, the Regions of Durham, Waterloo, and Niagara became upper-tier municipalities without planning responsibilities (Dentons, 2024). The proposal also intended to amend O. Reg. 525/97 to exempt most official plan amendments of certain lower-tier municipalities from needing the Minister’s approval. This proposal amendment applies to official plan amendments adopted on or after January 1, 2025, for the Region of Durham and Region of Waterloo (Dentons, 2024). In opposition to this, Waterloo regional mayors recommended that a proclamation be given to Bill 23 revisions related to transferring regional planning responsibilities to local municipalities by the end of the 2nd quarter of 2024, as legislative changes make it so that regional governments in Waterloo can no longer provide planning approvals, thereby forcing local municipalities to assume all responsibilities (City of Kitchener, 2024). These legislative changes also create difficulties for municipalities that are not able to meet their legislative obligations under the *Planning Act*, as regional government involvement causes delays for developers (City of Kitchener, 2024).

As well, they recommend the MMAH amend Section 11 of the *Municipal Act, 2001*, to identify water production, treatment, and storage as non-exclusive jurisdiction, as Section 11 bans local Waterloo municipalities from providing water production, treatment, and storage services (City of Kitchener, 2024). Amendments should be put forward so that local municipalities can either have control over the provision of potable water to support residential

or non-residential development or leverage the private sector to fund and construct communal water systems in areas unable to connect to the regional water system (City of Kitchener, 2024).

2. OVERVIEW OF WATERSHED ECOLOGY

2.1 Background

The Grand River Watershed is the largest inland river system in Southern Ontario, stretching across 300 km from Dundalk Village in Grey County down to Port Maitland in Haldimand County (GRCA, 2020a) (Figure 1). The 6,800 sq. km watershed empties into the Lake Erie basin and houses about one million people within major urban centers such as Kitchener, Waterloo, Guelph, Cambridge, and Brantford (GRCA, 2020a). Farmland takes up 70% of the land surrounding the watershed with another 5% centered around urban spaces (GRCA, 2020a). With the introduction of the *More Homes Built Faster Act*, these numbers could see a drastic change, increasing urban areas at the expense of natural landscapes.

The watershed and its tributaries, including the Conestogo, Speed, Nith, and Eramosa Rivers, provide essential water resources for ecological, municipal, agricultural, and industrial uses (MNRF, 2019). However, as human activity and urbanization within the watershed continue to develop, concerns about watershed security have become increasingly prominent. Watershed security refers to the sustainable management and protection of water resources and the interplay between natural heritage sites such as upland forests, wetlands, and rivers to ensure long-term ecological integrity and human well-being (Environment Canada, 2014). The integrity of the Grand River Watershed is threatened as expanding urban zones increase physical and ecological pressures due to runoff, erosion, water quality changes, flooding, and degrading stability. Urban

expansion has led to increased impervious surfaces, contributing to higher levels of stormwater runoff that carry sediments, pollutants, and contaminants into the river system.

Additionally, urban activities such as pollution, salting, detergent and fertilizer use, introduce excess nutrients such as phosphorus and nitrogen into waterways, exacerbating issues like harmful algal blooms and oxygen depletion (GRCA, 2020a). With the continued threats of climate change and weather variability, extreme weather events have heightened the risk of flooding, which threatens infrastructure and disrupts aquatic ecosystems (Environment Canada, 2014). The *Build More Homes Faster Act* will increase development around the watershed, compromising its integrity against these threats and heightening risks for ecological devastation.

This chapter will review different impacts that urbanization can have on the watershed including water quality, erosion, and flooding, with supporting evidence and comparisons made from studies done on the Don Valley watershed. Further discussions will highlight watershed management practices that can be used to mitigate these effects and help protect the integrity of the watershed resulting in lasting watershed security.

2.2 Important Factors of Water Quality

With the intensification of both urbanization and agricultural lands around watersheds, contaminant loading will surge due to higher runoff rates from impervious surfaces, carrying excess nutrients, salts, heavy metals, and sediments into water systems (Puckett, 1995). Urban development disrupts natural filtration processes resulting in drastic declines in the watershed's soil and water quality, posing ecological risks and threats to human health (Puckett, 1995).

2.2.1 Nutrients

Nitrogen enters the watershed as nitrates or ammonia, eventually converting into the highly soluble molecule nitrate (NO_3^-), which can be transported throughout the water column (Carey et al., 2013). Due to its solubility, nitrate easily leaches into groundwater, posing risks to both well water quality and the ecological health of benthic organisms (Carey et al., 2013). In aquatic environments, elevated nitrate levels can disrupt the metabolism of aquatic organisms and benthic invertebrates leading to reduced growth, increased stress, and lower reproductive success ultimately impacting survival rates (Carey et al., 2013). Additionally, excessive nitrate in drinking water has been linked to various health concerns including respiratory issues and even certain cancers (Mensinga et al., 2003). Similarly, phosphorus enters aquatic systems primarily through fertilizers, manure, and detergents (Carey et al., 2013). Unlike nitrate, phosphorus binds tightly to soil particles allowing it to move through sediment transport rather than dissolving in water (Carey et al., 2013). While phosphorus tends to accumulate in sediments, disturbances such as storms can resuspend it into the water column influencing nutrient dynamics and water quality (Carey et al., 2013).

Urban wastewater discharge, stormwater runoff, and the widespread use of fertilizer and detergents in residential and industrial areas significantly contribute to nutrient pollution. These are the leading urban sources of nitrogen and phosphorous entering watersheds (Puckett, 1995). Although further development of agricultural lands to keep up with urban expansion leads to more non-point nutrient sources, expanding municipalities introduce more point-source pollution, such as wastewater treatment plants, and non-point pollution from storm drains, lawn care, and road runoff (Puckett, 1995). The expansion of urban zones prevents natural infiltration, amplifying nutrient transport into water bodies, particularly during storm events (Puckett, 1995).

Excessive use of fertilizers and the production of organic matter like lawn clippings, leaves, and pet waste during residential lawncare become concentrated in urban areas and contribute to the non-point urban sources that bring additional nitrogen to watersheds via runoff (Small et al., 2023). Furthermore, commercial, and industrial detergents as well as cleaning products can contain phosphates which enter the watershed through homeowners'/ businesses' wastewater systems (Puckett, 1995). Runoff can also contribute to the addition of phosphates to the watershed when these products are used outside for cleaning cars, furniture, or sidewalks (Puckett, 1995). While these non-point sources are bringing excessive nutrients into the watershed resulting in negative ecological impacts such as mass algae blooms, point-source wastewater discharge can compound these effects and heighten the risks of harmful diseases and pathogens entering the watershed through human waste (Puckett, 1995).

More urban expansion corresponds with an increase in water treatment plants, which empty effluents into the watershed (Puckett, 1995). Across Canada, many populations are served by wastewater collection and treatment systems resulting in municipal wastewater effluents being the largest single effluent discharges, by volume, in the country (Environment and Climate Change Canada, 2014). It is stated that even advanced treatment systems are unable to remove all pollutants and chemicals from the wastewater before it is released into nearby waterbodies (Environmental and Climate Change Canada, 2014). These effects can be amplified in municipalities that use combined sewer systems, which utilize the same piping system for wastewater and stormwater runoff (Environmental and Climate Change Canada, 2014). During heavy rain events, these systems can become overloaded, resulting in the release of partly treated or untreated wastewater overflowing directly into waterbodies (Environmental and Climate Change Canada, 2014). Furthermore, the development of cracks and fractures in piping systems

and septic tanks can go unnoticed and result in direct sources of raw sewage entering soil and groundwater sources, leaching into the watershed (Environmental and Climate Change Canada, 2014). Excess nitrogen and phosphorous within wastewater and fertilizers combined with agricultural runoff during extreme precipitation events can have devastating effects on ecological life within the watershed and on human health through drinking water (Puckett, 1995).

These nutrients are crucial for algae and aquatic plant growth at natural levels; when they become excessive, they can accelerate algae growth, leading to harmful algae blooms within the watershed. Algae blooms can block out the sunlight, preventing photosynthesis from occurring within the plants beneath the water surface, resulting in their decline (Carey et al., 2013). Moreover, as algae chokes itself out and starts to die off, it is decomposed by bacteria which consumes large amounts of dissolved oxygen within the water (Carey et al., 2013). This results in a decline of usable oxygen for other aquatic life and an increase in low oxygen conditions within the water system (United States Environmental Protection Agency [EPA], 2024). These low-oxygen areas are called “dead zones.” The conditions are widespread and long-lasting, often resulting in large kills of fish, benthic organisms, and other aquatic life (EPA, 2024). Nitrates can also cause toxic algae blooms that exacerbate the poor quality of surface water, groundwater and drinking water (EPA, 2024). Some algae such as Blue-green algae release cyanotoxins into the water that cause health risks to mammals swimming in or ingesting it (EPA, 2018). These blooms often go unnoticed by people and are known for killing unsuspecting dogs as well as causing illness in humans who encounter them (EPA, 2018).

Many studies have revealed that Lake Erie is experiencing an increase in these kinds of algae blooms due to the vast expansion of agricultural and urban land in the area. One well-documented study was the Toledo Ohio Water Crisis in 2014, in which traces of cyanotoxins

were discovered in the drinking water supplies of over 400,000 residences (Lindsey, 2014). Tests determined that the outbreak stemmed from a massive phosphorous-induced bloom within Lake Erie due to a rain event days before (Lindsey, 2014). Although nutrients are one of the main factors influencing ecological wellbeing, it is only one of the many substances that can be brought in through urban wastewater and runoff. Salt is another very common mineral that is transported into watersheds from municipalities, especially in cooler climates (Scott et al., 2019).

