

Citizen science, community-based monitoring and urban planning: *Exploring ideas to extend conceptual and theoretical implications of public participation*

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1: ABSTRACT

Citizen science is a concept that advocates involving non-experts in scientific research by framing research potentially as a two-way street between researchers and civil society (Hecker et al., 2019). Citizen science has produced a number of innovative approaches to participatory research, a prolific example of which is community-based monitoring (Conrad & Hilchey, 2011). This report will explore whether citizen science approaches such as community-based monitoring can provide the beginnings of some new ideas to extend existing planning theories of public participation. Since the 1980's, communicative planning theory has emerged as the predominant alternative to rational-comprehensive planning theory (Innes & Booher, 2015). Communicative planning theory states that planners plan in the public interest only as a result of participatory processes that address power imbalances between all stakeholders (Innes & Booher, 2016). Yet, some theorists argue that planning theory and practice fails to meaningfully address these power dynamics (Brabham, 2009). This report follows from the critique that planning expertise itself determines, *a priori*, what counts as credible knowledge in planning processes and thus creates an inherent power imbalance between planners and civil society (Flyvbjerg, 2002). This report proposes citizen science as one potential framework to ameliorate this problem. To explore the potential for developing such a framework, a case study of the unique planning environment on the Oak Ridges Moraine, Ontario, Canada is presented, examining linkages between citizen science scholarship and planning theory.

2: INTRODUCTION

The following report explores the potential of citizen science to further enhance planning theory on the subject of public participation. In the past two decades, citizen science has achieved mainstream recognition within many scientific communities (e.g. Cornell School of Ornithology and the Citizen Science Association) and has been incorporated into public policy in several prominent jurisdictions (e.g. the Government of the United States of America, the European Commission and the European Environment Agency). Despite the widespread recognition by academic research and increasing integration into public policy, citizen science has not yet been extensively applied in urban and regional planning. Planners, one might argue, ought to be early adopters of citizen science, because of their professional commitment to evidence-based practice and planning in the public interest (OPPI, 2012).

Recent research indicates that citizen science is an emerging concept in urban planning (Freihardt, 2020; Macaraig, 2015; Newman et al., 2020; Pykett et al., 2020). This literature can be broadly divided into two camps: 1) the study of citizen science theory and methods (Graham et al., 2015; Hochachka et al., 2012) and 2) the application of particular methods in local citizen science programs (Little et al., 2016; Cartwright et al., 2015). What is lacking from this body of research and applied experience is how to conceptualize the systematic integration of these new processes and information into urban planning - linking citizen science theory, applied citizen science practice and planning processes. The following report aims to provide the beginnings of such a conceptual framework by linking citizen science to planning theories of public participation. This report is further motivated by the notion that because these two domains share common underlying values (e.g. democratization) and aim at similar goals (a more equitable

society), the integration of the two domains makes a stronger case for both democratization and equity together than individually.

Thus, this project is conceptualized as exploring contributions to thinking on how to increase devolution of decision making while increasing planning effectiveness, efficiency and equity. Furthermore, the particular emphasis on citizen science in this endeavor aims to increase the pareto efficiency of participation processes. That is to say, an effective citizen science program could potentially make a number of stakeholders better off without necessarily making any one worse off. Local authorities would potentially benefit from the low cost of citizen science research, planners would potentially benefit from more robust local data, and citizens would potentially benefit from transparency and a sense of agency in local planning processes. As with any novel social intervention, it is always possible that such programs could generate unintended consequences. For example, if community groups routinely got their way, then planning proposals could be rejected or modified and negatively impact applicants, or other stakeholders who wish to see the proposals approved. However, this is neither a necessary consequence of more local scientific research nor of more volunteer involvement. Furthermore, if such efforts should indeed increase the evidentiary basis of planning decisions, it would be difficult to argue that such programs have a net negative effect on the planning process. Of course, polemics are one thing and proof is quite another. The remainder of this research report will outline and briefly summarize the constituent parts of this argument to present the vision of this report as a whole.

In the middle of the 20th century, professional planning underwent a paradigm shift. A number of critiques emerged questioning the traditional rational-comprehensive planning theory (Hudson, 1979; Forester, 1982; Dalton, 1986; Lawrence, 2000; Lane, 2006) (*) and several

competing alternatives were proposed including but not limited to advocacy planning (Davidoff, 1966; Peattie, 1968; Mazziotti, 1974; Checkoway, 1994; Benner & Pastor, 2014), communicative planning (Healy, 1992; Huxley & Yiftachel, 2000; Mäntysalo & Jarenko, 2014; Innes & Booher 2016) and radical planning (Grabow & Haskin, 1973; Albrechts, 2015). Central to these alternative theories was an emphasis on public participation. Yet, planning theorists continue to critique public participation methods for failing to meet the basic goals of public participation (Conrad & Cassar, 2011).

Citizen science is an umbrella term which has emerged out of academic environmental research, referring to approaches which involve the public in scientific research. These approaches have demonstrated that, through a well-designed citizen science program using the appropriate methods in the appropriate context, lay researchers can produce data that is comparable in quality to data produced by professional researchers (Burgess et al., 2014; Colston et al., 2015). Moreover, these research programs can produce low-cost data in remote regions using local amateur researchers (McKinley, 2016) and can produce robust data sets by using crowdsourced online data collection (Luna, 2018). Citizen science has now begun to spread into public policy. For example, the Federal Community of Practice on Crowdsourcing and Citizen science has been created in the United States to connect employees from over twenty federal agencies to conduct citizen science research (Government of the United States of America, 2021); in Europe, agencies such as the European Commission (European Commission, 2021) and the European Environment Agency have endorsed citizen science programs to fill knowledge and policy gaps (Hecker et al., 2018).

Recently, many citizen-science practitioners and organizations have begun to rebrand under the nomenclature of ‘community science’ in response to mass social movements and

renewed social consciousness around issues of equity, inclusion, diversity, accessibility and social justice (Cooper, 2021). There has been two related but distinct critiques motivating this change: 1) that the dated and theory-laden modifier ‘citizen’ fails to communicate the democratic goals of citizen science, and instead insinuates the exclusion of non-citizens; 2) that citizen science has failed to live up to its own goals, given unequal levels of participation in citizen-science programs between different demographic groups (a study from Great Britain revealed that participants were overwhelmingly white and well-educated) (Pateman et al., 2021).

Although it remains unclear how these critiques will augment the theoretical underpinnings of citizen science, it is clear that the emerging focus for citizen science organizers will be adopting an equity lens in their practice.

Community-based monitoring is a well-developed citizen science research method which has been used to inform environmental management activities such as water quality monitoring (Buckland-Nicks et al., 2016; Carlson & Cohen, 2018; Conrad and Daust, 2008; Murphy-Mills et al., 2019; Tulloch et al., 2013). This paper will investigate one community-based monitoring case study to explore citizen science methods as an option to improve public participation in planning practice.

If a single description could characterize the current moment, it would be this: There is a novel rate of novelty. That is to say, not only are social problems emerging faster than ever, but the types of problems emerging are frequently unprecedented. The SARS-COV 2 pandemic is perfectly representative of this trend. Not only is this case characteristic of the trend towards increasingly complex social problems, but it is also characteristic of the direction of emerging responses to this trend. Traditional government structures are being taxed to their limit and the traditional scientific research cycle is struggling to keep up. In this environment, new approaches

to social policy which crowdsource data collection and create collaborative relationships between government and civil society are being tested. For example, many jurisdictions experimented with contact tracing apps which use citizens with smartphones to extend government's capacity to monitor the spread of the virus (Firth et al., 2020).

In light of the pandemic, planners are reflecting on the future trajectory of planning practice (Allam & Jones, 2020; Banai, 2020; Barbarossa, 2020; Lai et al., 2020; Pinada & Corburn, 2020; Sharifi & Khavarian-Gharmis, 2020; Chigbu & Onyebueke, 2021). In this time of potential reorientation, planners should place increased emphasis on public participation in planning policy. If it is, in fact, the case that social problems of this magnitude and complexity will become the norm rather than the exception, then we cannot afford to waste any minds willing to contribute to solving social problems. This is not simply a practical consideration, but also a deeply ethical requirement. If social problems increasingly require novel and extreme solutions, then they will also increasingly require the support of civil society.

3: LITERATURE REVIEW

3.2: CITIZEN SCIENCE

3.2.1: A HISTORY OF CITIZEN SCIENCE

Citizen science is an intellectual movement concerned with the involvement of non-professionals in scientific research. Many researchers trace the intellectual roots of citizen science to the efforts of early amateur naturalists, such as Darwin (Strasser et al. 2019). They also note the tradition of public involvement in species monitoring, such as the century-old annual Christmas Bird Count in Canada and the United States (Kobori et al. 2019). The contemporary concept of citizen science was formalized in the 1990's when two versions of this

idea were developed in close succession. The first version of this idea, published in 1995 by science policy analyst Alan Irwin, advocated for the democratisation of science policy (Kullenberg & Kasperowski 2016). It recommended a science “by the people” and “for the people” (Irwin 1995, in Strasser et al. 2019, p. 62). The second, and now more popular version of citizen science emerged from the work of Richard Bonney (Hecker et al. 2019), who was studying public participation in science programs with the support of the United States National Science Foundation. This version of citizen science conceptualized public participation in science research as a “two-way street” between the public and researchers (Bonney 1996, in Strasser et al. 2019 p. 54). In other words, researchers provide members of the public with the skills and education necessary to collect data, and in return, the public applies these skills to provide researchers with more robust observational data. Recent scholarship has broadened this concept to promote equity and provide meaningful outcomes when involving marginalized groups in the production of scientific knowledge. This research emphasizes the importance of working with such communities from the outset of the research process to collaboratively define the research question (Wong et al., 2020).

Since this time, citizen science has become commonplace in academic research, particularly in disciplines grounded in ecology. In particular, the Cornell University ornithology lab, directed by Bonney, was responsible for the early proliferation of citizen science projects (Strasser et al., 2019). Over the past two decades, case studies have begun to show that data gathered by well-designed citizen science programs can be just as reliable as data gathered by professional researchers (McKinley et al., 2017). These claims have been met with some skepticism, particularly regarding the influence of local biases on findings and the difficulties involved with standardizing citizen methods (Silvertown, 2009). However, citizen science has

continued to generate data that would be difficult for traditional methods to provide due to the temporal or geographic scope of the research (Hochachka, 2012). Moreover, a recent survey of academic scientists indicates that negative perceptions and lack of knowledge about citizen science may be a bigger barrier to using citizen science as a primary research method than the efficacy of the methods themselves (Burgess et al., 2017). Despite these reservations, academic discourse for the most part no longer debates *if* citizen science works, but rather in which situations it works *best* (Conrad & Hilchey 2011; Newman et al. 2012).

3.2.2: OPPORTUNITIES AND ISSUES

Applications of citizen science methods are now beginning to expand outside of ecological research into conservation planning (Graham et al., 2015; Jarvis et al. 2015), urban health research (Pykett et al. 2020), sanitation planning (Freihardt, 2020) and even community master planning (Newman et al., 2020). Urban planning, in particular, has been identified as a possible entry point for citizen science into public policy because it already uses “participatory programs to implement a co-produced vision with scientists and policy makers” (Colston et al., 2015, p.68). Policy makers increasingly view citizen science as a desirable tool (Dillon et al., 2016; Hecker et al., 2018; Hecker et al., 2019) because citizen science can be more cost-effective than traditional research methods (e.g. when conducting research in remote areas) (Tulloch et al., 2013), it can generate fine-scale data across large geographical areas, and it can help incorporate local and traditional knowledge into research (Jarvis et al., 2015). Citizen science practitioner organizations now exist to train professionals in citizen science techniques in Europe, the United States and Australia. Prominent public policy organizations and government agencies such as the European Environment Agency, the European Commission Union (Hecker et al. 2018) and

the White House Office of Science (Thompson, 2016) have either already committed to, or begun investigating applications of citizen science on public policy.

Despite the recent increase in citizen science research, there are barriers to assessing the state of the field and bringing its findings into the domain of public policy. The first barrier is that because it is an intellectual movement rather than a specific methodology, it often does not use consistent terminology (Eitzel et al., 2017). According to scholarship in the sociology of scientific knowledge, an intellectual movement is a collective effort, similar to a social movement, that advocates for research programs in the face of resistance from others in the scientific or intellectual community (Frickel & Gross, 2005). According to Frickel & Gross (2005), intellectual movements must satisfy six criteria:

1. They must have a coherent program for scientific or intellectual change and advancement.
2. This program must be contentious relative to normative expectations and default methods in a scientific or intellectual domain.
3. As a result of their contentiousness, they are inherently political.
4. They involve organized collective action.
5. They are identifiable as discrete historical episodes.
6. They contain a central vision and scope.