2.2.2 Salts

Urbanization introduces large amounts of sodium chloride (NaCl) into watersheds This is a highly soluble mineral that can be quickly transported. Sodium chloride is sourced from road de-icing, industrial discharge, and wastewater treatment plants (Scott et al., 2019). In colder climates, such as the Grand River Watershed, the use of road salts within municipalities is common during winter months to prevent ice buildup on roads and sidewalks. Runoff during snow melt and rain events carries the salt off the roads and into the local waterways where it can accumulate in water supplies and infiltrate into the groundwater and soil (Scott et al., 2019). Excessive salt accumulation in watersheds compounds the pre-existing effects caused by nutrient runoff. It further disrupts aquatic life, water quality, and human health affecting long-term watershed health and well water quality (Scott et al., 2019). With the increase in salt concentration, water salinity changes, causing an increase in watershed pH (Scott et al., 2019). Many freshwater organisms are highly sensitive to these changes, such that even the smallest increase in salt concentrations results in stress or the death of these organisms and even the relocation of some mammals or birds due to the decline in water quality (Scott et al., 2019). These changes affect all levels of the aquatic food web, with drastic implications for biodiversity

in the area (Scott et al., 2019). Furthermore, changes in salt concentrations degrade riparian vegetation. Salt infiltrates the soil and dehydrates plant roots, resulting in vegetation degradation and thus increasing the risks of bank erosion (Lenhart et al., 2018).

2.2.3 Sediments

Urbanization has significant impacts on its surrounding natural landscapes, including causing increased erosion, sedimentation, and depositing suspended solids within waterways. One major and widely documented sediment source is channel erosion, which is common in altered urban flow conditions and can cause excess sediment to flow downstream (Russell et al., 2017).

Other sources include sediment from sealed and unsealed roads and imported sediments from surrounding landscapes (Russell et al., 2017). This includes gravel roads and road shoulders that can produce significant sediment loads on the same order of magnitude to construction sites (Russell et al., 2017). Construction activities during expansion remove existing soils and the vegetation holding soils together while stirring up and exposing sediments that can be taken into the watershed via runoff (Russell et al., 2017). Increased impermeable surfaces such as roads, sidewalks and rooftops increase runoff rates and can cause significant sediment transport during high precipitation events (Russell et al., 2017). This carries larger sediments into the watershed, where they accumulate. Dust particles, vehicle emissions, and tire particles contribute to the fine suspended solids that can enter the waterways when kicked up by vehicle or foot traffic, and wind (Russell et al., 2017).

High levels of suspended solids and sediments decrease water clarity, which reduces light penetration through the water resulting in disruptions of aquatic plant photosynthesis and impacts

on oxygen levels (Randhir, 2003). This issue is enhanced as sediments also contain organic matter that uses up dissolved oxygen as it decomposes in the watershed (Randhir, 2003). The decline in water visibility also makes it difficult for fish to find food and shelter, impacting aquatic food webs (Henley et al., 2000). Furthermore, excessive sediments can clog fish gills, reducing their breathing ability, as well as smothering fish eggs, leading to biodiversity loss (Henley et al., 2000). Moreover, sediments can also carry in other contaminants such as heavy metals, pesticides, and oils, that can accumulate in sediment beds or on the water surface, causing long-term effects on water quality and habitable areas for aquatic organisms (Randhir, 2003).

Flow rates and sediments can also influence erosion and flooding. High, fast-paced sediment movement can cause channel widening and deepening as it eats away at the underlying structure of the riverbed (Russell et al., 2017). In contrast, sediments can build up and form blockades at slower flows, diverting water flow and increasing the risk of flooding in some areas (Russell et al., 2017).

2.3 Erosion and Flooding

Alterations to historic flow patterns caused by urbanization around the watersheds decrease bank stability, leading to erosion and flooding. Riparian buffer zones are heavily impacted by surrounding urban areas and degrade over time due to removal, modification or vegetation stress brought on by the nearby urban influences (Welsch, 2022). This degradation and the manipulation of riverbanks to support urban expansion results in increased risks of flooding and potential erosion that can have devastating effects on the watershed's integrity and

newly developed areas (Feng et al., 2021). This can result in unexpected flooding within the expanded urban areas or the collapse of newly developed structures (Feng et al., 2021).

During urbanization, rainwater movement and sediment-water storage within nearby watersheds are significantly altered by changes arising from transitions of natural to man-made landscapes. Natural landscapes are degraded by increasing impervious surfaces, disrupting natural water flow, decreasing soil water retention, and reducing vegetation cover (Feng et al., 2021). These changes intensify pre-existing soil erosion and flooding risks, leading to water quality degradation, infrastructure damage, and habitat loss (Feng et al., 2021). Erosion naturally occurs in localised areas when soil is displaced by water or wind, although human activities accelerate this process, resulting in the degradation of the whole landscape (Lenhart et al., 2018). With urban expansion comes a loss in vegetation. Forests, grasslands, and wetlands that once naturally stabilized the soils of the watershed and absorbed rainfall are removed and replaced with roads and buildings that are less permeable and less stabilizing (Feng et al., 2021). These changes not only result in less water infiltration through the ground but also degrade the stability of the soils holding the watershed together (Feng et al., 2021).

Riparian buffer zones, located along the banks of a floodplain, are an excellent example of why vegetation is crucial to supporting the structural integrity of the watershed. The roots of the vegetation here help hold the soil in place, preventing erosion during increased precipitation events (Welsch, 2022). Furthermore, the vegetation can absorb incoming runoff, absorbing the excess nutrients in the process and reducing runoff velocity and volume (Welsch, 2022). These zones are being degraded due to a decline in water quality, outright removal, or modification to make room for urban expansion (Lenhart et al., 2018). Erosion of the banks can be devastating for the pre-existing urban areas, to such an extent that roadways, buildings, and other structures

can collapse into the watershed (Feng et al., 2021). Simultaneously, erosion can increase the risks of flooding as stream beds are scoured deeper, increasing flow rates, thus degrading the banks and floodplain keeping the water inside (Feng et al., 2021). Floodwaters weaken road foundations, erode bridge supports, and clog drainage systems with debris (Feng et al., 2021). Moreover, increased sediments are deposited back into the watershed following flooding events which can cause blockages within the watershed that divert stream flows to areas that may not have had flooding risks prior (Feng et al., 2021). It is also noted that sinkholes and road washouts are becoming more common in flood-prone urban areas due to the lack of natural water absorption and soil stabilization (Feng et al., 2021).

Natural landscapes absorb more rainfall through infiltration and evapotranspiration, while most urbanized areas can only handle limited amounts of excess rainfall, resulting in more runoff than the natural surrounding environment is designed to handle (Feng et al., 2021). As climate change continues to amplify, precipitation events become more unpredictable and powerful (Environment Canada, 2014). This increases flash flooding events in areas where they are less common and therefore less prepared for the consequences (Environment Canada, 2014). These floods are further enhanced by channeling urban runoff to the nearest portions of the watershed increasing water levels and erosion rates in that area and sediment deposition further downstream (Feng et al., 2021). These floodwaters can have devastating effects on the remaining ecology within the watershed due to the contaminants brought in, lowering water quality, inducing habitat destruction and displacing aquatic species (Oosterberg et al., 2005). Fast-moving waters can washout stream banks, destroying habitats and spawning grounds for fish, amphibians, reptiles, and insects (Oosterberg et al., 2005). Furthermore, floods can transport fish and other organisms into unsuitable habitats, leading to displacement and population declines (GRCA, 2020a).

In conclusion, expanding urban development zones will further degrade the stability of the watershed, leading to increased risks of erosion and flooding that can degrade water quality, displace aquatic organisms, destroy their habitats, and threaten the developed urban areas with increased flash flooding and erosion impacts.

2.4 Watershed Management Practices

Many actions have already been taken to try and improve watershed security and reduce the impacts that urban expansion has on watersheds. This includes increased water quality monitoring, bank restoration, and stormwater pond installations. These processes should be continued, but evaluations and modifications are constantly needed to enhance these features to keep them functioning with the increased stressors brought on by urban expansion (Heathcote, 2009). If we can find ways to help reduce and restore the impacts brought on by urbanization, the integrity of the watershed can be maintained for a longer time, and watershed security can be improved (Heathcote, 2009).

2.4.1 Water Quality Monitoring

Water quality monitoring is the organised collection and analysis of water samples to assess pollutants, contaminants, biological activity and health, and overall ecosystem conditions within a watershed (Behmel et al., 2016). It follows strict protocols to ensure samples are accurately and consistently collected to help identify any early signs of contamination that can cause potential threats to biological organisms within the watershed and drinking water sources (Bhateria & Jain, 2016). Using the data assessed, we can identify threats and guide policies toward sustainable actions that can improve watershed quality (Behmel et al., 2016). In urban

watersheds, where pollution, stormwater runoff, industrial discharge and sewage overflows are of increasing concern, water quality monitoring helps identify issues as soon as possible and come up with strategies to combat them (Behmel et al., 2016).

The monitoring is broken up into three different aspects: physical, chemical, and biological assessments (Behmel et al., 2016). Physical water parameters such as temperature, turbidity, and flow rate can be assessed using both real-time remote sensors and physical surveys (Behmel et al., 2016). Temperature can influence oxygen levels, contamination breakdown rates and aquatic life cycles; turbidity determines water clarity, indicating the presence of pollutants or sediments; flow rate determines the movement of these through the watershed (Bhateria & Jain, 2016). Chemical components are mainly assessed through sample collection and lab analyses for nutrient concentrations and heavy metals, but components such as salinity, dissolved oxygen and pH levels can be assessed using a real-time water quality sensor (Behmel et al., 2016). Heavy metals in high concentrations such as lead, mercury, and arsenic indicate high inflow rates from industrial and urban sources (Bhateria & Jain, 2016). Dissolved oxygen, which is crucial for aquatic life, needs to be assessed closely, with low levels raising concerns for aquatic wellbeing (Bhateria & Jain, 2016). Salinity and pH are also closely monitored in winter months to assess sodium chloride concentrations from de-icing runoff (Bhateria & Jain, 2016). Biological assessments of fish, bacteria, macroinvertebrates (worms, snails, and insects), and algae or cyanobacteria are mainly assessed in lab-based settings for characteristics, quality, and quantity (Bhateria & Jain, 2016). Certain bacteria such as E. coli indicate sewage or animal waste contamination (Pandey et al., 2012). Algae and cyanobacteria can help detect signs of algae blooms while fish or macroinvertebrates can act as long-term indicators for watershed health (Pandey et al., 2012).

If conducted regularly, water quality monitoring strengthens watershed security by providing trends over time and detecting early contaminant infiltration, leading to data-driven decisions to aid in prevention strategies (Behmel et al., 2016). For example, surveying after a rain event can help assess the quality of installed runoff contamination prevention measures. If there is a parameter that is of particular concern, the prevention method can then be re-evaluated for better security. Making these processes more consistent will help detect early signs of contamination and aid in the improvement of prevention measures to combat pollution from urbanized areas, leading to longer-lasting watershed integrity and quality (Behmel et al., 2016).

2.4.2 Bank Restoration

Urban watersheds are at increased risk of significant degradation due to erosion, excess stormwater runoff, and habitat loss caused by urbanization (Lenhart et al., 2018). Bank restoration is an adaptive strategy to restabilize streambanks, and reduce erosion and flooding, thus improving water quality (Pinto et al., 2016). By implementing natural stabilization techniques, vegetation, and habitat restoration, urban watersheds can improve erosion prevention, flood resilience and the protection of aquatic life (Pinto et al., 2016).

Multiple bank restoration practices can be used to help stabilize banks and prevent erosion (Pinto et al., 2016). Regrading slopes involves reshaping steeper, eroded banks into more gentle slopes, reducing the risk of collapse (Pinto et al., 2016). This can be done either by removing sediment from the top of the banks or adding sediment back to the eroded areas (Pinto et al., 2016). Depending on the severity of water flow and the type of sediment, this process may have to be repeated over time (Lenhart et al., 2018). Natural design can also include the addition of rocks or logs to the base edges of sharp banks to slow down, redirect and prevent undercutting

by fast-moving water (Pinto et al., 2016). Riprap is a common practice used in fast-flowing urban streams near the edges of bridges to prevent sediment erosion of the bridge supports (Pinto et al., 2016).

Riparian buffer planting and vegetation stabilization is another common bank restoration process (Pinto et al., 2016). Re-planting trees and shrubs on riverbanks helps anchor the soil through root structures, preventing erosion, and filtering pollutants of water within the watershed (Welsch, 2022). As mentioned, riparian buffers are critical to the natural stabilization of riverbanks and improvements in water quality (Welsch, 2022). A more drastic approach is floodplain reconstruction, where manmade barriers are added to slow down the flow of high-velocity water within the watershed, resulting in declined erosion rates of sites downstream (Lenhart et al., 2018). As water flow slows after severe precipitation events, these barriers can be removed to reduce bank pressure around the barrier (Lenhart et al., 2018).

These bank restoration strategies are crucial in urbanized watersheds to reduce the erosive impacts of stormwater runoff. Bank restoration reduces the effects of fast-flowing water on sediments, which improves water quality, flood prevention, and erosion rates, all while enhancing biodiversity and providing habitats for mammals, birds, insects, and aquatic life (Pinto et al., 2016).

2.4.3 Stormwater Ponds

Stormwater ponds are engineered water retention systems that are designed to capture, treat, and slowly release stormwater runoff from urban areas into the watershed (Government of Ontario, 2021). As cities expand, there is a significant increase in impervious surfaces compared to natural land which cannot absorb precipitation (Roy et al., 2008). Stormwater ponds play a

vital role by taking on this excess water, reducing flooding risks, improving water quality, and protecting the local watershed from erosion (Roy et al., 2008).

The ponds act as a temporary holding basin where rainwater and runoff collect, giving time for any suspended pollutants and sediments to settle in a sediment forebay before the improved surface water is slowly released into the watershed (Government of Ontario, 2021). The slower release rates of surface water reduce flooding and erosion risks and provide the watershed with improved water quality (Roy et al., 2008). Depending on the rate of incoming water flow during a precipitation event, highly soluble nutrients such as nitrates can come out of suspension, reducing excess nitrogen and phosphorous from entering the watershed (Roy et al., 2008). Trapping the sediments prevents accumulation and blockages in downstream waterbodies and the slow release of water reduces flash floods and prevents erosion (Roy et al., 2008).

Stormwater ponds can be broken down into two types: wet and dry ponds (Government of Ontario, 2021). Wet ponds are constantly holding water, filtering out the sediments and pollutants before it is introduced to the watershed (Government of Ontario, 2021). These ponds, dependent on its water quality, can provide habitats for aquatic organisms such as fish, reptiles, amphibians, macroinvertebrates, and insects, as well as habitats and nesting sites for many birds and mammals in its surrounding vegetation (Government of Ontario, 2021). Dry ponds do not always hold water and instead take on excessive water if other ponds reach capacity during heavy precipitation events (Government of Ontario, 2021). These ponds are effective for flood control, but not pollutant removal, as water only sits in the pond for a fraction of the time before being released (Government of Ontario, 2021). These ponds improve overall watershed health as they collect water from roads, construction sites and industrial zones, trapping the sediments,

filtering pollutants, and reducing contaminants before releasing water back into the watershed (Roy et al., 2008).

Depending on sediment intake rates, these sediment forebays can fill up over the years and require maintenance to ensure continued efficiency (Government of Ontario, 2021). Ponds now undergo partial dredging, where the water level within the pond is reduced and the contaminated sediments within the confined sediment forebay are excavated and disposed of (Government of Ontario, 2021). This new approach including access roads and flood control points around the ponds, allows for more effective partial dredging of the confined area rather than the pond needing to undergo a full dredge (Government of Ontario, 2021). This dredging process makes room for new sediments during future precipitation events, improving the pond's overall efficiency. Stormwater management ponds are an effective and reliable way to help manage excess runoff in urbanized areas, reducing contamination and sediments entering the watershed (Roy et al., 2008). As these municipalities continue to expand, more ponds need to be established to help alleviate the runoff stress on surrounding natural features (Roy et al., 2008). Ponds are also developing with improvements in technology and monitoring measures to increase their capabilities and help ensure better watershed security for the future (Roy et al., 2008).

2.5 Potential Future Impacts on the Grand River Watershed: Lessons from the Don River

The Don River watershed serves as a cautionary tale for what could happen to the Grand River watershed, particularly in the Waterloo Region, if urbanization and housing expansion continue without adequate environmental safeguards. Given that the Don River watershed is already 90% urbanized (Toronto Region Conservation Authority [TRCA], 2022), its ecological

decline, including increased runoff, pollution, loss of biodiversity, and hydrological disruptions, provides insight into potential long-term consequences for the Grand River watershed, which is currently experiencing rapid development.

2.5.1 Urbanization and Increased Impervious Surfaces

One of the key parallels between the Don and Grand River watersheds is the expansion of impervious surfaces from urban housing developments. In the Don River watershed, urbanization has resulted in excess stormwater runoff, leading to stream bank erosion, flash floods, and a reduction in groundwater recharge (Bonnell, 2014). Similarly, in the Waterloo Region, ongoing and future urban expansion, if not managed properly, could replicate these issues by overloading natural waterways with excessive runoff, leading to more frequent flooding events in areas like Waterloo, Cambridge, Kitchener, and Guelph (GRCA, 2020a). As well as eroding riverbanks and destabilizing aquatic habitats, these events can further threaten fish species that rely on stable stream conditions (Region of Waterloo, 2022). Without effective stormwater management strategies, the Grand River watershed could soon face similar degradation as seen in the Don River watershed, where increased runoff has drastically altered the hydrological cycle.

2.5.2 Water Pollution and Nutrient Overloading

A major issue in the Don River watershed is water quality degradation due to stormwater runoff-carrying pollutants, including human waste, heavy metals, road salt, and microplastics (TRCA, 2022). When the Don River was urbanized, the amount of stormwater ponds needed was not accounted for which led to the degradation of water quality, bank erosion, and flooding under

certain storm conditions (TRCA, 2022). Additionally, high levels of phosphorus and nitrogen from urban fertilizer runoff have caused eutrophication and algal blooms in the Don River, reducing oxygen levels and harming aquatic life (Bonnell, 2014). The Grand River watershed is already showing early signs of nutrient pollution. Without strict management, it could face similar or worse water quality issues, as housing developments increase fertilizer use on lawns and green spaces, leading to higher phosphorus and nitrogen runoff into the Grand River system (GRCA, 2020a). Also, stormwater systems fail to properly filter urban contaminants, increasing the presence of heavy metals, pesticides, and oils in tributaries and reservoirs (GRCA, 2020a). The Don River's declining water quality serves as a warning, suggesting that without intervention, the Grand River may face increased pollution, making its water unsafe for recreation, drinking, and aquatic biodiversity.