Citizen science qualifies as an intellectual movement because: 1) it advocates for direct non-expert involvement in scientific research, 2) it is contentious relative to scientific norms of unbiased objectivity and perceptions that the involvement of non-expert researchers inherently affects data quality 3) it has become inherently political, 4) it has organized collective grassroots action, 5) it is identifiable as a discrete historical phenomenon emerging in the 1990's, and it

contains a central vision of democratizing participation in science and science-based public policy.

Many research practices involving non-professional participants, such as Public Participation in GIS (PPGIS) do not consistently use citizen science terminology in their literature and can be easily overlooked (Luna et al. 2018). Additionally, many researchers fail to adequately document citizen involvement in research. This raises ethical questions regarding data ownership and privacy. This can erode trust between citizen scientists and professional researchers, which would undermine efforts to improve policy through public participation and citizen generated data. Nonetheless, these concerns can be addressed through the development of standardized citizen science research practices that include methods for data ownership, privacy and citation norms (Hecker et al., 2019).

3.2.3: TYPOLOGIES OF CITIZEN SCIENCE

Citizen science is a difficult concept to analyze and implement because it is an incredibly heterogeneous field. The two separate origins of citizen science as an intellectual movement (i.e., in the work of Bonney and Irwin) have created diverging branches of citizen science scholarship. According to a meta-analysis by Kullenberg and Kasperowski (2016), three strands of research have emerged in the citizen science literature. The largest strand follows the research of Bonney. It consists of research on biology, conservation and ecology, and uses citizen science to collect and classify data (Kullenberg and Kasperowski, 2016). The second strand emerged from GIS research and deploys citizens to collect geographic data (Kullenberg and Kasperowski, 2016). The third strand of research, follows from Irwin's notion of citizen science. This strand can be found in social science and epidemiology research and facilitates public participation to investigate environmental issues and health (Kullenberg and Kasperowski, 2016).

Because of the diverse lineage of citizen science research, much of the existing literature attempts to demarcate citizen science from other forms of participatory research. This area of the literature offers many typologies of citizen science, which can be useful models for categorizing citizen science projects. Many typologies categorize citizen science according to the kind and degree of public participation (Danielson et al., 2009; Dillon, 2016). Other typologies categorize citizen science by the objectives of the research itself (Tulloch et al., 2013; Wiggins & Crowston, 2011). Finally, some typologies analyze the involvement of and the relationship between stakeholders such as government agencies and civil society organizations in citizen science research (Whitelaw et al., 2003). Table 1, below, summarizes the typologies included in this literature review.

TABLE 1 — TYPOLOGIES OF CITIZEN SCIENCE

This table summarizes the prominent typologies of citizen science surveyed through the literature review. This summary table illustrates the diverse goals of citizen science research. These goals range from improving public science literacy (Bonney et al., 2009), to understanding existing citizen science scholarship (Tulloch, 2013), to extrapolating citizen science techniques for application in developing countries (Danielson et al., 2009). This table also shows that despite these heterogeneous goals, citizen science typologies share common methods of classifying citizen science: 1) According to the types of actors involved in the citizen science study and the power relations between them (Bonney et al., 2009; Danielson et al., 2009), 2) According to the research goals of the citizen science study (Dillon 2016; Tulloch 2013; Wiggins and Crowston 2011) and 3) According to the methods used in the citizen science study (Hacklay et al., 2013; Tulloch, 2013).

Author(s)	Purpose	Typology	Conclusions
Bonney et al. (2009)	To describe how Public Participation in Scientific Research (PPSR), in the context of informal science education (ISE), can provide multiple opportunities to increase public science literacy.	1) Contributory projects 2) Collaborative projects 3) Co-created projects	Despite growth in the popularity of citizen science, little research has been done to monitor and evaluate the effectiveness of citizen science methods. The authors recommend additional citizen science project reviews and more research into project design. They argue that citizen science projects should articulate learning goals and desired outcomes better than in the past.
Danielson et al. (2009)	To hone citizen science species or habitat monitoring techniques for application in developing countries.	1. Externally driven, professionally executed. 2. Externally driven, with local data collectors. 3. Collaborative monitoring with external data interpretation. 4. Collaborative monitoring with local data interpretation. 5. Autonomous local monitoring.	A citizen science typology was developed and assessed according to common environmental monitoring challenges in developing countries. Based on the findings, Category 1 schemes are recommended when large scale technical monitoring requires experts and funding is guaranteed. Category 2 schemes are recommended when large data sets are required over large areas and skilled volunteers or funding are available. Category 3 and 4 schemes (which include community-based monitoring) are recommended where local participants have a high interest in natural resource use. In such cases, local ownership, empowerment, and connection to management decisions can be more important than data quality. Category 5 schemes cannot be initiated externally by definition. Such schemes can be highly effective when monitoring is conducted by people who have a high stake in the status of a particular resource.
Dillon (2016)	To establish citizen science as a tool for more effective public engagement, in order to	1. Science-driven citizen science 2. Policy-driven citizen science	Several typologies were combined, producing a two-axis schema to categorize existing citizen science articles according to a common standard. Practitioners are encouraged to

	promote more emancipatory forms of civic science that could lead to meaningful socio-ecological outcomes.	3. Transition-driven citizen science.	consider the conservation problem at hand, but also to consider ontological, deontological, and epistemological dimensions of the problem before selecting the most suitable program design.
Hacklay et al. (2013)	To link citizen science with Volunteered Geographic Information (VGI) and Participatory Geographic Information Systems (PGIS) research, and offer a framework for more participatory forms of citizen science.	1. Crowdsourcing 2. Distributed Intelligence 3. Participatory Science 4. Extreme Citizen science	Analysis of these three similar intellectual movements reveals two critical issues: 1) the need to determine which scientific questions can be answered by individual citizen science research methods and 2) the need to develop acceptance of citizen science within the scientific community.
Tulloch (2013)	To determine the objectives of existing citizen science research in comparison to the stated objectives of citizen science theory.	1. Management 2. Awareness 3. Education 4. Serendipity 5. Recreation 6. Social and economic research 7. Ecological knowledge 8. Improving methods	Review of academic research found that applied research has focused primarily on three of the objectives of citizen science defined in the literature: 1) knowledge gain, 2) increasing awareness and 3) improving methods.
Wiggins & Crowston (2011)	To address a limitation of existing citizen science typologies: they focus primarily on the structure of participation, paying little attention to the organizational and macrostructural properties that are important to designing and managing effective projects.	1. Action 2. Conservation 3. Investigation 4. Virtual 5. Education	Citizen science projects were surveyed using landscape sampling, then cases were coded on 80 facets to construct an empirically-grounded citizen science typology. This method produced 5 types of citizen science. Action-oriented citizen science encourages participant intervention in local concerns, using science to support civic agendas. Conservation citizen science supports stewardship and natural resource management. Investigation citizen science focuses on scientific research goals requiring data collection from the physical environment. Virtual citizen science is conducted exclusively through digital communication technologies. Despite sharing many similarities with Investigation citizen science, the scope of Virtual citizen science is not defined by place. Education citizen science makes education and outreach its primary goal.

This research paper expands upon the four-point typology used to classify citizen science carried out through a national project led by Environment Canada's Ecological Monitoring and Assessment Network at the time (Whitelaw et al., 2003; Pollock et al., 2005). This typology was selected as the basis for developing the conceptual framework linking citizen science and planning theory in this report because it was used in the large-scale study of 28 different Canadian community-based monitoring programs. Furthermore, elements of this typology mirror theories of planning such as rational-comprehensive planning, collaborative planning and advocacy planning. Because of the Canadian context and this correspondence to planning theory, this typology is uniquely amenable to investigating applications of citizen science for planning through case studies of Canadian planning regimes and community-based monitoring.

3.2.4: COMMUNITY-BASED MONITORING

Community-based monitoring is an environmental citizen science method in which “concerned citizens, government agencies, industry, academia, community groups, and local institutions collaborate to monitor, track and respond to issues of common community concern” (Whitelaw et al. 2003, p. 410). Community based monitoring can focus on species and habitat monitoring (Cartwright et al., 2015), ecosystem function monitoring, or environmental quality monitoring (Conrad & Hilchey, 2011). In Canada, community-based monitoring has been adopted as a cost-effective way to fill gaps in monitoring capacity — particularly for monitoring drinking water quality — in response to government decentralization and withdrawal from environmental monitoring activities (Conrad & Daost, 2008; Buckland-Nicks et al., 2016; Little et al., 2016).

According to Pollock et al. (2005), there are four primary types of community-based monitoring: 1) government led monitoring 2) education-focused monitoring 3) advocacy monitoring and 4) multi-party collaborative monitoring. These four types of community-based monitoring represent different degrees of public participation. In fact, according to Buckland-Nicks et al., community-based monitoring “has the potential to enhance public participation and access to information” (2016, p. 2). Moreover, a survey of citizen science practitioners indicates that community-based monitoring is most likely to link data to decision making at local or subnational levels (Carlson & Cohen, 2018), making it ideal for the scope of urban and regional planning. The pervasiveness of community-based monitoring activities in Canada, the suitability of community-based monitoring for the scope of urban and regional planning, and the recognition that community-based monitoring can promote and enhance public participation makes community-based monitoring a good candidate to evaluate citizen science as a means of improving public participation in planning.

3.3: PLANNING THEORY

This report aims to address an established problem in planning theory. According to Flyvbjerg (2002), planning experts dictate what counts as planning knowledge, and in doing so, they create an inherent power imbalance between planners and civil society. In order to demonstrate that citizen science methods such as community-based monitoring can ameliorate these conditions and resolve this problem in planning theory, it will be necessary to establish the connection between public participation practices and planning theory. Three planning theories are examined to this end in this report: 1) rational-comprehensive planning 2) communicative planning and 3) advocacy planning. Each of these theories corresponds to part of the four-point taxonomy of community-based monitoring used in this report.

3.3.1: RATIONAL-COMPREHENSIVE PLANNING THEORY

Rational-comprehensive planning was selected because it is the common point of departure for all subsequent 20th century planning theories (Hudson et al., 1979). Public participation within rational-comprehensive planning corresponds to the first two points of the typology: 1) government lead community-based monitoring and 2) Education focused community-based monitoring (Whitelaw et al., 2003). Analysis of this theory will be used to identify the historical problem in planning that spurred a shift towards increased public participation.

Rational-comprehensive planning was shaped by the education of early planners, many of whom were trained professionals in technical or scientific disciplines such as architecture, engineering and medicine (Lawrence, 2000). As a result, rational-comprehensive planning was influenced by 20th century logical positivism and emphasized procedural rationality in planning practice (Dalton, 1986). This took the form of prescribing discrete steps for planning practice which paralleled the steps of the scientific method. Typically, these steps consisted of: 1) goal-setting 2) identifying policy alternatives 3) evaluating available interventions against the identified goals and 4) implementing the decisions (Hudson et al. 1979).

Beginning in the 1960's support for the substantive outcomes of rational comprehensive planning began to unravel. Citizens and professionals began to criticize wholesale neighbourhood redevelopment practices that disproportionately impacted those without the socio-economic status to appeal their case. Books such as Jane Jacobs' *Death and Life of Great American Cities* (1961) gained widespread readership, bringing this attitude into the mainstream. Around this same time, a critique from political scientist Alan Altshuler (1965) undermined the theoretical basis for rational comprehensive planning which, coupled with the widespread

societal disapproval for the outcomes of this model of planning, nearly decimated the urban planning profession. This critique stated that long-range comprehensive plans require planners to claim expertise in the public interest. Altshuler's critique assumed "the impossibility of aggregating the public interest so that its optimization can be amenable to rational systematic analysis" (Innes, 1995, p. 184). In other words, the problem according to Altshuler was that the relevant knowledge required to plan in the public interest could never be reduced to a single perspective, and thus deliberation about optimal outcomes for a singular 'public' was not possible. Altshuler contended that if planners do not speak for the public, then they have no special source of expertise that demarcates them from other professionals working in public policy and development. If this were the case, then planning as a discipline would lose its legitimacy.

After Altshuler's demonstration that the public interest was integral to planning, public participation became recognized as an indispensable component of planning. The seminal work on public participation in planning is Arnstein's *A Ladder of Citizen Participation* (1969). This model casts public participation as a hierarchical scale which ranges from degrees of nonparticipation, such as manipulation, at the bottom to degrees of citizen power, such as citizen control, at the top. Although this model has been highly influential, it is controversial because it suggests that the more citizen participation, the better. The problem with this view is that public opinion can be uninformed (Innes & Booher, 2004). Thus, the perennial tension in planning practice since this time has been balancing technical expertise on the one hand with representation and participation on the other.

3.3.2: COMMUNICATIVE PLANNING THEORY

Communicative planning theory was selected to inform this project because it is a contemporary alternative to rational-comprehensive planning and it is predicated on the notion of communicative rationality, which makes public participation integral to the planning process (Innes, 1995). Furthermore, communicative planning theory is consistent with multi-party collaborative monitoring, identified as one of four types of community-based monitoring in the typology used in this report.

In response to growing disenchantment with the rational comprehensive model of planning, new conceptions of planning emerged from a number of different sources. Some of these conceptions relied on procedural norms of collective debate and decision-making to guide planning decisions (Forester, 1989). This trend was later labelled the ‘communicative turn’ in planning (Healey, 1992). This growing trend was eventually identified as an alternative theory to rational-comprehensive planning by a student of Altshuler named Judith Innes, who claimed that communicative planning theory resolved the critique raised by her mentor about rational-comprehensive planning. From this perspective, communicative planning sidesteps Altshuler’s critique by adopting a new epistemology and redefining the role of reason in planning. Altshuler’s critique relied on a positivist epistemology and an instrumental conception of the purpose of reason in planning. Communicative planning, on the other hand, adopts an intersubjective epistemology and limits the role of reason in planning to building consensus (Lane, 2005). This new theory relied on Habermas’ notion of communicative rationality (Mäntysalo & Jarenko, 2014) to produce “consensus building as a form of deliberation” (Innes, 1996, p. 461). In other words, communicative planning no longer claims that planners are experts *in* the public interest, but rather are experts in *facilitating* the public’s interests to reach

consensus and make decisions. As a result, planners, according to communicative theory, need not worry about the legitimacy of planning, since planning decisions are the public's decisions through consensus.

Because communicative planning theory places the burden of planning decisions on public consensus, it makes public participation paramount to the planning process. According to Lawrence, (2000) this can be characterized as the participation critique in planning. Through this, communicative attempts to resolve the perennial tension in planning by reframing the role of rationality and expertise. According to communicative planning theory, offering all actors a chance to voice their concerns can ameliorate the detrimental effects of power imbalances and produce more sustainable planning outcomes. However, some planning theorists maintain that communicative planning theory's emphasis on procedural norms means that it, like rational-comprehensive planning tends to ignore the reality of power imbalances. According to Huxley and Yiftachel (2000), the existence of disparities in communicative power means that deliberative discourse will always ultimately favour the interests of the powerful.

3.3.3: ADVOCACY PLANNING THEORY

Advocacy planning was selected because it corresponds to advocacy monitoring identified in the four-point typology of community-based monitoring used in this report. Additionally, advocacy planning centres power dynamics in its normative description of planning practice. Addressing power dynamics has been identified by some planning theorists (Fainstein, 2014; Flyvbjerg, 2002) as indispensable to successful public participation, so an advocacy planning lens will help determine whether citizen science methods can offer insights to improve participation in planning.

Advocacy planning emerged from critiques that were contemporaneous with and parallel to communicative planning theory. Unlike communicative planning, which centres procedural norms of consensus building in the planning process, advocacy planning centres consciousness of power disparities among participants in planning processes and civil society. According to Lawrence (2000), this can be characterized as the equity critique in planning. Unlike rational-comprehensive planning and communicative planning theory, advocacy planning argues that the planning process is not value-neutral but rather value-laden. As a result of its awareness of inequality and its acknowledgement of the normativity of planning practice, advocacy planning draws on the analogy of legal defense to argue that planners should advocate for the interests of the less powerful in the planning process (Davidoff 1962).

Advocacy planning assumes there is: 1) profound inequality of bargaining power between groups; 2) unequal access to the political structure; and, 3) a large number of unorganized people unrepresented by interest groups (Mazziotti, 1982). Furthermore, it advances the notion that redistributive justice to rectify inequality is a precondition of genuine consensus building. One of the objectives of this research report is to explore how to reconcile the procedural ideal of communicative planning in which all actors have an equal voice, with the substantive ideal of advocacy planning that seeks equal representation. This report aims to do this through an analysis of community-based monitoring as a form of citizen science which can foster co-learning and data sharing to produce more equal and democratic public participation outcomes for planning.

TABLE 2 — COMPARISON OF PLANNING THEORIES

This table summarizes the broad differences between how three schools of planning theory (Rational-Comprehensive, Communicative and Advocacy) conceptualize public participation. The purpose of this table is to highlight that the manner in which each theory conceptualizes the identity of planners and the identity of civil society, the locus of knowledge and the function of consultation affects how each theory frames power relations between planners and civil society. Rational-comprehensive planning places all power in the hands of planners due to its preference for expert knowledge. Communicative planning moderates this relationship by appointing planners as gatekeepers because it establishes planners as synthesizers of individual interests into the public interest through dialogue. Advocacy planning aims to address the perceived inequality in each of the prior schools of thought by recommending planners to represent the interests of less powerful groups in the planning system.

Theory	Intellectual Tradition	Role of Civil Society	Role of Planner	Function of Consultation	Locus of Knowledge
Rational-Comprehensive Planning	Scientific positivism	Passive engagement	Plan according to expertise	Educate and appease the public	Concentrated among experts
Communicative Planning	Deliberative democracy	Active participation	Plan according to public interest (emerges through dialogue)	Incorporate formal and informal knowledge into decision making	Distributed between individuals
Advocacy Planning	Community organization	Direct action	Represent interests of less powerful in the planning system	Ensure equitable participation	Distributed across groups

3.3.4 PUBLIC CONSULTATION

Public participation in the form of public consultation eventually became a universal feature of planning practice as a result of the widespread criticism described above directed at the so-called urban renewal practices of the 1960s (Shiple and Untz, 2012). Although each of the criticisms against the planning practices of the 1960’s agreed upon the central malady within planning, the recommended remedies varied widely. As a result, many different methods of public consultation have been proposed to increase public participation in planning. Examples of these different methods include: public meetings, focus groups, scenario workshops, visioning exercises, collaboration, consensus building and web-based techniques such as surveys (Shiple and Untz, 2012).

Notwithstanding the proliferation of consultation, institutionalized consultation practices have been roundly criticized. Some have alleged that these methods do not produce genuine participation because planning bureaucracy relegates citizen involvement mainly to setting goals and then giving minor feedback on alternatives (Innes and Booher, 2000). Others point out that some consultation methods tend to bias public participation towards the interests of specific demographics. For example, letters to homeowners tend to primarily attract married people between the ages of 35-55 with a higher level of education and higher level of household income (Halseth & Booth, 2003). In a study of consultation methods in Canada, Halseth and Booth determined that the most essential component of consultation is the provision of “relevant and understandable information on a timely basis”. Furthermore, they elaborate on this general principle, stating that:

“Information must be available at the start of the process in order to create a level playing-field among participants. It must also be available throughout the course of the process in order to keep participants as up-to-date on deliberations as possible. Timely, relevant and readable information is what people are asking for. They have little use for legal notices couched in jargon and legal definitions or highly technical reports which the public is not likely to understand” (p. 453).

Therefore, a primary goal of effective consultation should be increased knowledge sharing and the democratization of participation in the planning process.

In Canada, public consultation in land use planning is enshrined in legislation that varies by province. In the province of Ontario, public consultation requirements are established in the *Planning Act*. Under the *Planning Act*, there are 6 types of planning activities which may require public consultation (Planning Act, 1990):

1. In the course of preparing a new Official Plan;
2. Before an Official Plan amendment application is submitted to the approval authority;
3. Before revising an Official Plan;
4. Before a Zoning By-law amendment is submitted to the approval authority;
5. Before plans and drawings in support of a site plan control area are submitted to the approval authority; and
6. Before a Plan of Subdivision application is submitted to the approval authority.

The required method of public consultation varies according to each of these planning activities, but includes (Planning Act, 1990):

1. Applicant meetings with the approval authority;
2. Special meetings of council, open to the public;
3. Public meetings; and
4. Open houses.

Given these parameters, the natural entry points for public participation in the planning process are at the plan review stage and at the policy development stage. Since planning development applications are reviewed for conformity with existing policies, policy development is upstream of development review. Therefore, it stands to reason that public participation might be more meaningful, effective and impactful when directed at policy development. For this reason, this report will analyze planning policy to explore entry points for public participation through citizen science.

4: METHODS

4.1 LITERATURE REVIEW

The first step of the research process consisted of a review of scholarly articles on citizen

science, community-based monitoring and theories of public participation in planning. The purpose of the literature review was to explore the existing body of knowledge related to the research topic, and to inform the development of a conceptual framework linking the three topics. Scholarly databases were used to search for academic literature (Scopus, Web of Science, Science Direct). Google Scholar was also used to supplement this search by locating additional academic studies, reports and publications in the subject areas of citizen science, community-based monitoring, and planning theory. A combination of keywords and search terms were selecting to explore the literature, according to their relevance to the topic of the research project and the research questions. The keywords and search terms used during this literature review are provided in Table 3.

TABLE 3 — LITERATURE REVIEW KEYWORD SEARCH

This table indicates the keywords that were used to conduct the literature review. Google scholar was used to scope the literature using the combinations of keywords from Group 1 and Group 2, as well as by using the Individual Search Phrases. Following this scoping, scholarly portals were searched to confirm that the scoping identified the most relevant scholarship on the topics included in the literature review.

Keyword(s) Group 1	AND	Keyword(s) Group 2
Citizen science	AND	Community based monitoring Urban planning Public participation Public consultation Canada Ontario Oak Ridges Moraine
Community based monitoring	AND	Urban planning Public participation Public consultation Ontario Canada Oak Ridges Moraine
Urban Planning	AND	Public participation Public consultation Ontario Canada Oak Ridges Moraine
Individual Search Phrases		
Planning theory Rational Comprehensive Planning Advocacy Planning Communicative Planning Collaborative Planning		

This literature review consisted of two parts: the first part focused on citizen science and community-based monitoring, and the second part focused on planning theory and public participation. The first part of the literature limited search results to articles published within the last ten years in order to capture the most recent knowledge on citizen science and community-based monitoring and to scope the review. Articles that were cited multiple times in the literature were also included in the review as foundational or highly influential texts. Case studies and

empirical research on specific citizen science projects were omitted from the literature reviewed unless they specifically applied to planning. As a result, a substantial number of research papers in environmental science and ecology were omitted.

The literature review of planning theory and public participation was conducted in a different manner to the citizen science and community-based monitoring literature review. The purpose of this literature review was to trace an intellectual history of planning theory and connect this intellectual history to public participation approaches. Based on existing literature (Lawrence, 2000), this planning literature was subdivided into key topic areas. These topic areas were: 1) rational-comprehensive planning, 2) communicative planning and 3) advocacy planning. The focus of this literature review was to compare the intellectual history of different approaches to public participation in planning. Therefore, the review was not restricted to articles published within a set number of years and instead it reviewed widely-cited documents on each topic area.

4.2 DOCUMENT ANALYSIS

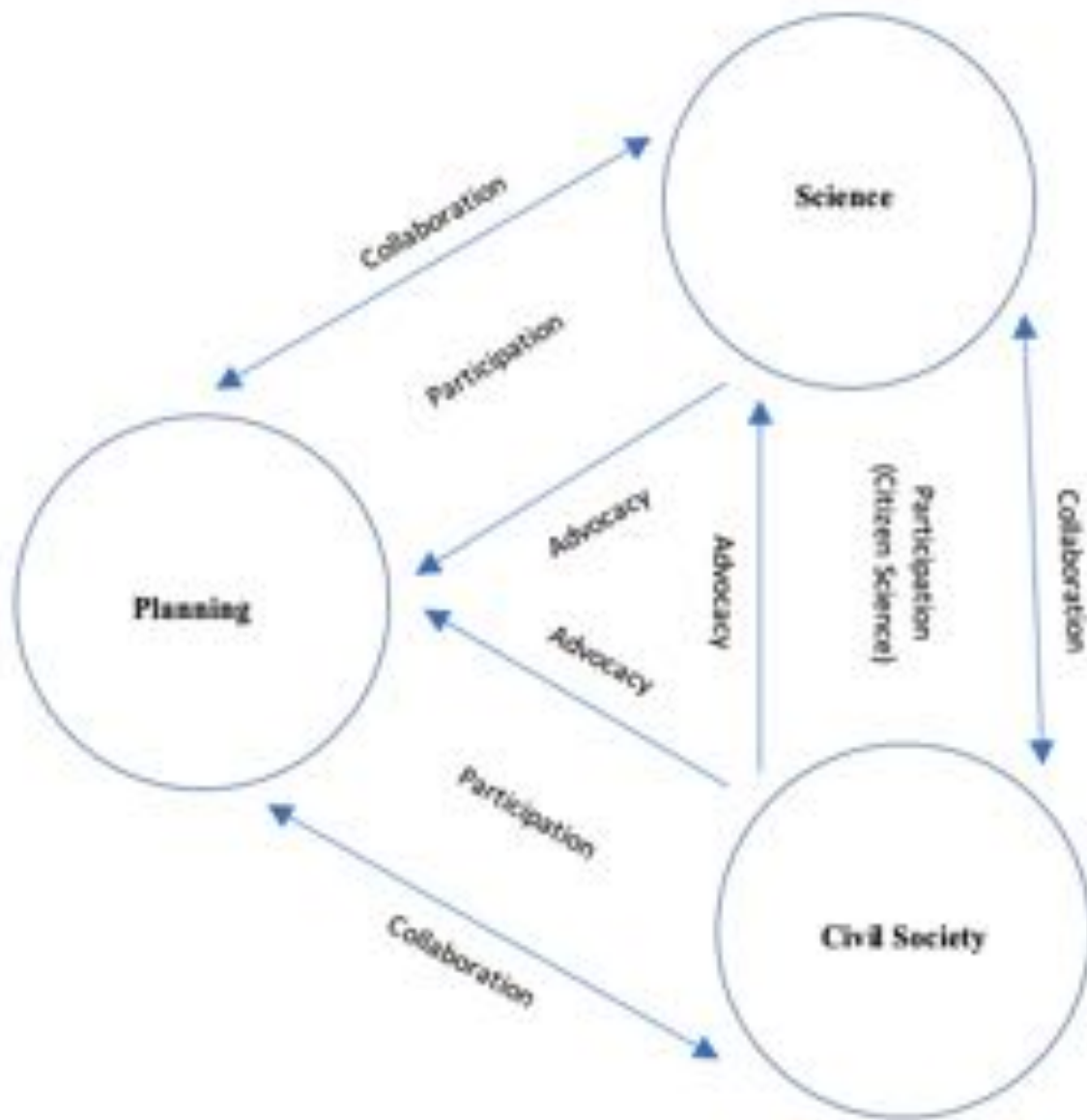
The second step of this research report used qualitative research methods to explore linkages between the conceptual framework and planning. Qualitative methods are suitable because this research aims to contribute to planning theory and qualitative research “focuses on the unique characteristics of a phenomenon that are not accounted for or explained by positivist approaches to research” (Patterson & Silverman, 2015, p. 9). An exploratory approach to qualitative methods was used. This approach uses a conceptual framework (see below) to assess qualitative data and is best conducted through case study research (Robson 1993). The case study approach emphasizes depth of analysis over breadth and is particularly useful for extreme or outlier cases (Patterson & Silverman, 2015). Case based research uses extreme cases to