2.5.3 Biodiversity Loss and Habitat Fragmentation

The Don River watershed has suffered significant habitat loss due to urban sprawl and now antiquated planning practices, with forest cover and wetlands declining rapidly (TRCA, 2022). This habitat destruction has led to a reduction in native species populations, as natural corridors for wildlife movement have been severed. An increase in invasive species, which outcompete native plants and animals, further degrades local ecosystems (Bonnell, 2014). If urban development in the Waterloo Region continues without ecological safeguards, the Grand River watershed could experience similar habitat destruction, leading to the loss of critical wetlands, which naturally filter water and protect against floods; displacement of native species, such as migratory birds and fish species, which rely on uninterrupted habitats; and higher vulnerability to invasive species, altering the watershed's ecological balance (GRCA, 2020a).

2.5.4 Hydrological Changes and Flooding Risks

The Don River watershed's urbanization has significantly disrupted its natural hydrological cycle, causing increased stormwater surges, which result in flash floods during heavy rainfall, and lower water tables, as less water infiltrates the ground to recharge aquifers (TRCA, 2022). Similar hydrological changes could occur in the Grand River watershed, particularly in the Waterloo Region, as more green spaces and permeable lands are converted into urban zones. This could lead to more frequent and intense flooding in low-lying areas like Cambridge and Brantford, increasing risks to infrastructure and residents, and decreasing groundwater reserves, putting stress on the region's drinking water supply (Region of Waterloo, 2022).

2.5.5 Mitigating the Risks: Lessons from the Don River

To prevent the Grand River watershed from suffering the same fate as the Don River, proactive measures must be implemented, including strengthening stormwater management infrastructure to ensure urban runoff is properly filtered and stored before entering waterways, protecting and restoring wetlands and riparian buffers to enhance natural water retention and filtration, imposing stricter regulations on construction projects to minimize habitat destruction and pollution risks and investing in sustainable urban design, such as green roofs, permeable pavements, and rain gardens, to reduce runoff and improve water infiltration (Citygreen, 2023). The Don River watershed provides a critical warning for the future of the Grand River watershed in the Waterloo Region. If urbanization continues without sustainable planning, the Grand River could face increased flooding, pollution, habitat destruction, and biodiversity loss just as the Don

River has experienced. However, by implementing lessons learned from the Don River, the Waterloo Region has an opportunity to develop responsibly, ensuring that economic growth does not come at the cost of environmental sustainability. By taking immediate action through better land-use planning, stricter pollution control, and enhanced green infrastructure, it is still possible to protect the Grand River watershed from experiencing the same environmental degradation seen in the Don River, preserving its ecological health for future generations.

3. POTENTIAL POLICY IMPACTS ON THE GRAND RIVER WATERSHED

3.1 Policy Changes and Their Ecological Consequences for Conservation Land

Conservation areas in the Regional Municipality of Waterloo and County of Wellington, Ontario, are critical for preserving local biodiversity, maintaining ecosystem services, and providing recreational spaces for residents. These areas protect against soil erosion and serve as essential habitats for many native and migratory species (Morgan, 2022). However, urban expansion and legislative changes have begun to erode the stability of these protected lands. Ontario's recent policy shifts, most notably under Bill 23, have significantly impacted conservation efforts in these regions by prioritizing economic development and housing construction over environmental sustainability (Clark, 2022; Syed & McIntosh, 2022). The reduction of conservation authorities' regulatory power and the easing of restrictions on land development have raised concerns regarding habitat fragmentation, wetland degradation, species displacement, and water quality deterioration (Clark, 2022).

Analyzing how these policies have impacted conservation areas in Wellington County and Waterloo Region highlights the ecological implications of increased urbanization and

legislative rollbacks in environmental protection. The significance of these areas extends beyond ecological preservation as their ecosystems provide crucial goods and services (Eby, Thomason, & Reusser, 2023). For example, wetlands, forests, and river systems in conservation areas like Rockwood Conservation Area and Guelph Lake Conservation Area act as buffers against extreme weather events, absorbing excess rainfall and stabilizing riverbanks (Eby, Thomason, & Reusser, 2023). Similarly, Elora Gorge Conservation Area and Laurel Creek Conservation Area offer natural corridors for species migration, ensuring genetic diversity and ecosystem resilience (GRCA, 2020b). The encroachment of urban expansion into these areas not only threatens wildlife but also disrupts the ecological balance, leading to cascading effects on water quality, soil stability, and climate mitigation efforts. Without proper intervention, these natural spaces may lose their ability to provide these essential services, ultimately affecting both human and ecological communities (GRCA, 2020a). One of the most immediate ecological impacts of Ontario's policy changes is the destruction and fragmentation of habitats within conservation areas. By limiting conservation authorities' ability to consider and comment on factors beyond flooding and erosion, Bill 23 facilitates unchecked development on ecologically sensitive lands (Kolarich, 2025). The expansion of urban boundaries for development purposes without adequate consultation has led to deforestation, loss of green corridors, and increased habitat fragmentation (Morgan, 2022). In Rockwood Conservation Area and Laurel Creek Conservation Area, forested regions that support a diverse range of wildlife have already faced pressures from urban encroachment (Kolarich, 2025). Habitat fragmentation isolates wildlife populations, limiting their genetic diversity and reducing resilience to environmental changes. Species such as the Jefferson salamander (*Ambystoma jeffersonianum*), designated as endangered in Ontario, depend on large, interconnected habitats (Ontario Nature, 2024). With increasing development near these

conservation areas, species like this face greater risks of local extirpation. Disruptions in pollination networks can affect plant reproduction, leading to shifts in vegetation structure and ecosystem composition. Pollinators rely on continuous habitats for breeding and foraging (Delnevo et al., 2020). Without proper corridors to connect remaining habitats, species mobility becomes increasingly restricted, limiting their ability to adapt to changing environmental conditions.

Wetlands are among the most biologically diverse ecosystems, offering services such as water filtration and flood regulation. Bill 23's changes to the evaluation of critical wetlands allow developers to build on, near, or around wetlands with minimal oversight (Morgan, 2022). This exacerbates wetland degradation by monetizing environmental destruction instead of enforcing strict preservation measures.

In Guelph Lake Conservation Area and Shade's Mills Conservation Area, wetlands play a crucial role in maintaining regional water quality and preventing downstream flooding (Eby, Thomason, & Reusser, 2023). Any changes to them can alter aquatic habitats, affecting species such as the northern pike (*Esox lucius*), which depend on stable wetland ecosystems for survival (U.S. Fish & Wildlife Service, n.d.). Urban expansion leads to an increase in impervious surfaces, such as roads and buildings, which further contribute to stormwater runoff and pollution entering wetland systems (Morgan, 2022). Wetlands also provide essential breeding grounds for amphibians, and their loss leads to declining populations of species such as the Jefferson salamander, which is highly sensitive to changes in water quality (Ontario Nature, 2024).

Ontario's recent policy changes under Bill 23 have facilitated urban expansion at the cost of ecological integrity (Clark, 2022). The weakening of environmental regulations, particularly

regarding conservation authorities, has led to widespread concerns about the future of Ontario's protected natural areas (Morgan, 2022). If the trajectory of these policy changes continues, the long-term consequences could be devastating, not only for the ecosystems directly affected but also for the broader environmental stability of the region (Syed & McIntosh, 2022). The continued degradation of Wellington County and Waterloo Region's conservation areas threatens to reduce their effectiveness in performing crucial functions, which in turn affects human communities that rely on them. If left unaddressed, these changes could lead to cascading ecological effects, including increased habitat loss, species extinctions, and diminished water quality (Syed & McIntosh, 2022). The cumulative impacts of these effects make them more vulnerable to environmental pressures, like climate change. Increased development without sustainable planning contributes to rising temperatures in urban centers and further stress on local wildlife populations (Seifert, 2016).

3.2 Effects of Reduced Development Fees on Conservation and Public Safety

When any government changes policy or puts new legislature into place, funding will always be an important question. As we discussed in section 1.3 Funding and Costs of this report, there are several federal funding programs to support housing development, and the provincial government has launched or enhanced several of their own. However, as we mentioned before, it is difficult to quantify whether these programs will be enough to support the costs of development to municipalities. Much of the funding is set to go straight to new infrastructure development, so municipalities may not have a say in how the spending of that money is prioritized (Jacek, 2022). This means they cannot allocate that funding towards

updating preexisting infrastructure that might allow their cities to support more housing and more residents (Jacek, 2022).

Additionally, fees from developers represent a significant amount of income for municipalities, which often goes towards infrastructure development and maintenance (Jacek, 2022). Municipalities are responsible for the maintenance of roads, bridges, sewer systems, waterlines and many other supports required for development, accounting for 60% of core public infrastructure (Federation of Canadian Municipalities, n.d.). Some aspects of infrastructure development fall to developers, but quality and safety monitoring fall to the municipal governments. Recent changes to the *Development Charges Act* and *Planning Act* include eliminating the fees developers have to pay to municipalities, as long as the developers are following provincial guidelines for affordable housing (Jacek, 2022; Clark, 2022). A loss of funding to this sector will reduce municipalities' abilities to provide these services, many of which concern public safety. This may lead to the degradation of existing infrastructure and lower the quality of new infrastructure unless funds can be allocated from elsewhere in municipal budgets.

Similarly, changes to the *Conservation Authorities Act* have eliminated the fees that developers pay when using conservation land (Government of Ontario, 2024). These groups are now also left to make up for the lost revenue if they want to continue providing their now-restricted services.

The Grand River watershed is one region that will be impacted by these changes. With less funding in the hands of municipalities to maintain their infrastructure, and less revenue available to conservation authorities to monitor the watershed, it is very likely that development along the Grand River watershed will have adverse effects on the environment and public safety.

Infrastructure like impervious surfaces may lead to increased runoff, which increases the risks of flooding and overloading natural waterways (GRCA, 2020a). Similarly, the more expansive development is along the watershed, the more likely it is to be polluted by road salt and microplastics (TRCA, 2022). Many municipalities rely on this watershed for drinking water (Eby, Thomason & Reusser, 2024), and with funds reduced for both municipalities and conservation authorities, water quality may become a growing concern for many of these communities. Lower water quality will also increase the costs of water treatment, putting further strain on municipal budgets (Open Council, 2024).

Despite an apparent push for public safety in their current Provincial Planning Statement ("PPS"), the provincial government does not seem to have considered how this push for new development could have drastic implications for public health and safety. Thoughts about increased flood risks, pollution, and cessation of the benefits of a healthy watershed seem to have passed them by.

3.3 Impacts of Increased Urban Development on Watershed Security

With the numerous policy changes brought on by Doug Ford's *More Homes Built Faster Act, 2022*, to 'streamline' the process of building 1.5 million homes across Ontario by 2031, nearly all of them have come at the price of compromising the integrity of the environment where these homes will be built (The Narwhal, 2023). These changes predominantly apply to reducing conservation authorities' abilities to implement efforts that protect the environment and the many valuable goods and services it provides (Conservation Ontario, n.d., GRCA, 2024; The Narwhal, 2023). Conservation authorities, led by professionals, previously had the important task of protecting various aspects of the environment to help sustain human, ecological, and

economic needs through science-based initiatives (Conservation Ontario, n.d.). Conservation Ontario, which represents the 36 conservation authorities that used to act primarily as local watershed management agencies, has aired concerns about the potential impacts of the policy changes on watersheds and their complex features (Conservation Ontario, 2022). Based on the worrisome number of reductions in regulations and restrictions regarding development, as well as the expansion of boundaries where urban development is permitted, Conservation Ontario has stated that this could roll successful watershed management back 70 years (Conservation Ontario, 2022). This management has resulted in watersheds across Ontario being maintained in a healthy and resilient manner, despite various physical and socioeconomic drivers threatening their security over decades of climate change, urban development, and agricultural activities. Changing the focus of environmentally based policies to the needs of housing supply can only lead to watershed security deteriorating to an irreversible point, which will have devastating impacts on irreplaceable environmental features, as well as society's social and economic welfare.

As previously mentioned, the Government of Ontario has opened up many important landscapes for use in urban development projects. This includes the expansion of urban boundaries into conservation lands, greenspaces, and farmlands that all play important roles in ecological and economic systems we interact with daily (Eby, Thomason, & Reusser, 2023; MNRF, 2024; Government of Ontario, 2024). Along with these land use transitions, the government has also eased the entire development process for developers from beginning to end, weakened soil use regulations, and 'streamlined' sewage and water transit projects (Government of Ontario & Malek, 2024a; MNRF, 2024). All of these changes have been made in the name of expediting housing development and infrastructure projects needed to support the exponential

growth that the provincial government is demanding. This momentous endeavor poses a great risk to the environment and puts intense pressure on the watersheds connected to these activities (GRCA, 2020a). Unfortunately, this type of unsustainable urban growth often leads to various contaminants entering bodies of water, ultimately threatening the security of the watershed (Puckett, 1995; Russell et al., 2017; Tasdighi et al., 2017; Carey et al., 2013). It also involves disturbing the landscape in a way that exposes it to increased erosion, contaminated runoff, flooding, pollution, diseases, and extreme weather events related to climate change (Puckett, 1995; Russell et al., 2017; Tasdighi et al., 2017; Carey et al., 2013). Exposing the land to these threats also decreases the stability of the land and nearby watersheds, water quality, ecological goods and services, biodiversity, and soil quality (Puckett, 1995; Russell et al., 2017; Tasdighi et al., 2017; Carey et al., 2013). Each of these potential effects can have severe implications for human and ecological health (Mensinga et al., 2003; Carey et al., 2013).

The Region of Waterloo was one of the largest regions instructed to open its greenspaces and farmland for development, putting it at particular risk from the threats described above (Syed & McIntosh, 2023). The Region of Waterloo includes seven municipalities and is a part of the Grand River watershed, which includes 39 municipalities and two First Nations territories; most of which rely on the watershed for their local water systems (GRCA, n.d.). The Grand River watershed is incredibly ecologically diverse, and when all rivers and streams are combined with the watershed, it is approximately 11,000 kilometers in length, making it an important resource to manage (GRCA, n.d.). Despite the unequivocal significance of the Grand River watershed, little concrete legislation and regulation remain in place to protect it. The Region of Waterloo previously had what was considered a groundbreaking, long-term development plan for the region, that would slowly build it up over 30 years, while still respecting the limitations of the

land and the watershed (Eby, Thomason, & Reusser, 2023). However, these plans have now either been scrapped or greatly accelerated by Bill 23, with little input from the Region of Waterloo, the GRCA, or the Six Nations of the Grand River (Eby, Thomason, & Reusser, 2023; Syed & McIntosh, 2023). Given the vast amount of greenspace and farmland present in the Region of Waterloo, there is predominant concern over the irreversible changes that urban development will bring (Eby, Thomason, & Reusser, 2023; Syed & McIntosh, 2023). Many farmers in the area have been implementing the best stewardship management practices for their soils and water uses with the help of the GRCA to prevent unnecessary runoff of nutrients, like phosphorous and nitrogen from agricultural lands. However, construction practices could disturb the land in ways that will further expose the watershed and alter these management conditions (Eby, Thomason, & Reusser, 2023; Puckett, 1995; Syed & McIntosh, 2023). This is further enhanced by the runoff of nitrogen and pathogens, through the use of fertilizers, wastewater, and the production of organic matter, which is concentrated within the expanding urban areas. Furthermore, the increased risk of phosphate infiltration from urban detergents contributes to additional non-point sources that bring excessive nutrients into watersheds, compounding ecological impacts (Small et al., 2023; Puckett, 1995). These nutrients not only pose a threat to water quality but can also lead to toxic conditions, ultimately killing the once lively watershed and the invaluable goods and services it provides (Puckett, 1995; Tasdighi et al., 2017; Carey et al., 2013). Farmland and greenspaces also provide important services like water filtration, which helps to prevent erosion and flooding (Feng et al., 2021). Without these spaces, the region is vulnerable to extreme events that can quickly put human health and safety at risk (Environment Canada, 2014; Feng et al., 2021).

Overall, the rapid increase in urban growth poses a threat to environments that are already fragile from the impacts of climate change and has particularly nerve-wracking implications for watershed security (Syed & McIntosh, 2023; The Narwhal, 2023). Despite Bill 23 instigating policy changes that are, supposedly, meant to better support human life and their needs, jeopardizing irreplaceable characteristics that watersheds supply for increased housing supply will only further hurt the human population. The ecological goods and services that watersheds provide are vital to maintaining stable socioeconomic status; without them, humans' well-being will undoubtedly be imperiled (Conservation Ontario, n.d.; GRCA, 2024). Therefore, supporting watershed security through proper land management techniques *is* protecting human life and any trade-offs that endanger this security are simply not worthwhile.

CONCLUSION

As mentioned, this report provides a summary of provincial policy changes and some local ecological impacts on watersheds and watershed security in South-Central Ontario and the Waterloo Regional Municipality and County of Wellington. Based on our policy and literature analysis, it is clear that actions taken by Doug Ford's Government to advance Ontario's provincial Housing Action Plan have the potential for adverse ecological impacts on the Grand River watershed.

Shifts in legislation away from a sustainability-based approach towards one of economic profitability and mass housing expansion have affected the stability of protected lands used for biodiversity conservation, ecosystem service maintenance and recreation. As a result, wetlands and conservation areas will become more vulnerable to future environmental pressures brought on by climate change. Similarly, changes in the funding priorities will also affect the

development of municipalities, such that it may lead to the degradation of new and existing infrastructure, and the conservation authorities responsible for protecting water quality, undoubtedly putting public health and safety at risk. Finally, policy changes and restrictions put forward by the government regarding regulations and development will affect watershed management and security in ways that allow the construction of housing into conservation lands, greenspaces, and farmlands, weaken soil use regulations, and 'streamline' sewage and water transit projects (Eby, Thomason, & Reusser, 2023; MNRF, 2024; Government of Ontario, 2024; Government of Ontario & Malek, 2024a).