exaggerate the phenomenon being studied in order to provide the researcher with a clear example to develop concepts and formulate theory (Patterson & Silverman, 2015). This method is appropriate for this report because citizen science is an emerging concept in planning literature and the conceptual framework developed in this report attempts to link citizen science with planning theory in a novel manner.

The method used in this research was document analysis. Document analysis is “a systematic procedure for reviewing or evaluating documents” (Bowen, 2009, p. 27). Document analysis is one part of a larger grounded theory approach to qualitative research that uses triangulation to build theory to supplement quantitative research. involves layering multiple qualitative methods to study the same data to narrow in on and corroborate a particular phenomenon (Bowen, 2009). Due to the limitations of this research report, the additional methods required to complete triangulation have not been conducted. Thus, this report can be thought of as a first step towards building a new theory of public participation in science and planning. In support of the document analysis an original conceptual framework was developed, as depicted in Figure 1 below.

FIGURE 1 — CONCEPTUAL FRAMEWORK LINKING CITIZEN SCIENCE TO PLANNING THEORIES OF PARTICIPATION

This table illustrates the hypothesized linkages between three social domains of knowledge and action: planning, science and civil society. In this framework, knowledge in each domain is co-dependent on knowledge from the other domains and can be improved by knowledge from the other domains. Thus, knowledge from the three domains could form a feedback loop by which each domain expands its knowledge basis, and in so doing, improve its core activities by incorporating knowledge from the other domains. The space which transfers knowledge from one domain to another is conceptualized as the space for participation. This shows how ‘participation’ is extended beyond the relationship between planners and civil society as conceived in the planning theories examined in the literature review. In this framework, participation can occur through bidirectional collaboration or unidirectional advocacy. Citizen science is defined as participation between the civil society and science domains. Based on the assumptions of this conceptual framework, it is hypothesized that knowledge generated through this form of participation could increase knowledge in all three domains, and most importantly for the purposes of this report, potentially lead to more effective action in the planning domain.



This conceptual framework illustrates the hypothesized relationship between citizen science and public participation in planning, based on the literature examined in the literature review. This conceptual framework is intended to be not only descriptive, but also normative. That is to say, it not only aims to explain how citizen science interfaces with planning, but it also aims to justify the extent to which planners should value citizen science. The substantive implication of this conceptual framework is that civil society, planning and science can form a feedback loop that iteratively generates mutually beneficial gains for all stakeholders by cooperating in ways that share knowledge and advocate for better land-use governance.

This conceptual framework extends the bodies of literature on citizen science and planning theories of public participation identified in the literature review to explain how such beneficial knowledge transfers could potentially take place. This conceptual framework identifies three social domains of knowledge and action. In this framework, knowledge is transferred between these domains through participation. In this sense, ‘participation’ is extended beyond formal consultation and expanded to include a wider range of actors than merely planners and the public. In this framework, participation can occur by two means: 1) through bidirectional collaboration, and 2) through unidirectional advocacy. Citizen science is defined as a particular form of participation between the civil society and science domains. Based on the assumptions of this conceptual framework, it is hypothesized that knowledge generated through this form of participation could benefit all three domains by increasing knowledge and thereby bringing about the possibility of more informed action. Most relevant for the purposes of this report, it is hypothesized that in this manner citizen science could potentially lead to more effective action in the planning domain.

4.3 THEMATIC ANALYSIS METHODS

The thematic analysis was conducted by reviewing documents associated with Moraine planning authorities and civil society organizations. One of these civil society organizations, Save the Oak Ridges Moraine Coalition, maintains a list of organizations with an active mandate on the Moraine, which was modified to create Table 4 above (STORM Coalition, 2021). For the municipal planning authorities on this list, Official Plan and Strategic Plan documents were selected. Official plans were selected because they are the primary locus of a community's land use policies, they cover a long-range time horizon and they are prepared with extensive input from the community. Strategic plans were selected because they outline the short-term strategies and goals municipalities are pursuing. For Conservation Authorities, Regulations and Guidelines documents and Watershed Report Card documents were selected. Regulations and Guidelines documents were selected because they provide the local interpretive lens that each conservation authority adopts to guide implementation of its regulatory powers under the Provincial Policy Statement. Watershed report cards were selected because they are informed by monitoring conducted by the conservation authorities and offer insight into how scientific monitoring impacts land-use planning. Additional documents, such as the *Ganaraska Region Monitoring Report 2018*, were also included if they were deemed particularly relevant to the conceptual framework developed in this report. The documents selected to represent civil society organizations were much more variable and were generally selected according to overlap with the components of the conceptual framework. Table 5, below, lists the documents reviewed in this analysis.

TABLE 5 — LIST OF ORGANIZATIONS AND DOCUMENTS REVIEWED IN DOCUMENT ANALYSIS

Type of Organization	Name of Organization	Documents Analyzed
Upper-Tier Municipality	County of Dufferin	<ul style="list-style-type: none"> • <i>Dufferin County Official Plan 2017</i> • <i>Dufferin County Corporate Strategic Plan 2015-2018</i>
	County of Simcoe	<ul style="list-style-type: none"> • <i>County of Simcoe Official Plan 1994</i> • <i>Strategic Plan 2015-2025</i>
	County of Peterborough	<ul style="list-style-type: none"> • <i>County of Peterborough Official Plan 1994</i> • <i>Strategic Plan 2015-2019</i>
	County of Northumberland	<ul style="list-style-type: none"> • <i>Northumberland County Official Plan 2016</i> • <i>Northumberland County 2019-2023 Strategic Plan</i>
Regional Municipality	Regional Municipality of Durham	<ul style="list-style-type: none"> • <i>Durham Regional Official Plan</i> • <i>Durham Region Strategic Plan 2020-2024</i>
	Regional Municipality of Peel	<ul style="list-style-type: none"> • <i>Region of Peel Official Plan 2018</i> • <i>Term of Council Priorities 2018-2022</i>
	Regional Municipality York	<ul style="list-style-type: none"> • <i>The Regional Municipality of York Official Plan 2019</i> • <i>2019 to 2023 Strategic Plan</i>
Lower-tier Municipality	City of Vaughan	<ul style="list-style-type: none"> • <i>City of Vaughan Official Plan 2010</i> • <i>2018-2022 Term of Council Service Excellence Strategic Plan</i>
	Municipality of Clarington	<ul style="list-style-type: none"> • <i>Municipality of Clarington Official Plan 2018</i> • <i>Municipality of Clarington Strategic Plan 2019 to 2022</i>
	Municipality of Port Hope	<ul style="list-style-type: none"> • <i>Municipality of Port Hope Official Plan 2014</i> • <i>Port Hope Strategic Plan 2019-2022</i>
	Township of Cramahe	<ul style="list-style-type: none"> • <i>The Official Plan of the Township of Cramahe 2014</i> • <i>Strategic Plan 2019-2022</i>
Conservation Authority	Credit Valley Conservation Authority	<ul style="list-style-type: none"> • <i>Credit Valley Conservation Watershed Planning and Regulation Policies 2010</i> • <i>Our Future Taking Shape: Strategic Plan 2020-2022</i> • <i>Credit Valley Conservation Watershed Report Card 2018</i>
	Nottawasaga Valley Conservation Authority	<ul style="list-style-type: none"> • <i>Nottawasaga Valley Conservation Authority Planning and Regulation Guidelines 2009</i> • <i>Nottawasaga Valley Watershed Health Check 2018</i>
	Toronto and Region Conservation Authority	<ul style="list-style-type: none"> • <i>Planning and Development Procedural Manual 2008</i> • <i>Conservation Matters 2020 Annual Report</i>

		<ul style="list-style-type: none"> • <i>Toronto and Region Watersheds Report Card 2018</i>
	Lake Simcoe Region Conservation Authority	<ul style="list-style-type: none"> • <i>Lake Simcoe Region Conservation Authority Guidelines for the Implementation of Ontario Regulation 179/06, 2014</i> • <i>Lake Simcoe Watershed Report Card 2018</i>
	Central Lake Ontario Conservation Authority	<ul style="list-style-type: none"> • <i>Policy and Procedural Document For Regulation and Plan Review 2014</i> • <i>Central Lake Ontario Conservation Watershed Report Card 2018</i>
	Kawartha Region Conservation Authority	<ul style="list-style-type: none"> • <i>2017-2021 Strategic Plan</i> • <i>Kawartha Conservation Watershed Report Card 2018</i>
	Ganaraska Region Conservation Authority	<ul style="list-style-type: none"> • <i>Ganaraska Region Watershed Monitoring Plan: towards an integrated approach 2014</i> • <i>Ganaraska Region Monitoring Report 2018</i> • <i>Ganaraska Region Watershed Report Card 2018</i>
	Otonabee Region Conservation Authority	<ul style="list-style-type: none"> • <i>Otonabee Region Watershed Report Card 2018</i>
	Lower Trent Conservation Authority	<ul style="list-style-type: none"> • <i>Lower Trent Region Conservation Authority Plan Review Manual 2019</i> • <i>Lower Trent Region Watershed Report Card 2018</i>
Non-government Organization	Oak Ridges Moraine Land Trust	<ul style="list-style-type: none"> • <i>2018 Action Report</i> • <i>Gratitude Report 2016</i> • <i>Caretakers: 2014 Annual Report</i> • <i>The Official Newsletter of the Oak Ridges Moraine Land Trust Fall 2013</i> • <i>The Official Newsletter of the Oak Ridges Moraine Land Trust Spring 2012</i> • <i>Annual Report 2011</i> • <i>2004 Annual Report</i> • <i>2002 Annual Report</i>
	EcoSpark	<ul style="list-style-type: none"> • <i>Citizens' Guide to the Oak Ridges Moraine</i>
	Save the Oak Ridges Moraine Coalition	
	Friends of the Greenbelt Foundation	<ul style="list-style-type: none"> • <i>Report Card on the Environmental Health of the Oak Ridges Moraine and Adjacent Greenbelt Lands</i>
	Conservation Authorities Moraine Coalition	
	Oak Ridges Moraine Foundation	

The thematic analysis was conducted by coding these documents according to a set of themes drawn from the conceptual framework. These themes were 'Planning', 'Participation',

‘Civil Society’ and ‘Science’. Within each of these themes, sub-themes were identified based on the literature review. Nvivo qualitative analysis software was used to code the documents and categorize the coded sections into the appropriate themes and sub-themes. The keywords used in this process are listed in Table 4 below.

TABLE 4 — DOCUMENT ANALYSIS THEMES AND SUB-THEMES

This table outlines the themes and subthemes generated based on the literature review and the conceptual framework. The names of the sub-themes and their cognates (e.g. the Consultation sub-theme also coded for the keywords ‘consult’, ‘consulted’, ‘consulting’) also served as the keywords used to code the documents in the document analysis.