Through our research, we found that the Ontario Headwaters Institute ("OHI") has developed a comprehensive, outcomes-based framework for watershed security (OHI, 2025). This framework involves addressing the known policy gaps in provincial policy, integrating land use and watershed planning for municipalities, and re-establishing the role conservation authorities have historically played, especially in the light of the recent abolition of regional planning (OHI, 2025). While this is a great first step towards crucial discussions regarding the importance of watershed security, there are some flaws with their approach. For example, it may be challenging for municipalities with limited staff and reduced funding to adjust their management perspectives and further incorporate watershed planning. This is exacerbated by the reduced power of conservation authorities brought on by the recent provincial policy changes. Without first reinstating the many responsibilities that have been stripped from conservation authorities, it will be very difficult for individual municipalities and planning boards to develop comprehensive, informed, and effective management plans. Additionally, their approach overlooks the key role agricultural lands play in watershed security. Agricultural lands are important for many aspects of climate change mitigation, but in this context, they provide

support for nutrient cycling, soil erosion control, flood mitigation and groundwater recharge (Ontario Federation of Agriculture [OFA], 2021). However, we are losing these lands at a rate of 319 acres per day as a result of urbanization, and further losses are expected from the discussed push for intensive urban development (Ontario Farmland Trust [OFT], 2024).

Based on our understanding, there are steps conservation authorities, municipal governments and the provincial government can take to reduce the impacts of extensive urbanization. Watershed management practices such as water quality monitoring, bank restoration, and the implementation of stormwater ponds should be continued, with updates to technology and monitoring measures essential to compete with heightened stressors brought on by urbanization. Consistent improvements in technology and more frequent monitoring of water quality parameters will help mitigate the impacts of urbanization before they become disastrous. Conservation authorities should continue advocating for the protection of our environment while providing municipalities and their citizens with the information needed to make considerate decisions. Implementing more outreach and educational programs can update residents on the impacts of urbanization. This can include information about how to advocate for change, how to improve their environmental stewardship, and how to best support their local conservation authorities. Overall, there are many perspectives to consider when discussing plans to combat the devastation of these policy changes, and further research must be done as to how those plans should best be implemented. Although these actions would aid in mitigating the adverse effects of urbanization, the government is still failing to meet their responsibilities in protecting Ontario's resources.

Despite the Grand River watershed's significance to the Waterloo Regional Municipality and County of Wellington, it lacks protective legislation and regulations. As it stands, watershed

management is at risk of being rolled back 70 years due to the discussed policy changes (Conservation Ontario, 2022). To prevent further degradation, immediate action is required. The provincial government must restore the authority of conservation organizations, municipalities must better integrate land use and water planning, and the public must advocate for stronger environmental protection. Without decisive action, Ontario's watersheds and the communities that depend on them will face irreversible consequences. If we act now and push towards environmental stewardship and the protection of watershed security, Ontario's watersheds and their resources can be enhanced and preserved for future generations, even in the face of climate change.

GLOSSARY

Brownfield Redevelopment: The redevelopment and revitalization of historically contaminated lands (also known as brownfields) (Government of Ontario & Malik, 2024a)

Contaminant Loading: The amount (mass) of a pollutant that is discharged into a water body during a period of time (Puckett, 1995)

Cyanotoxins: Highly potent toxins released by species of Cyanobacteria during blooms that can lead to a variety of health problems for both human and aquatic species (US EPA, 2018)

Dissolved Oxygen: Dissolved oxygen (DO) refers to the concentration of oxygen gas incorporated in water (EPA, 2024)

Extirpation: when a species is eliminated from a certain geographic area but still exists elsewhere. Essentially it is a regional extinction.

Habitat Fragmentation: When parts of habitat are destroyed, leaving behind smaller unconnected habitats

Impervious Surfaces: Materials that block water from natural penetration, decreasing the surface infiltration rate (Feng et al., 2021)

Indexed @ 2% per Year: Funding value adjusted annually by 2% to reflect changes in inflation

Non-point source: Runoff access into a watershed over a wide area rather than a specific pin-pointed location (Point-source)

Other Areas: (pertaining to the prohibition of development activities within nearby wetlands): Original prohibited development boundaries defined as for wetlands greater than 2 hectares in size required a 120-metre regulated boundary around the wetland area, updated to prohibit activities within 30 metres of all wetlands

Per-Capita-Basis: Amount calculated per person; in this case, amount of funding calculated per person in the province (Government of Canada, 2024)

Riparian Zone/ Vegetation: "An area of trees and other vegetation located in areas adjoining and up gradient from surface water bodies and designed to intercept surface runoff, wastewater, subsurface flow and deeper groundwater flows from upland sources for the purpose of removing or buffering the effects of associated nutrients, sediment, organic matter, pesticides or other pollutants prior to entry into surface waters and groundwater recharge areas" (Welsch, 2022)

Riprap: A foundation or sustaining wall of stones or chunks of concrete thrown together without order. A layer of this or similar material on an embankment slope to prevent erosion (Merriam-Webster, 2024)

Sediment-water Storage: The comparison between sediments and water in the surrounding area representing the ability for the sediments to hold water during precipitation events

Soluble: Susceptible of being dissolved in or as if in liquid and especially water (Merriam-Webster, 2024)

Tributaries: A stream feeding into a larger stream or lake (Merriam-Webster, 2024)

Watercourse: Originally defined as any identifiable depression, updated (04/01/2024) to be a defined channel with a bed and banks/sides

Water Quality Sensor Probe: A device that measures various parameters of water quality such as temperature, pH, dissolved oxygen, conductivity, turbidity, and pollutants such as heavy metals or chemicals in real time (Behmel et al., 2016)

REFERENCES

Behmel, S., Damour, M., Ludwig, R., & Rodriguez, M. J. (2016). Water quality monitoring strategies — A review and future perspectives. *Science of the Total Environment*, 571, 1312–1329. https://doi.org/10.1016/j.scitotenv.2016.06.235

Bhateria, R., & Jain, D. (2016). Water quality assessment of lake water: A review. *Sustainable Water Resources Management*, *2*(2), 161–173. https://doi.org/10.1007/s40899-015-0014-7

Bonnell, J. (2014). *Reclaiming the Don: An environmental history of Toronto's Don River Valley*. University of Toronto Press. https://books-scholarsportal-info.us1.proxy.openathens.net/en/read?id=/ebooks/ebooks9/degruyter9/2024-10-08/1/9781487560416

Canada, A. and A.-F. (2014, July 18). *Understanding Watersheds*. Agriculture Canada. https://agriculture.canada.ca/en/environment/resource-management/managing-water-sustainably/understanding-watersheds

Carey, R. O., Hochmuth, G. J., Martinez, C. J., Boyer, T. H., Dukes, M. D., Toor, G. S., & Cisar, J. L. (2013). Evaluating nutrient impacts in urban watersheds: Challenges and research opportunities. *Environmental Pollution*, *173*, 138–149. https://doi.org/10.1016/j.envpol.2012.10.004

Citygreen. (2023, November 30). *How to build resilient cities with green infrastructure*. City Green: Urban Landscape Solutions. https://citygreen.com/green-infrastructure-in-urban-planning/

Clark, S. (2022). *More Homes Built Faster Act, 2022.* Legislative Assembly of Ontario. https://www.ola.org/en/legislative-business/bills/parliament-43/session-1/bill23/status

Conservation Ontario. (n.d.). *Watersheds 101*. Conservation Ontario: Natural Champions. https://conservationontario.ca/conservation-authorities/watersheds-101

Conservation Ontario. (2022, November 9). *A watershed moment – The true cost of rolling back decades of environmental protection in Ontario.* Conservation Ontario: Natural Champions. https://www.crowevalley.com/wp-content/uploads/2022-Changes-to-CAA-Conservation-Ontario-Updated-Response-Nov-9-2022.pdf

Delnevo, N., van Etten, E. J., Byrne, M., Petraglia, A., Carbognani, M., & Stock, W. D. (2020, November 14). *Habitat fragmentation restricts insect pollinators and pollen quality in a threatened Proteaceae species*. Biological Conservation. https://www.sciencedirect.com/science/article/abs/pii/S000632072030882X

Dentons. (2024, November 15). *O. Reg. 525/97: Durham, Niagara and Waterloo set to become upper-tier municipalities without planning responsibilities*. Dentons.com. https://www.dentons.com/en/insights/articles/2024/november/15/reg-525-97

Eby, K., Thomason, K., & Reusser, M. (2024, May 24). *Bill 185 Cutting Red Tape to Build More Homes Act, 2024.* Ontario Headwaters Institute.

Eby, K., Thomason, K., & Reusser, M. (2023, November 21). *Submission to Local and Regional Councils RE: Ministry of Municipal Affairs and Housing Request ROPA 6*. Ontario Headwaters Institute.