Theme	Planning	Participation	Civil Society	Science
Sub-Themes	Consultation	Collaboration	Citizens	Methods
	Collaboration	Advocacy	Stakeholders	Monitoring
	Advocacy	Education	Community	Data
		Engagement		Citizen science

This approach was selected to conduct the thematic analysis over alternatives such as directly reviewing monitoring cases for two primary reasons. First, the purpose of this analysis is to engage in exploratory research to determine linkages between disparate theoretical and practical domains. As such, it was important to review similar types of high-level documents across these different domains. Second, monitoring activities have been poorly documented, which makes thematic analysis an inappropriate method to study these practices. This approach poses an important limitation: monitoring activities are mentioned rarely and obliquely in the documents reviewed. It is recommended that this report be supplemented by future research using qualitative methods such as interviews with citizen science and community-based monitoring practitioners. Such a method would be more appropriate for documenting and analyzing these activities since they are not well documented in existing planning grey literature. This approach would be consistent with the qualitative research approach known as

‘triangulation’, which aims to layer multiple sources of qualitative data to increase their persuasiveness.

5: CASE STUDY

5.1 OAK RIDGES MORAINE

The Oak Ridges Moraine (the Moraine) was selected as a case study due to its rich history of civil society advocacy and its unique system of land-use governance. The unique context of the Moraine as a governance and land use planning regime has been described as a social innovation that has profoundly changed the basic routines, resources, authority flows and beliefs of ecosystem-based land-use planning under its jurisdiction (McCarthy et al. 2014). Community-based water quality monitoring on the Moraine has also been previously studied, indicating that community-based monitoring activity is occurring on the Moraine and is producing some degree of influence on its water governance (Murphy-Mills et al., 2019). These characteristics of the Moraine and the previous research on community-based monitoring activities within its jurisdiction thus make it the perfect case to explore linkages between citizen science, and land-use planning theories of public participation.

5.1.1 HISTORY OF THE OAK RIDGES MORAINE

The Oak Ridges Moraine is a significant landform in central Ontario located at the northern periphery of the Greater Golden Horseshoe. This landform, consisting of rolling hills and river valleys, was created through glacial retreat nearly 12,000 years ago and is now home to an abundance of native plants and animals (Government of Ontario, 2017). Although the Moraine was severely affected by deforestation by the turn of the last century, reforestation

efforts by the Provincial government returned the extensive forest cover that provides groundwater recharge and discharge for over 65 watercourses. The Moraine divides the watersheds draining north into Lake Simcoe and Georgian Bay from the watersheds draining south into Lake Ontario, thus providing significant ecosystem services to one of Canada's most urbanized regions. In addition to its natural abundance, the Moraine now provides substantial agricultural area and is a primary source of aggregate materials for the Greater Golden Horseshoe to the south (Government of Ontario, 2017).

The creation of the Moraine land-use planning system spawned out of grassroots advocacy and direct action in opposition to proposed suburban development on the Moraine in the late 1980s. A coalition of local grassroots organizations called Save the Oak Ridges Moraine (STORM) solidified around advocating that the distinct ecological value of the Moraine warranted its protection (McCarthy et al., 2019). This advocacy was able to influence a series of technical government studies in 1994 that brought recognition to the Moraine (Oak Ridge Moraine Technical Working Committee, 1994). These reports subsequently recommended that the Provincial government should take steps immediately to conserve the Moraine and conduct further studies to assess its role in groundwater protection and the cumulative effects of encroaching development. Finally, these technical studies mapped the Moraine, identifying its significance and landscape value in land-use planning legislation. These recommendations were not immediately realized in provincial legislation, but rather were buoyed in the public consciousness throughout the subsequent decade by continuous interaction between civil society advocacy and scientific monitoring. This history of advocacy providing vision and values to motivate science makes the Moraine an excellent case study exemplifying the Civil Society-Science linkage of the conceptual framework (Whitelaw et al., 2008). The planning regime that

emerged from this process is described in the following section and establishes why the Moraine is also an excellent case study for the Civil Society-Science-Planning linkage that completes the conceptual framework.

5.1.2 OAK RIDGES MORAINÉ CONSERVATION PLAN

The nascent public consciousness of Moraine conservation forced a legislative agenda in 2001, after a major residential development expansion in Richmond Hill prompted massive public backlash. A year earlier, roughly 1600 citizens crowded a local Council meeting in opposition to the controversial development application on the Moraine (Whitelaw et al., 2008). This turnout resulted in a temporary moratorium of development on the Moraine, and the appointment of a multi-stakeholder Advisory Panel to recommend conservation and planning recommendations on the Moraine (Whitelaw et al., 2008). These recommendations eventually became the basis of the *Oak Ridges Moraine Conservation Act* and the *Oak Ridges Moraine Conservation Plan* (Oak Ridges Moraine Conservation Act, 2001; Government of Ontario, 2017). Figure 2, below, depicts the resulting land-use schedule map regulating development on the Moraine (Ontario Regulation 140/02, 2001).

FIGURE 2 — OAK RIDGES MORaine CONSERVATION PLAN LAND USE DESIGNATION MAP (ONTARIO REGULATION 140/02)

This figure depicts the geographic boundaries of the area regulated by the Oak Ridges Moraine Conservation Plan. Dark green areas represent the ‘Natural Core’ land use designation, light green areas represent the ‘Natural Linkage’ designation and brown areas represent the ‘Countryside’ designation. Settlement areas are depicted in grey, whereas the boundaries of upper/single-tier and lower-tier municipalities are outlined using solid and thatched lines respectively. This shows how the regulation of development on the Moraine is a shared jurisdiction between multiple municipalities.



This plan operates on the basis of traditional exclusive zoning principles that have been modified — based on ecological science — to primarily serve environmental protection. This zoning system uses four land use designations: natural core, natural linkage, countryside and settlement. The jurisdiction over Moraine planning is administered by all municipalities with lands covered by these land use designations, making its conservation uniquely collaborative. Local municipalities are required to maintain in their Official Plan, policies for the implementation of these regulatory responsibilities under the Oak Ridges Moraine Conservation Plan (Government of Ontario, 2017). Regulation of watercourses within the moraine, as in all of

Southern Ontario, falls to regional watershed-based Conservation Authorities (Government of Ontario, 2017). Table 4, below lists the prominent organizations with a mandate on the moraine (this list is not exhaustive of the numerous non-government organizations and partnerships active on the Moraine).

TABLE 4 — LIST OF ORGANIZATIONS WITH MANDATE ON THE OAK RIDGES MORaine

Type of Organization	Name of Organization
Regional Municipality	Regional Municipality of Durham
	Regional Municipality of Peel
	Regional Municipality York
Upper-Tier Municipality	County of Dufferin
	County of Simcoe
	County of Peterborough
Lower-Tier Municipality	Town of Mono
	Township of Adjala-Tosorontio
	Town of New Tecumseth
	Town of Caledon
	Township of King
	City of Vaughan
	Town of Newmarket
	Town of Aurora
	Town of Richmond Hill
	Town of East Gwillimbury
	Town of Whitchurch-Stouffville
	Town of Markham
	Township of Uxbridge
	City of Pickering
	Township of Scugog
	Town of Whitby
	City of Oshawa
	Municipality of Clarington
	Township of Cavan-Millbrook-North Monaghan
	Municipality of Port Hope
Township of Hamilton	
Township of Alnwick-Haldimand	
Municipality of Trent Hills	
Township of Cramahe	
Conservation Authority	Credit Valley Conservation Authority
	Nottawasaga Valley Conservation Authority
	Toronto and Region Conservation Authority
	Lake Simcoe Region Conservation Authority
	Central Lake Ontario Conservation Authority
	Kawartha Region Conservation Authority
	Ganaraska Region Conservation Authority
	Otonabee Region Conservation Authority
Lower Trent Conservation Authority	
Non-Government Organization	Oak Ridges Moraine Land Trust
	EcoSpark
	Save the Oak Ridges Moraine Coalition
	Friends of the Greenbelt Foundation
	Conservation Authorities Moraine Coalition
Oak Ridges Moraine Foundation	

6: FINDINGS

Once the document analysis was completed, the results for each sub theme were recorded as tables, which can be found in the appendix attached to this report. Some sub themes retrieved results that were not relevant for this report. These results were manually filtered for relevance based on the literature review and conceptual framework when creating these tables. The findings included in these tables are summarized below, sorted by theme and subtheme. Documents that reflect the broad trends found in the data have been included at the outset of each subtheme, whereas particularly noteworthy examples with respect to the findings of the literature review and assumptions of the conceptual framework are quoted in the body of each section.

6.1 PLANNING

6.1.1 ADVOCACY:

The first sub-theme of the planning theme examined attitudes towards advocacy in the planning domain. Advocacy themes occurred less frequently than collaborative themes, and were represented in fewer documents (County of Dufferin, 2015; County of Northumberland, 2019; Credit Valley Conservation Authority, 2010; Credit Valley Conservation Authority, 2020; Oak Ridges Moraine Land Trust, 2013; Regional Municipality of Peel, 2018; Regional Municipality of York, 2019; Toronto and Region Conservation Authority, 2008; Toronto and Region Conservation Authority, 2020), indicating that advocacy may play less of a role within the municipal domain than collaboration. A wide range of attitudes towards advocacy were represented in the documents; some documents conceptualize the direction of advocacy as top-down (County of Northumberland, 2019; Regional Municipality of York, 2019) while others identified the purpose of advocacy as public education (County of Northumberland, 2019;

Toronto and Region Conservation Authority, 2020). As an example of this, some planning documents advocate for the importance of provincially sanctioned land-use planning itself in environmental management. For example:

“In this regard, CVC advocates for an integrated and comprehensive approach to planning and managing natural hazards and natural resources, features, areas and systems, including their functions, consistent with direction provided by the PPS” (Credit Valley Conservation, 2010, p. 20).

Another example of this way of conceptualizing advocacy frames the function of advocacy in planning as bringing awareness of local issues:

“Strengthen capacity to advocate for Northumberland and promote awareness of specific issues facing the community” (Northumberland County, 2019, p.10).

Some planning authorities also indicate that top-down advocacy is also coming from higher levels of government, in the form of recommended best planning practices:

“The Ministry of Natural Resources and Forestry, the Ministry of the Environment, Conservation and Parks and the conservation authorities have been advocating watersheds/subwatersheds as the appropriate units for ensuring proper hydrologic functioning and water related features, functions and landforms” (Region of Peel, 2018, p. 238-239).

In contrast to this top-down, technocratic conceptualization of advocacy, other planning authorities frame advocacy in planning in a more decentralized manner. This vision of planning characterizes advocacy as working with civil society to build local capacity to improve and create new land-use planning processes. For example:

“Engage and coordinate a committed volunteer base that advocates for and builds a healthier environment, including building innovative volunteer management tools and processes” (Credit Valley Conservation, 2020, p.18).

Also:

“To foster engagement of community members, TRCA needs to build civic capacity by providing the tools and opportunities needed for community members to transition from participants into advocates and leaders. (Toronto Region Conservation Authority, 2015, p. 13).

Finally, a third category of advocacy emerged that conceptualizes planning authorities as advocates that represent local interests by advocating up to higher levels of government. For example:

“Provide a strong voice for advocating to the province” (Dufferin County, 2015, p. 8).

Also:

“advocating for the community and social needs of Vaughan residents by working with senior levels of government and social service providers” (City of Vaughan, 2020, p. 16).

6.1.2 COLLABORATION

The second sub-theme of the planning theme examined attitudes towards collaboration within the planning domain. Many of the documents examined recognized the value of collaboration in the planning domain (County of Dufferin, 2015; County of Northumberland, 2019; County of Peterborough, 2015; Credit Valley Conservation Authority, 2020; EcoSpark & Save the Oak Ridges Moraine Coalition, 2010; Ganaraska Region Conservation Authority, 2018; Kawartha Region Conservation Authority, 2017; Lower Trent Conservation Authority, 2019; Regional Municipality of Durham, 2020; Regional Municipality of Peel, 2018; Regional Municipality

York, 2019; Toronto and Region Conservation Authority, 2020), although few planning authorities identified formal collaborative processes. Some planning authorities conceptualize collaboration as a professional virtue, indicating that it may form an important part of professional ethics in planning. For example: “We encourage professional excellence through collaboration, partnerships and teamwork in a culture that fosters trust and respect” (Durham Region, 2020b, p. 3). In fact, some planning authorities identify this professional virtue as a key component of their success:

“Success can be attributed to the efforts of staff joining forces across departments and with multiple stakeholders. It exemplifies our organizational value of collaboration: To work together and with our volunteers, partners and the community to achieve shared goals” (Credit Valley Conservation, 2020, p. 12).

In some jurisdictions, the ethic of collaboration is valued beyond the merely professional context and is viewed as a universal value that ought to be promoted amongst all participants in the land-use planning domain: “We believe in fostering an environment of collaboration that contributes to informed and thoughtful decisions that are reflective of the needs of those affected” (Dufferin County, 2015, p. 5).

Other planning authorities conceptualize collaboration as an approach to specific projects rather than merely as a general virtue (County of Peterborough, 2015; Credit Valley Conservation Authority, 2020; EcoSpark & Save the Oak Ridges Moraine Coalition, 2010; Toronto and Region Conservation Authority, 2020). This approach to projects is valued as a method of innovation that can address common issues and goals for participants:

“Regionally collaborative projects, such as the Climate Change Action Plan of Sustainable Peterborough are viewed as innovative by our funding partners and provide a

greater opportunity to work together towards common issues and goals. We see a great opportunity to continue to leverage partnerships at every level to achieve our goals”

(Peterborough County, 2015, p. 8).

Furthermore, these project-based collaborations are conceived by some authorities as a method of determining how to best apply the knowledge gained from data gathered by the planning authority:

“Undertake pilot collaborations with industry, academic institutions and partners to determine and demonstrate which TRCA data are most useful in supporting sustainable practices, and how best to provide access to that data to achieve more sustainable development” (Toronto Region Conservation Authority, 2020, p.1).

In other words, collaboration is framed as a method to translate theoretical knowledge into practical knowledge.

6.1.3 CONSULTATION

In general, discussion of consultation in the documents reviewed was limited to the legislative requirement to consult the public mandated by the Planning Act. However, some planning authorities (County of Dufferin, 2017; Lake Simcoe Region Conservation Authority, 2014; Regional Municipality of Peel, 2018) indicated that they valued methods of consultation that exceeded these minimum requirements due to the high value placed on public consultation.

For example, the Peel Region Official plan recognizes that:

“Public involvement is a vital part of the planning process and decision making. Effective public consultation enables people to influence decisions about planning issues that affect the place in which they live and work” (Region of Peel, 2018, p. 197).

Moreover, it recommends to “investigate more effective ways to consult with the public on planning matters” and “work jointly with the area municipalities and other relevant agencies to prepare guidelines and/or protocols regarding public consultation on Regional initiatives” (Region of Peel, 2018, pp. 198, 207). The Lake Simcoe Region Conservation Authority’s public consultation methods are generally representative of the range of methods used to consult the public. These methods include:

“multiple postings of the draft guidelines on the LSRCA website, public open houses, municipal consultation, notices in watershed newspapers and municipal offices as well as a special meeting of the LSRCA Board of Directors” (Lake Simcoe Region Conservation Authority, 2020, p.19).

6.2 CIVIL SOCIETY

6.2.1 COMMUNITY

The most frequent way that civil society was conceptualized in the documents reviewed was through bulk nouns such as ‘the community’ or ‘the public’ (County of Dufferin, 2015; County of Dufferin, 2017; Credit Valley Conservation Authority, 2020; EcoSpark & Save the Oak Ridges Moraine Coalition, 2010; Kawartha Region Conservation Authority, 2017; Regional Municipality York, 2019). Within the community sub-theme, community groups were frequently identified as a stakeholder that planning authorities should collaborate with: For example:

“Maintain and create relationships with community groups, government organizations, stakeholders and the agricultural and other industry sectors to better understand their interests, concerns and opportunities” (Kawartha Conservation, 2017, p. 12).

These community groups were frequently mentioned in both the planning and in the civil society domains as collaborative partners in the documents surveyed. For example, in the civil society domain it was recognized that the

“Oak Ridges Moraine Conservation Plan, like any policy or regulation, is only as strong as the will of people to implement it. The future of the Moraine rests not solely with provincial or municipal governments but also with residents, community groups, environmental movement organizations and the private sector” (EcoSpark and Save The Oak Ridges Moraine (STORM) Coalition, 2010, p. 11).

An example of this type of collaborative project with community groups is Check Your Watershed Day. EcoSpark and STORM state that this project is

“coordinated by EcoSpark in collaboration with multiple agencies and volunteers including the Ministry of Natural Resources, conservation authorities, other ENGOs, and community groups. Since 2006, we have worked with 390 volunteers to check 1529 sites, covering 11 watersheds” (EcoSpark and Save The Oak Ridges Moraine (STORM) Coalition, 2010, p. 32).

In the planning domain, Credit Valley Conservation identifies as one of its core objectives the formation of “[a]n alliance of environmental and community organizations that work together to achieve shared goals” (Credit Valley Conservation, 2020, p. 25). In York region, planning authorities have formed “[p]artnerships with over 50 government and non-government organizations, stakeholders and community groups” in order to support “[p]ublic programs and stewardship initiatives, which include support for private rural reforestation projects, urban private-yard tree planting, community engagement, and more” (The Regional Municipality of York, 2019, p. 17). An example of one of these programs is the Regional

Greening Strategy, which “has had a number of successes between 2001 and 2008 including: Over 750,000 trees and shrubs planted with annual planting numbers ranging from 50,000 to 100,000 trees and shrubs” (The Regional Municipality of York, 2019b, p. 17).

6.2.1 STAKEHOLDERS

The next most term used to identify civil society in the planning domain is as a ‘stakeholder’. This term does not exclusively designate civil society, but rather is a universal term to describe any individual or group with an interest in an issue. Some authorities recognize the need to include stakeholders in the planning process because the scope of some planning issues inherently necessitates interdisciplinary work. For example, one of Credit Valley Conservation’s primary goals is

“to provide clearer and more consistent direction to CVC staff, partners and stakeholders recognizing the interdisciplinary nature of watershed planning, natural hazard management and the multitude of factors to be considered” (Credit Valley Conservation, 2010, p. 4).

Furthermore, Credit Valley Conservation recognizes that programs and services provided through this approach can

“promote community engagement and partnerships allowing CVC to work with municipalities and stakeholders in a cooperative and holistic approach to watershed management” (Credit Valley Conservation, 2010, p. 7).

York Region identifies this approach as valuable because developing partnerships with stakeholders can “leverage resources and extend program reach” (Regional Municipality of York, 2019b, p. 11).

The Durham Region Official Plan extends the value of including stakeholders further to include monitoring activities, stating that

“The Region, in cooperation with the Province and other stakeholders, shall participate in the development of a series of indicators to monitor the longterm health of the Moraine and to assist in public education” (Durham Region, 2020a, p. 123).

This sentiment of direct involvement in the planning process is echoed by civil society groups with a mandate on the moraine. For example, Ecospark and STORM state that

“Our project objectives are:

- To increase awareness and understanding of the Oak Ridges Moraine
- To work with stakeholders to gather relevant information about the Oak Ridges Moraine
- To work towards a process where all Moraine stakeholders take responsibility in its safekeeping” (EcoSpark and Save The Oak Ridges Moraine (STORM) Coalition, 2010, p. 8).

Furthermore, they state that “as Moraine stakeholders, the MTM [Monitoring the Moraine] Project Partners hold ourselves responsible to contribute relevant information in preparation for the ORMCP Review” (EcoSpark and Save The Oak Ridges Moraine (STORM) Coalition, 2010, p. 35).

Finally, involving stakeholders is seen as important to the success of planning because it can increase and improve knowledge relevant to the planning process. For example, Credit Valley Conservation recommends leading and participating “in joint research and knowledge transfer with our municipal and conservation authority partners, academia and other public and private sector stakeholders” (Credit Valley Conservation, 2020, p. 17). Likewise, Toronto

Region Conservation Authority advises an “increase collaboration with senior levels of government, academic institutions, private sector and not-for-profit stakeholders to develop leading-edge sustainability knowledge” (Toronto Region Conservation Authority, 2020, p. 10).

6.2.3 CITIZENS

The final sub-theme investigated within the civil society theme was the extent to which Moraine organizations identify and value individual citizens. EcoSpark and STORM provide the strongest statement of the importance of individual citizens, stating that “[w]e recognize the value of local knowledge and the role that citizens must play in preserving our shared environment” (EcoSpark and Save The Oak Ridges Moraine (STORM) Coalition, 2010, p. 8). Rather than merely viewing citizens as requiring engagement and education on issues, this statement indicates that this relationship can be reciprocal and citizens can be a source of knowledge relevant to environmental management in return. This observation is reiterated by the Oak Ridges Moraine Land Trust, which “was incorporated in 2000 by a group of citizens with a passionate belief that the Moraine’s features and functions required protection for the benefit of generations to come” (Oak Ridges Moraine Land Trust, 2014, p. 1). Directors of this organization “are drawn from the community to direct and support the work of the Trust in a volunteer capacity” and “[t]he Trust works closely with individual landowners and many organizations who believe in protection, conservation and sustainable use of the Moraine” (Oak Ridges Moraine Land Trust, 2014, p. 8). In a similar capacity, York Region aims “[t]o encourage citizen engagement and shared responsibility in decisions affecting individual and community health and well-being” (The Regional Municipality of York, 2019a, p. 2).

6.3 PARTICIPATION

6.3.1 ADVOCACY

The first sub-theme examined in the participation theme was advocacy, corresponding to advocacy planning theory. In general, advocacy was not identified in the documents surveyed as a type of public participation. One possible reason for this is provided by the Oak Ridges Moraine Land Trust, which acknowledges that “[c]haritable organizations like the Trust have limited ability to lobby and advocate” and that “[i]ndividuals are much better positioned to contact governing authorities” (Oak Ridges Moraine Land Trust, 2013, p. 2).

6.3.2 COLLABORATION

The second sub-theme investigated within the participation theme was collaboration. As with advocacy, collaboration was generally not explicitly identified as a method of public participation. EcoSpark and STORM claim that it is “uniquely positioned to work with Moraine stakeholders towards a meaningful ORMCP Review” (EcoSpark and Save The Oak Ridges Moraine (STORM) Coalition, 2014, p. 36). The reason for this is that the Monitoring the Moraine “Project Partners have a specialized ability to easily engage with multiple Moraine stakeholders (community groups, the general public, technical scientific audiences, municipalities, conservation authorities, and other Moraine-based ENGOs)” (EcoSpark and Save The Oak Ridges Moraine (STORM) Coalition, 2014, p. 36). This comment indicates that there may be a perception that engagement with planning policy on the Moraine requires engagement with a diverse range of stakeholder perspectives, including technical scientific audiences, which may be prohibitive to collaboration serving as a form of participation for lay audiences.

6.3.3 EDUCATION

The third sub-theme investigated was education. Education was mentioned more frequently than either advocacy or collaboration with respect to public participation in both the civil society domain and the planning domain (City of Vaughan, 2010; County of Northumberland, 2016; County of Simcoe, 2015; Credit Valley Conservation Authority, 2020; Durham Region, 2020; EcoSpark & Save the Oak Ridges Moraine Coalition, 2010; Ganaraska Region Conservation Authority, 2018; Kawartha Region Conservation Authority, 2017; Lower Trent Conservation Authority, 2018; Nottawasaga Valley Conservation Authority, 2009; Oak Ridges Moraine Land Trust, 2018; Regional Municipality of Peel, 2018; Regional Municipality York, 2019; Toronto and Region Conservation Authority, 2020). For example, Northumberland County requires “that local decision-making processes are transparent and evident to the public through the provision of information, participatory tools, education, and an open process” (Northumberland County, 2016, p.7). EcoSpark and STORM take this idea one step further and aims to provide people with skills they can use to enact their own change in the future. It states that one of its fundamental objectives is “to give people the tools for education, monitoring, and influencing positive change. Together we create a healthy environment for all” (EcoSpark and Save The Oak Ridges Moraine (STORM) Coalition, 2010, p. 8). Even the few citizen science programs mentioned in the surveyed documents served an educational purpose (Oak Ridges Moraine Land Trust, 2016; 2018). For example, the Oak Ridges Moraine Land Trust stated that “[w]ith your renewed support, we want to host 14 educational workshops and 4 BioBlitz events in 2018!” (Oak Ridges Moraine Land Trust, 2018, p. 2).

6.3.4 *ENGAGEMENT*

The sub-theme within the participation theme that was most frequently reflected in the documents was engagement (City of Vaughan, 2010; City of Vaughan, 2018; Conservation Authorities Moraine Coalition, 2015; County of Dufferin, 2015; County of Northumberland, 2019; County of Peterborough, 2015; Credit Valley Conservation Authority, 2010; Credit Valley Conservation Authority, 2020; Ganaraska Region Conservation Authority, 2018; Kawartha Region Conservation Authority, 2017; Municipality of Port Hope, 2019; Nottawasaga Valley Conservation Authority, 2009; Oak Ridges Moraine Land Trust, 2014; Oak Ridges Moraine Land Trust, 2016; Regional Municipality of Peel, 2018a; Regional Municipality of Peel, 2018b; Regional Municipality York, 2019a; Regional Municipality York 2019b; Toronto and Region Conservation Authority, 2020; Township of Cramahe, 2019). For example, Credit Valley Conservation aims to provide programs and services that “promote community engagement and partnerships allowing CVC to work with municipalities and stakeholders in a cooperative and holistic approach to watershed management” (Credit Valley Conservation, 2010, p. 6). The engagement of civil society is viewed by several as a fundamental motivation by several planning authorities. For example, the Town of Port Hope believes that “civic pride and engagement propels Council to be leaders who are committed to your needs and values” (Municipality of Port Hope, 2019, p. 2). It also recognizes “that community engagement is a key element of Council’s decision-making process” (Municipality of Port Hope, 2019, p. 3). In the civil society domain, the Oak Ridges Moraine Land Trust emphasizes that “the success of a conservation organization isn’t measured just in land protected, but in its ability to engage people who will contribute to the vision of a vibrant, healthy and sustainable ecosystem” (Oak Ridges Moraine Land Trust, 2014, p. 1). The County of Peterborough states a desire to “[c]ontinue to

engage and support our volunteer community” to investigate “opportunities for knowledge transfer and mentoring programs between volunteers and municipal staff” (Peterborough County, 2015, p. 14), indicating that there is interest in engagement as a method to form a meaningful two-way relationship between planning authorities and civil society. The Conservation Authority Moraine Coalition states that its key recommendations to improve conservation on the Moraine are

“to engage all partners to fill monitoring gaps and to fund and employ the full range of tools and best management practices necessary to restore and enhance the environmental health of the Oak Ridges Moraine and adjacent Greenbelt lands” (Conservation Authorities Moraine Coalition, 2015, p. 2).