Environment and Climate Change Canada. (2014). *Wastewater pollution.* Canada.ca. https://www.canada.ca/en/environment-climate-change/services/wastewater/pollution.html

Environmental Protections Agency [EPA]. (2024, January 3). *The Effects: Dead zones and harmful algal Blooms*. US EPA. https://www.epa.gov/nutrientpollution/effects-dead-zones-and-harmful-algal-blooms

EPA. (2018, June 6). *Learn about harmful algae, Cyanobacteria and Cyanotoxins*. US EPA. https://www.epa.gov/habs/learn-about-harmful-algae-cyanobacteria-and-cyanotoxins

Evans, L. (2019, August 1). *Designing a resilient Don Watershed in Toronto.* Open Access Government. https://www.openaccessgovernment.org/designing-resilient-don-watershed-toronto/20450/

Federation of Canadian Municipalities. (n.d.). *Infrastructure*. https://fcm.ca/en/focus-areas/infrastructure

Feng, B., Zhang, Y., & Bourke, R. (2021). Urbanization impacts on flood risks based on urban growth data and coupled flood models. *Natural Hazards*, 106(1), 613–627. https://doi.org/10.1007/s11069-020-04480-0

Government of Canada. (2024, November 27). *The Canada Community-Building Fund*. Housing, Infrastructure and Communities Canada. https://housing-infrastructure.canada.ca/ccbf-fdcc/index-eng.html

Government of Ontario. (2024, February 16). *Legislative and regulatory proposals affecting conservation authorities to support the Housing Supply Action Plan 3.0.* Ontario. https://ero.ontario.ca/notice/019-6141

Government of Ontario. (2021). *Operation, maintenance and monitoring | Stormwater Management Planning and Design Manual*. Ontario. https://www.ontario.ca/document/stormwater-management-planning-and-design-manual-0/operation-maintenance-and-monitoring

Government of Ontario, & Malik, S. (2024a, November 20). *Cutting red tape, building Ontario*. Ontario Newsroom. https://news.ontario.ca/en/backgrounder/1005367/cutting-red-tape-building-ontario

Government of Ontario, & Malik, S. (2024b, November 20). *Ontario cutting red tape to further reduce cost for people and businesses*. Ontario Newsroom. https://news.ontario.ca/en/release/1005365/ontario-cutting-red-tape-to-further-reduce-costs-for-people-and-businesses

Government of Ontario, & Office of the Premier. (2024, March 31). *Ontario investing over $1.8 billion to build more homes*. Ontario Newsroom. https://news.ontario.ca/en/release/1004332/ontario-investing-over-18-billion-to-build-more-homes

Government of Ontario, Ministry of Municipal Affairs and Housing [MMAH], & Office of the Premier. (2023, August 21). *To build more homes, Ontario launching building faster fund and expanding strong mayor powers*. Ontario Newsroom. https://news.ontario.ca/en/release/1003397/to-build-more-homes-ontario-launching-building-faster-fund-and-expanding-strong-mayor-powers

Grand River Conservation Authority [GRCA]. (n.d.). *Our watershed*. Grand River Conservation Authority. https://www.grandriver.ca/our-watershed/

GRCA. (2024, May). *Policies for the administration of the prohibited activities, exemptions and permits regulation.* Grand River Conservation Authority. https://www.grandriver.ca/media/f4zljaqe/policies-for-admin-of-ont-reg-41-24-final.pdf

GRCA. (2020a). *Grand River Watershed: State of water resources.* Grand River Conservation Authority. https://www.grandriver.ca/media/3ntphtmf/2020_01_02_sowr_report.pdf

GRCA. (2020b). *Maps and data*. Grand River Conservation Authority. https://www.grandriver.ca/our-watershed/maps-and-data/

Heathcote, I. W. (2009). *Integrated watershed management: Principles and practice*. John Wiley & Sons.

Henley, W. F., Patterson, M. A., Neves, R. J., & Lemly, A. D. (2000). Effects of sedimentation and turbidity on lotic food webs: A concise review for natural resource managers. *Reviews in Fisheries Science*, 8(2), 125–139. https://doi.org/10.1080/10641260091129198

Housing, Infrastructure and Communities Canada [HICC]. (2024, June 5). *Joint statement on the Canada Community-Building Fund*. Government of Canada. https://www.canada.ca/en/housing-infrastructure-communities/news/2024/06/joint-statement-on-the-canada-community-building-fund.html

Jacek, M. (2022, November 2). *Unpacking Bill 23 – More Homes Built Faster Act, 2022*. Association of Municipalities of Ontario (AMO). https://www.amo.on.ca/advocacy/health-human-services/unpacking-bill-23-more-homes-built-faster-act-2022

Kerr, J. M., DePinto, J. V., McGrath, D., Sowa, S. P., & Swinton, S. M. (2016). Sustainable management of Great Lakes watersheds dominated by agricultural land use. *Journal of Great Lakes Research*, 42(6), 1252–1259. https://doi.org/10.1016/j.jglr.2016.10.001

Kolarich, R. (2025, January 30). *Ontario's wetlands are worth protecting*. Environmental Defence. https://environmentaldefence.ca/2025/01/29/ontarios-wetlands-are-worth-protecting/

Lenhart, C. F., Smith, D. J., Lewandowski, A., Belmont, P., Gunderson, L., & Nieber, J. L. (2018). Assessment of stream restoration for reduction of sediment in a large agricultural watershed. *Journal of Water Resources Planning and Management*, 144(7). https://doi.org/10.1061/(asce)wr.1943-5452.0000908

Lindsey, R. (2014, September 8). *Spring climate plays major role in Lake Erie algae blooms*. NOAA Climate.gov. https://origin-east-01-drupal-climate.woc.noaa.gov/news-features/event-tracker/spring-climate-plays-major-role-lake-erie-algae-blooms

Loomer, H., & Cooke Draft, S. (2003). Water quality in the Grand River Watershed: Current conditions & trends (2003 – 2008). *Grand River Conservation Authority*. https://www.grandriver.ca/media/gt0nowco/water_quality_conditions_2011.pdf

Mayors of Cambridge, Kitchener, North Dumfries, Wellesley, Wilmot, and Woolwich. (2024, January 18). *Mayors working together for more housing, Stronger communities in Waterloo Region*. City of Kitchener. https://www.kitchener.ca/en/resourcesGeneral/Documents/COR_OMC_Mayors_Working_Together.pdf

Mensinga, T. T., Speijers, G. J., & Meulenbelt, J. (2003). Health implications of exposure to environmental nitrogenous compounds. *Toxicological Reviews*, 22(1), 41–51. https://doi.org/10.2165/00139709-200322010-00005

Merriam-Webster. (2024). *Merriam-Webster Dictionary*. Merriam-Webster. https://www.merriam-webster.com

Ministry of Natural Resources and Forestry [MNRF]. (2019, December 30). *Independent review of the 2019 flood events in Ontario*. Ontario.

https://www.ontario.ca/document/independent-review-2019-flood-events-ontario/background-and-2019-flooding-ontario

MNRF. (2024, February 16). *Proposed updates to the regulation of development for the protection of people and property from natural hazards in Ontario*. Environmental Registry of Ontario. https://ero.ontario.ca/notice/019-2927

Ministry of Red Tape Reduction [MRTR]. (2024, November 20). *Fall 2024 red tape reduction package*. Ontario. https://www.ontario.ca/page/fall-2024-red-tape-reduction-package

Ministry of the Environment, Conservation and Parks [MECP]. (2016, September 28). *Water management: Policies, guidelines, provincial water quality objectives*. Ontario. https://www.ontario.ca/page/water-management-policies-guidelines-provincial-water-quality-objectives

Morgan, R. (2022, December 29). *Bill 23 will have devastating impacts on Ontario's water systems, threatening humans & wildlife*. The Pointer. https://thepointer.com/article/2022-12-29/bill-23-will-have-devastating-impacts-on-ontario-s-water-systems-threatening-humans-wildlife

Northumberland County: Planning and Development. (n.d.). *Bill 23: Changes to Development Charges*. Northumberland County. https://www.northumberland.ca/en/business-and-development/bill-23-changes-to-development-charges.aspx#:~:text=Bill%2023%20could%20result%20in,operations%20resulting%20from%20Bill%2023.

Office of the Auditor General of Ontario. (2023). *Chapter 1 Section 1.10 - Follow-up on 2021 value-for-money audit: Land-use planning in the Greater Golden Horseshoe*.

https://www.auditor.on.ca/en/content/annualreports/arreports/en23/1-10FU_land-use_en23.pdf

Ontario Farmland Trust. (2024, May 10). *RE: ERO 019-8462; Revier of proposed policies for a new provincial planning policy instrument.* https://ontariofarmlandtrust.ca/wp-content/uploads/2024/07/1.-ERO-Submission-ERO-019-8462-PPS.pdf

Ontario Federation of Agriculture. (2021, January 8). *OFA Consolidated Agricultural Land Use Policy.* https://ofa.on.ca/resources/ofa-consolidated-land-use-policy/

Ontario Headwaters Institute [OHI]. (2024, June 10). *Backgrounder on Watershed Security*. https://ontarioheadwaters.ca/wp-content/uploads/2024/06/Backgrounder-on-Watershed-Security-June-2024.pdf

OHI. (2025, February 3). *Discussion Paper: We Need to Talk About Watershed Security*. https://ontarioheadwaters.ca/wp-content/uploads/2025/02/We-Need-to-Talk-About-Watershed-Securituy-Feb-3-2025.pdf

Ontario Nature. *Jefferson salamander* (2024, August 19). https://ontarionature.org/programs/community-science/reptile-amphibian-atlas/jefferson-salamander/

Oosterberg, W., Drimmelen, V., & Van. (2005). *Strategies to harmonize urbanization and flood risk management in deltas.* Econstor. http://hdl.handle.net/10419/117480

Open Council. (2024, August 16). *Municipal operating budgets in Ontario.* Open Council. https://opencouncil.ca/municipal-operating-budgets-ontario

Pandey, P. K., Soupir, M. L., Haddad, M., & Rothwell, J. J. (2012). Assessing the impacts of watershed indexes and precipitation on spatial in-stream E. coli concentrations. *Ecological Indicators*, 23, 641–652. https://doi.org/10.1016/j.ecolind.2012.05.023

Pinto, A., Sanches, F., & Maia, R. (2016). Monitoring methodology of interventions for riverbanks stabilization: Assessment of technical solutions performance. *Water Resources Management*, *30*(14), 5281–5298. https://doi.org/10.1007/s11269-016-1486-4

Puckett, L. J. (1995). Identifying the major sources of nutrient water pollution. *Environmental Science & Technology*, 29(9), 408A414A. https://doi.org/10.1021/es00009a001

Randhir, T. (2003). Watershed-scale effects of urbanization on sediment export: Assessment and policy. *Water Resources Research*, 39(6). https://doi.org/10.1029/2002wr001913