This indicates that there is a desire to leverage civil society engagement to fill gaps in management processes. The TRCA reinforces this perspective and states a clear commitment “[t]o foster engagement of community members” (Toronto Region Conservation Authority, 2020, p. 7). TRCA has a vision to accomplish this by building “civic capacity by providing the tools and opportunities needed for community members to transition from participants into advocates and leaders” (Toronto Region Conservation Authority, 2020, p. 7). In other words, there is an interest in supporting citizens to empower citizens to become advocates in planning processes.

6.4 SCIENCE

6.4.1 MONITORING

The first sub-theme of the science theme is monitoring, and aims to determine linkages between standardized monitoring in the planning process and community-based monitoring. 23 of the documents surveyed were informative on this sub-theme (Central Lake Ontario

Conservation Authority, 2014; City of Vaughan, 2010; Conservation Authorities Moraine Coalition, 2015; County of Simcoe, 2008; Credit Valley Conservation Authority, 2018; Credit Valley Conservation Authority, 2020; Durham Region, 2020; EcoSpark & Save the Oak Ridges Moraine Coalition, 2010; Ganaraska Region Conservation Authority, 2014; Ganaraska Region Conservation Authority, 2018; Ganaraska Region Conservation Authority, 2018; Kawartha Region Conservation Authority, 2017; Kawartha Region Conservation Authority, 2018; Lower Trent Conservation Authority, 2018; Municipality of Clarington, 2018; Oak Ridges Moraine Land Trust, 2002; Oak Ridges Moraine Land Trust, 2011; Oak Ridges Moraine Land Trust, 2013; Oak Ridges Moraine Land Trust, 2018; Otonabee Region Conservation Authority, 2018; Regional Municipality of Peel, 2018; Regional Municipality York, 2019; Toronto and Region Conservation Authority, 2020). The report card produced for Kawartha region watersheds states an explicit commitment to “[s]upport local initiatives to monitor water quality and quantity” (Kawartha Conservation, 2018). The Ganaraska Region Conservation Authority conceptualizes monitoring as a universal tool that can be used by any party with an interest in environmental conservation, stating that:

“[a]t its core, a monitoring program is designed to assist those with a vested interest in appropriately managing, conserving and protecting local watersheds, natural resources and the environment. In order to assist those individuals, agencies or government bodies, the GRCA is a logical organization to design and implement a local watershed monitoring program. Data collected can be used, analyzed, or reported to a variety of audiences or data users” (Ganaraska Region Conservation Authority, 2014, p. 5)

The Oak Ridges Moraine Land Trust has been conducting small-scale monitoring on individual private properties on the Moraine for almost two decades. In fact, “2002 also marked

the first full year of the ORMLT's stewardship and property monitoring activities" (Oak Ridges Moraine Land Trust, 2002, p. 1). EcoSpark has also been a strong advocate for citizen involvement in monitoring activities by producing numerous resource materials. It states that:

The Monitoring the Moraine (MTM) Project Partners strongly believe in a model of shared responsibility for the Moraine. We recognize the value of local knowledge and the role that citizens must play in preserving our shared environment. In anticipation of the Oak Ridges Moraine Conservation Plan (ORMCP) Review in 2015, we are working to ensure that communities on and downstream of the Moraine are engaged, knowledgeable and mobilized to participate fully in defending and protecting the Oak Ridges Moraine (EcoSpark and Save The Oak Ridges Moraine (STORM) Coalition, 2010, p. 8).

Furthermore, EcoSpark has materialized these values in concrete results and "developed and adapted programs and protocols that support volunteers in collecting local information about the Moraine: Moraine Watch and Check Your Watershed Day" (EcoSpark and Save The Oak Ridges Moraine (STORM) Coalition, 2010, p. 31). Civil society involvement in monitoring activities to supplement standard monitoring practices are warranted because "[d]ata limitations are evident with a lack of sufficient ongoing monitoring coverage in one fifth of subwatersheds and only one year of data in other subwatersheds" (Conservation Authorities Moraine Coalition, 2015, p. 4).

The natural opportunity to create a linkage between citizen engagement, science and planning is reflected in several statements by planning authorities. For example, Otonabee Region Conservation Authority states that "watershed monitoring helps us understand problems, prioritize management actions and track progress" (Otonabee Region, 2018, p. 3). Credit Valley Conservation has a stated goal to "[I]verage monitoring data and tools to make science-based decisions in land use planning" (Credit Valley Conservation, 2020, p. 17).

6.4.2 METHODS

The second sub-theme of the science theme is methods, in order to explore how planning authorities and civil society evaluate specific monitoring methods. Many documents did not elaborate substantially on methods, except to acknowledge the appropriate provincial monitoring methods where they are required (County of Northumberland, 2019; Nottawasaga Valley Conservation Authority, 2009; Regional Municipality of Peel, 2018; Toronto and Region Conservation Authority, 2020). One significant exception is the Ganaraska Region Conservation Authority, which has produced a monitoring report that documents and critically evaluates monitoring methods used by the planning authority. This report adopts a set of *a priori* values against which to evaluate monitoring methods, stating that it aims to

“[c]reate a monitoring program that is flexible and adaptable to emerging issues (e.g., invasive species or climate change) as well as changes in science and technology (e.g., larger monitoring initiatives or new methods” (Ganaraska Conservation, 2018, p. 9)

Furthermore, GRCA uses these values to scope research methods:

“[i]n developing a watershed monitoring program, questions should be posed as to what needs be considered when seeking methods, selecting sites, and identifying indicators and targets” (Ganaraska Conservation, 2018, p. 10)

However, the GRCA also indicates that there is a countervailing force which may act as a barrier to the adoption of citizen science principles in the standard monitoring methods used to inform land-use planning. This barrier is the need for standardized uniform methods, which GRCA relies on to a large extent. For example, the GRCA uses a Water Quality Index in its monitoring by “employing the methodology published by the Canadian Council of Ministers of the Environment (CCME) in 2001 for assessing water quality conditions relative to water quality

objectives” (Ganaraska Conservation, 2018, p. 68). This reliance on standardized methods may be generated by a need for quality assurance. According to the GRCA:

“[q]uality assurance answers the question of: Were the methods used sufficient to gather the data to the accuracy needed? More formally, quality assurance is the maintenance of a desired level of quality in the data, especially by means of attention to every step of the process of collection” (Ganaraska Conservation, 2014, p. 6).

Furthermore, the importance of quality assurance is due to the fact that it “[e]nsures consistency with standards and generally accepted approaches” (Ganaraska Conservation, 2014, p. 6).

Similarly, the Nottawasaga Valley Conservation Authority recommends that “[r]ecognized analytical methods should be utilized” (Nottawasaga Valley Conservation Authority, 2009, p. 34). However, much of the acceptance and recognition sought as a proxy for assuring data quality appears to be conform to the preferred methods of senior government agencies. This is indicated by the reliance on provincially or federally sanctioned standardized methods. For example, many of the data collection methods used by GRCA are conducted “[a]ccording to the MOE protocol” and the GRCA directs readers to “[p]lease refer to Ministry of the Environment, 2010 for details” (Ganaraska Conservation, 2014, p. 43). Thus, it may be the case that narrow provincial monitoring standards act as a barrier to civil society involvement through citizen science.

6.4.3 DATA

The next sub-theme in the science theme is data collection, which aims to explore how information gathered through monitoring is documented, archived, shared, communicated and applied. This step of the scientific process is paramount because it forms the epistemic basis of land-use policy decisions. A systemic limitation of the current monitoring regime is the

unavailability of data. For example, the Conservation Authority Moraine Coalition notes that “one fifth of subwatersheds had insufficient or inconclusive monitoring data available to grade them” and that “[d]ata limitations are evident with a lack of sufficient ongoing monitoring coverage in one fifth of subwatersheds and only one year of data in other subwatersheds” (Conservation Authorities Moraine Coalition, 2015, p. 5). Similarly, one of the top priorities of Kawartha Region Conservation is to “[i]dentify and address science and information data gaps” (Kawartha Conservation, 2017, p. 10). Furthermore, GRCA acknowledges that in its monitoring network, “data gaps exist due to the limited spatial and temporal coverage” and that

“Without continued longterm financial support, adequate staff capacity, and the ability to improve equipment and software, the required data (current conditions and trends), and holistic understanding needed to run the many GRCA programs and ultimately deliver meaningful watershed conservation will falter” (Ganaraska Region, 2014, p. 39).

This limitation poses a significant challenge to land-use planning because many planning authorities aim to “[l]everage monitoring data and tools to make science-based decisions in land use planning and restoration” (Credit Valley Conservation, 2020, p. 17).

In order to reduce these gaps, some Moraine authorities supplement standardized monitoring with civil society involvement. For example, the Conservation Authorities Moraine Coalition notes that some Conservation Authorities with limited data have been “able to supplement their data with additional field work in 2013 with funding from the Friends of the Greenbelt Foundation” (Conservation Authorities Moraine Coalition, 2015, p. 5). Other authorities involve civil society out of a desire for transparency. For example, York Region plans to “[c]ontinue to implement Open Data platform to support maintaining an open and transparent government.” (The Regional Municipality of York, 2019, p. 14). Dufferin County shares this

goal and aims to “[i]ntroduce open government initiatives, ie. Open Data” (Dufferin County, 2015, p. 15). There is indication that these goals to engage civil society further with scientific data are supported by citizen science. For example, the Oak Ridges Moraine Land Trust states that its “BioBlitzes are engaging and inspiring, and also allow us to collect valuable data to help us monitor and track species and ecosystem adaptations due to climate change” (Oak Ridges Moraine Land Trust, 2014, p. 2).

6.4.4 CITIZEN SCIENCE

The fourth sub-theme of the science theme is citizen science. This theme aims to explore the extent of citizen science activity on the Moraine and determine any potential linkages to land-use planning. In general, citizen science activities mentioned in the documents analyzed were conducted primarily for educational purposes and aim to inspire individuals to become more involved with civil society organizations to protect the moraine (Kawartha Region Conservation Authority, 2017; Oak Ridges Moraine Land Trust, 2016). For example, the Oak Ridges Moraine Land Trust conducts BioBlitzes, which are a form of citizen science that involve documenting specific species observed within a set period of time in a specific location. The Land Trust provides the following report on these activities conducted in 2017 to its volunteers:

“You helped us ‘bioblitz’ 3 properties this year, recording and tracking every single species we saw—birds, insects, amphibians, plants—oh my! Together, we identified over 730 species— almost 400 of which were not yet known to us! We found species at risk including Monarch, Bobolink, and even found the Eastern Wood-Pewee on all 3 properties! We also assess plant species along the edges of water bodies, as well as look for aquatic invertebrates like insects and worms. Our BioBlitzes are engaging and inspiring, and also allow us to collect valuable data to help us monitor and track species

and ecosystem adaptations due to climate change” (Oak Ridges Moraine Land Trust, 2014, p. 2).

The Oak Ridges Moraine Land Trust explicitly acknowledges that its “community bioblitzes were designed to connect people to citizen science” and aims to increase these activities by “engaging more local people with citizen science activities like the BioBlitzes” (Oak Ridges Moraine Land Trust, 2016, p. 3). Kawartha Conservation is the only planning authority that explicitly acknowledges and supports citizen science. It set a strategic goal to “[d]evelop and implement a citizen science program to increase knowledge” (Kawartha Conservation, 2017, p. 10).