Region of Waterloo. (2022). *Community climate adaptation plan.* Region of Waterloo. https://www.regionofwaterloo.ca/en/livinghere/resources/Environment/CCAP_DRAFT_2022.pdf

Region of Waterloo. (2023). *Truth and Reconciliation*. Region of Waterloo. https://www.regionofwaterloo.ca/en/living-here/truth-and-reconciliation.aspx#Land-Acknowledgement

Roy, A. H., Wenger, S. J., Fletcher, T. D., Walsh, C. J., Ladson, A. R., Shuster, W. D., Thurston, H. W., & Brown, R. R. (2008). Impediments and solutions to sustainable, watershed-scale urban stormwater management: Lessons from Australia and the United States. *Environmental Management*, 42(2), 344–359. https://doi.org/10.1007/s00267-008-9119-1

Russell, K. L., Vietz, G. J., & Fletcher, T. D. (2017). Global sediment yields from urban and urbanizing watersheds. *Earth-Science Reviews*, 168, 73–80. https://doi.org/10.1016/j.earscirev.2017.04.001

Scott, R., Goulden, T., Letman, M., Hayward, J., & Jamieson, R. (2019). Long-term evaluation of the impact of urbanization on chloride levels in lakes in a temperate region. *Journal of*

Environmental Management, 244, 285–293. https://doi.org/10.1016/j.jenvman.2019.05.029

Seifert, J. (2016, May 25). *Spring comes sooner to urban heat islands, with potential consequences for wildlife*. University of Wisconsin-Madison News. https://news.wisc.edu/spring-comes-sooner-to-urban-heat-islands-with-potential-consequences-for-wildlife/

Small, G. E., Martensson, N., Janke, B. D., & Metson, G. S. (2023). Potential for high contribution of urban gardens to nutrient export in urban watersheds. *Landscape and Urban Planning*, *229*, 104602. https://doi.org/10.1016/j.landurbplan.2022.104602

Syed, F., & McIntosh, E. (2022, November 3). *All the Ontario environmental protections Doug Ford wants to overhaul to build new houses.* The Narwhal. https://thenarwhal.ca/doug-ford-housing-plan-ontario-environment/

Syed, F., & McIntosh, E. (2023, May 29). *Ontario orders Waterloo to sprawl into farmland*. The Narwhal. https://thenarwhal.ca/ontario-waterloo-sprawl-farmland/

Tasdighi, A., Arabi, M., & Osmond, D. L. (2017). The relationship between land use and vulnerability to nitrogen and phosphorus pollution in an urban watershed. *Journal of Environmental Quality,* 46(1), 113–122. https://doi.org/10.2134/jeq2016.06.0239

The Narwhal. (2023, February 8) *Bill 23: A guide to Ontario's new housing legislation*. The Narwhal. https://thenarwhal.ca/topics/bill-23-ontario-housing/#:~:text=To%20do%20this%2C%20the%20Ford,in%20the%20next%2010%20years.

Town of East Gwillimbury, & Jackson, V. (2023, January 26). *What is Bill 23 – More Homes*

Built Faster Act, 2022 and what is the impact East Gwillimbury?. Town of East Gwillimbury. https://www.eastgwillimbury.ca/en/news/what-is-bill-23-more-homes-built-faster-act-2022-and-what-is-the-impact-on-east-gwillimbury.aspx#:~:text=As%20a%20result%20of%20these%20changes%2C%20East,have%20been%20planning%20for%20the%20construction%20costs

Toronto and Region Conservation Authority [TRCA]. (2022). *Don River watershed report card*. TRCA Watershed and Ecosystem Reporting. https://reportcard.trca.ca/watershed-report-cards/don-river/

U.S. Fish & Wildlife Service. (n.d.). *Northern pike (Esox lucius).* FWS.gov. https://www.fws.gov/species/northern-pike-esox-lucius

Wellington County. (2015). *Land Acknowledgement | Government.* Wellington County. https://www.wellington.ca/your-government/land-acknowledgement

Welsch, D. J. (2022). Riparian forest buffers - Function for protection and enhancement of water resources. *NA-PR-07-91. [Broomall, PA:] U.S. Dept. Of Agriculture, Forest Service, Northern Area State & Private Forestry*, 791. https://research.fs.usda.gov/treesearch/10955

APPENDIX

Table 1.1

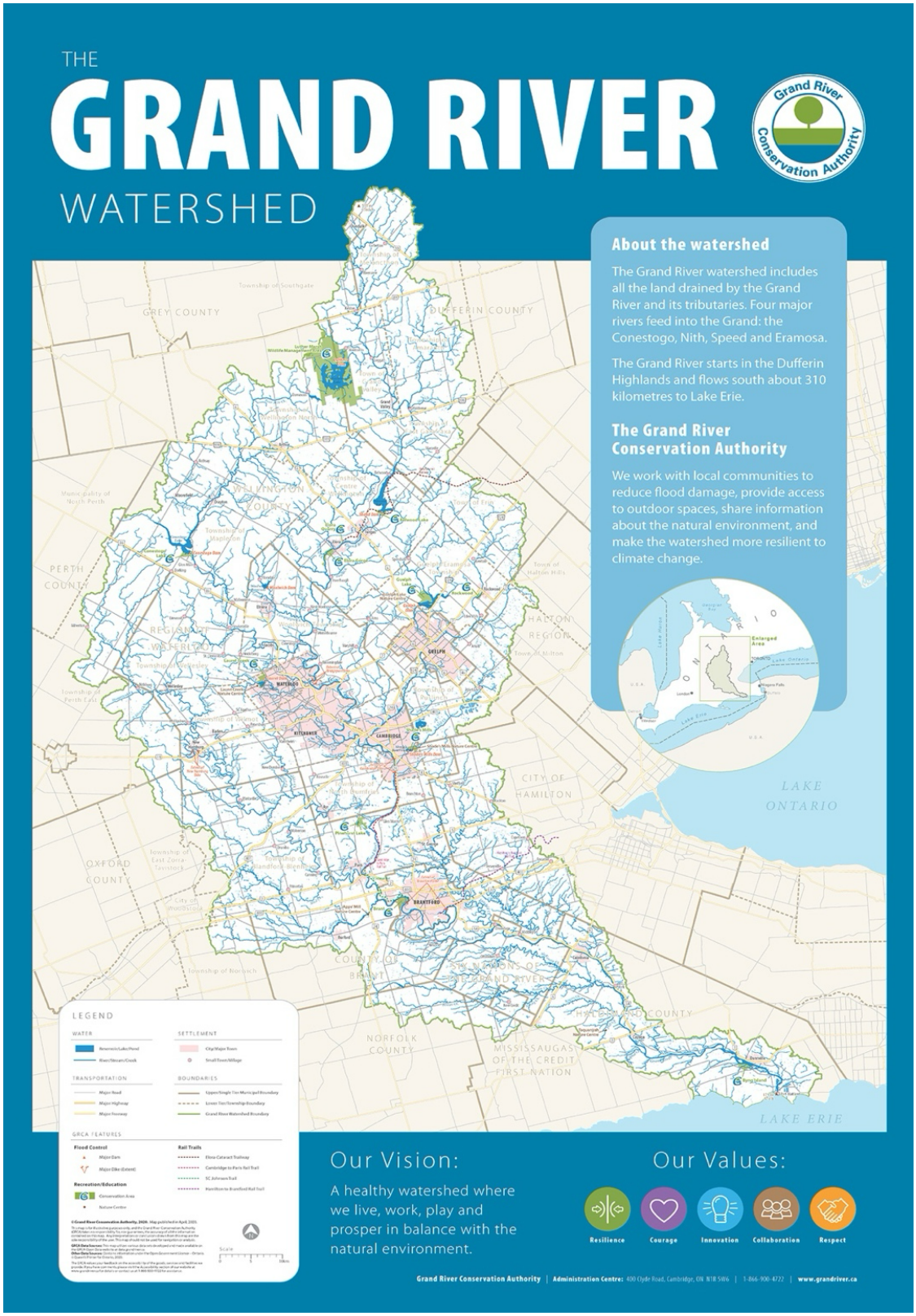
Summary of the Canada Community-Building (CCBF) Fund Investments and the Allocations for Ontario Between 2024-2029.

Province/ Territory	***2024-25***	***2025-26***	***2026-27***	***2027-28***	***2028-29***	***Total 2024-29***
Ontario	$895,480,297	$932,791,977	$932,791,977	$970,103,656	$970,103,656	$4,701,271,563
Total (All Provinces, Territories, and First Nations)	$2,400,000,000	$2,500,000,000	$2,500,000,000	$2,600,000,000	$2,600,000,000	$12,600,000,00

Note. Table of the annual funding Ontario will receive from the CCBF between 2024 - 2029, compared to the total annual funding for all the Provinces, Territories, and First Nations territories. Adapted from *The Canada Community-Building Fund*, by Government of Canada, 2024 (https://housing-infrastructure.canada.ca/ccbf-fdcc/index-eng.html). Copyright 2024 by Government of Canada.

Figure 1.1

Map of the Grand River Watershed



Note. The figure above depicts the extent of the Grand River Watershed. It includes a description of the watershed from the Grand River Conservation Authority, as well as some of their responsibilities, values, and goals. From *Maps and Data*, by the Grand River Conservation Authority, 2020 (https://www.grandriver.ca/our-watershed/maps-and-data/). Copyright 2020 by the Grand River Conservation Authority.