7: CONCLUSIONS

The limited coverage of citizen science and community-based monitoring in the documents analyzed reflects the fact that this is an emerging idea in the planning domain. Similarly, the limited identification of historic civil society advocacy on the Oak Ridges Moraine may be explained by the fact that the Moraine regime is currently in a transition phase from grassroots advocacy to governance (McCarthy et al., 2014). Nevertheless, several themes corroborate findings identified in the literature. For example, scientists may be a barrier to the uptake of citizen science through the insistence on standardized methods without considering viable citizen science methods (Burgess et al., 2017). As the typology of community-based monitoring developed by Whitelaw et al. predicts, advocacy appears to be less commonplace than collaboration (Whitelaw et al., 2003). Although planning authorities recognize collaboration as a virtue, top-down technocratic standards remain quite prevalent, indicating the rational-comprehensive method still has significant impact on planning processes. However, there is indication that planning authorities are interested in working with an active civil society

(Central Lake Ontario Conservation Authority, 2014; City of Vaughan, 2010; Credit Valley Conservation Authority, 2020; Dufferin County, 2015; Ganaraska Region Conservation Authority, 2018; Kawartha Conservation, 2017; Kawartha Conservation, 2018; Municipality of Port Hope, 2019; Northumberland County, 2019; Region of Peel, 2018; Region of York, 2019; Simcoe County, 2008; Toronto Region Conservation Authority, 2020). Indeed, there is indication that the efforts of civil society are beginning to be recognized as a method to fill data gaps. Notwithstanding the interest in this potential, conceptualizations of civil society remain relatively unsophisticated. Rather than recognizing the heterogeneity of civil society, many planning authorities use low-resolution terminology such as ‘the public’ or ‘the community’. Thinking of civil society in these terms lends itself to engaging with individuals and civil society groups in a manner that assumes their general lack of interest and expertise in the planning process or the science that informs planning decisions. Such a framing conceals the fact that civil society is also composed of scientific experts, many of whom volunteer their knowledge and expertise to collective environmental action. A more sophisticated framing of civil society may reveal potential for mutual knowledge transfer to improve local scientific research and land-use planning, and may act as the starting point for an expanded model of public participation more generally beyond environmental movements.

Planning authorities may continue to pursue and leverage partnerships with existing civil society organizations to this end, but may also consider initiating local programs to train individual citizens in scientific monitoring methods (Dean et al., 2018; Newman et al., 2020). Barriers to the routine implementation of such programs remain, such as the availability of predictable and consistent funding (Colston et al., 2015; Burgess et al., 2017; McKinley et al., 2017). Standard citizen science methods to answer common research questions would need to be

developed. Citizen science databases would need to be developed and maintained in order to facilitate this knowledge transfer. Adhering to open data principles would not only provide transparency in land-use planning decisions, but also give acknowledgement to the volunteer efforts that co-produced such knowledge (Eitzel et al., 2018). Government involvement might be required in such efforts to champion alternative research methods. There may be some opportunity for advocacy both from civil society and also from local planning authorities in order to set an agenda to promote citizen science research at the Provincial and Federal level. Perhaps citizen science will provide straightforward contributions to science and land-use planning; perhaps it will yet lead to unexpected outcomes that problematize our understanding of civil society, science and planning. What remains certain is that radical, hyper-novel problems will continue to emerge at an increasing rate in the near future. In order to respond to such problems, imaginative solutions are required that pool the talents of all minds willing to contribute. Furthermore, trends in recent scholarship reflect that a renewed focus on equity and inclusion will be necessary to build the capacity necessary for everyone to contribute meaningfully. Moreover, such solutions will hopefully disrupt conventional patterns of governance and will require a renewed focus on professional ethics— and in particular the ethics of citizen participation (Boonstra & Boelens, 2011).

8: APPENDIX

8.1 DOCUMENT ANALYSIS SUMMARY TABLES

8.1.1 PLANNING

Consultation

County of Dufferin	<i>Dufferin County Official Plan 2017</i>	the County will use a variety of techniques to encourage the participation of the public when changes to this Plan are being considered. Subject to the requirements of the Planning Act, the County may establish the public consultation program it feels will best deal with the matters before it.
Lake Simcoe Region Conservation Authority	<i>Lake Simcoe Region Conservation Authority Guidelines for the Implementation of Ontario Regulation 179/06, 2014</i>	<p>The LSRCA has undertaken a comprehensive public consultation process associated with the development of this document which was comprised of multiple posting the draft guidelines on the LSRCA website, public open houses, municipal consultation, notices in watershed newspapers and municipal offices as well as a special meeting of the LSRCA Board of Directors.</p> <p>These guidelines will be subject to a comprehensive review on a five year basis to evaluate its effectiveness and fairness. This review will involve public consultation.</p>
Regional Municipality of Peel	<i>Region of Peel Official Plan 2018</i>	<p>Public involvement is a vital part of the planning process and decision making. Effective public consultation enables people to influence decisions about planning issues that affect the place in which they live and work. Regional Council recognizes its responsibility to inform the residents and respond to their concerns.</p> <p>Investigate more effective ways to consult with the public on planning matters.</p> <p>Work jointly with the area municipalities and other relevant agencies to prepare guidelines and/or protocols regarding public consultation on Regional initiatives.</p>

Collaboration

Kawartha Region Conservation Authority	<i>2017-2021 Strategic Plan</i>	Enhance engagement, collaboration and knowledge sharing with our First Nation communities.
Township of Cramahe	<i>Strategic Plan 2019-2022</i>	<p>The work of the Township of Cramahe is guided by principles of:</p> <ul style="list-style-type: none"> • Accountability and Professional Integrity • Collaboration • Transparency and Honesty • Fiscal Responsibility • Respect
Ganaraska Region Conservation Authority	<i>Ganaraska Region Monitoring Report 2018</i>	Findings of this report may help to combine efforts for other adaptation measures to ensure compatibility and increase strategic planning with respect to robust resilient water management. Collaboration with municipalities, provincial agencies, academic researchers and other stakeholders would be seamless and of great mutual benefit.

Lower Trent Conservation Authority	<i>Lower Trent Region Conservation Authority Plan Review Manual 2019</i>	LTC recognizes the importance of communication with our municipal partners, developers, and the general public. We encourage and value collaboration and consultation opportunities when dealing with higher level land use planning matters and site-specific development applications, in the face of a changing policy regime as may be applicable from time to time.
Regional Municipality of Durham	<i>Durham Region Strategic Plan 2020-2024</i>	Service Excellence: We encourage professional excellence through collaboration, partnerships and teamwork in a culture that fosters trust and respect. Mission: Working together to deliver service excellence through leadership, collaboration, innovation and environmental stewardship.
		to promote informed stewardship in vulnerable areas in collaboration with the Province, area Municipalities and local Conservation Authorities. The County, in collaboration with the Province, the Conservation Authority, and local Municipalities, will promote good stewardship practices for lands and water within vulnerable areas.
Regional Municipality York	<i>The Regional Municipality of York Official Plan 2019</i>	This Official Plan represents York Region’s ongoing collaboration with its partners and stakeholders to rethink the way communities are designed, serviced and supported. For all development in York Region, the Region will continue to work with local municipalities, the development industry and other stakeholders to ensure: · a comprehensive, integrated and collaborative planning process; Identify specific short-term achievable actions that contribute towards a sustainability legacy · Set targets, monitor and report progress · Foster partnerships and public engagement · Create a spirit of stewardship, shared responsibility and collaboration · Raise the level of sustainability awareness through education, dialogue and reassessment · Promote sustainable lifestyles and re-evaluation of our consumption and expectations
County of Northumberland	<i>Northumberland County 2019-2023 Strategic Plan</i>	Council recognizes that partnership with staff, community groups, other levels of government and residents will be essential to moving the stated objectives herein from aspirations to accomplishments, ultimately delivering value to the community. We look forward to this ongoing collaboration to address identified priorities and to shape tomorrow’s Northumberland. Mission: To be a best practices leader of County government, and a collaborative partner with our member municipalities and community partners.

		<p>The County has a set of values—shared beliefs—that guide us toward our ultimate goals and unite us along the way. In all of our actions and decision-making, we reference these values:</p> <ul style="list-style-type: none"> • Accountability • Care and support • Collaboration and communication • Honesty and integrity • Innovation and excellence • Mutual trust and respect <p>Provide leadership and partner in the development of an overall health strategy for Northumberland, including:</p> <ul style="list-style-type: none"> • Participation in an Ontario Health Team proposal • Collaboration with partners on new and innovative approaches to the delivery of emergency services <ul style="list-style-type: none"> • Reinforce collaboration • Explore opportunities for additional voluntary shared services
<p>EcoSpark Save the Oak Ridges Moraine Coalition</p>	<p><i>Citizens’ Guide to the Oak Ridges Moraine</i></p>	<p>The Monitoring the Moraine Project is a collaboration between EcoSpark (formerly Citizens’ Environment Watch) and Save The Oak Ridges Moraine (STORM) Coalition.</p> <p>In response to the need for a comprehensive and collaborative policy, planning, and management approach for protecting the Oak Ridges Moraine, the Conservation Authorities Moraine Coalition (CAMC) was formed in 2000</p> <p>The Caring for the Moraine Project is a collaborative project that has delivered the support of 30 conservation and environmental organizations to more than 80,000 landowners on the Oak Ridges Moraine. The project aims to protect the sensitive environmental features of the Moraine by providing landowners with free property visits, technical advice, workshops, resource material and financial assistance. Engaging with landowners is particularly relevant and important to the protection of the Oak Ridges Moraine because more than 90% of the Moraine is privately owned.</p> <p>The Caring for the Moraine project is an excellent example of a successful, wide-ranging collaborative effort to protect the Moraine. The next section will discuss some opportunities for volunteer oriented projects on the Oak Ridges Moraine.</p> <p>Check Your Watershed Day is coordinated by EcoSpark in collaboration with multiple agencies and volunteers including the Ministry of Natural Resources, conservation authorities, other ENGOs, and community groups. Since 2006, we have worked with 390 volunteers to check 1529 sites, covering 11 watersheds (2539 square kilometers).</p> <p>We are uniquely positioned to work with Moraine stakeholders towards a meaningful ORMCP Review. The MTM Project Partners have a specialized ability to easily engage with multiple Moraine stakeholders (community groups, the general public, technical scientific audiences, municipalities, conservation authorities, and other Moraine-based ENGOs). We have</p>

		<p>developed our project in collaboration with many of these stakeholders.</p> <p>The project is a collaboration between EcoSpark and STORM Coalition.</p>
County of Dufferin	<i>Dufferin County Corporate Strategic Plan 2015-2018</i>	<p>The Corporation of the County of Dufferin delivers relevant, high quality services in collaboration with the community through innovative leadership, inclusive governance, effective resource management and ongoing evaluation.</p> <p>We believe in fostering an environment of collaboration that contributes to informed and thoughtful decisions that are reflective of the needs of those affected.</p> <p>Regular, two-way conversations encourage collaboration and innovation</p>
County of Peterborough	<i>Strategic Plan 2015-2019</i>	<p>Regionally collaborative projects, such as the Climate Change Action Plan of Sustainable Peterborough are viewed as innovative by our funding partners and provide a greater opportunity to work together towards common issues and goals. We see a great opportunity to continue to leverage partnerships at every level to achieve our goals.</p> <p>Our Key Principles Accountability: We will provide good governance, transparency and accountability. Commitment: We will be engaged, responsive and courteous. Value for Money: We will ensure service delivery is efficient, effective and economical. We will seek to continuously improve by applying best practices to all services. Collaboration: We will take a team approach to resolving issues, working in partnership within and outside the organization.</p>
Credit Valley Conservation Authority	<i>Our Future Taking Shape: Strategic Plan 2020-2022</i>	<p>Collaboration: We work together and with our volunteers, partners and the community to achieve shared goals.</p> <p>Success can be attributed to the efforts of staff joining forces across departments and with multiple stakeholders. It exemplifies our organizational value of collaboration: To work together and with our volunteers, partners and the community to achieve shared goals.</p> <p>Use collaboration tools that enable multi-disciplinary and cross-departmental teams to deliver integrated projects and programs efficiently and effectively.</p> <p>Work with other conservation authorities, watershed municipalities, government agencies and local environmental organizations to collaborate on similar programs and business areas to maximize efficiency of service delivery.</p>
Toronto and Region Conservation Authority	<i>Conservation Matters 2020 Annual Report</i>	<p>TRCA is thankful to partner municipalities, in addition to our vast network of residents, businesses, professional associations, not-for-profit organizations and other stakeholders throughout our jurisdiction for their unwavering encouragement and support of our actions and our collaborative approach.</p>

		<p>Increase collaboration with senior levels of government, academic institutions, private sector and not-for-profit stakeholders to develop leading-edge sustainability knowledge.</p> <p>Undertake pilot collaborations with industry, academic institutions and partners to determine and demonstrate which TRCA data are most useful in supporting sustainable practices, and how best to provide access to that data to achieve more sustainable development.</p> <p>To achieve shared goals of a green, sustainable, prosperous region, TRCA must build on its history of bringing stakeholders together from across watersheds in the jurisdiction to ensure regional-scale cross boundary collaboration on today’s challenges.</p> <p>TRCA staff continue to collaborate with our municipal partners and other conservation authorities to develop and refine Water Resource System mapping data layers such as wetlands and streams and other groundwater and surface water features and areas to support Municipal Comprehensive Reviews.</p> <p>TRCA has been a value-added collaborator throughout the three-year Provincial consultation process regarding the modernization of the CA Act.</p> <p>Conserve and restore natural resources and develop resilient communities through education, the application of science, community engagement, service excellence and collaboration with our partners.</p>
<p>Regional Municipality of Peel</p>	<p><i>Region of Peel Official Plan 2018</i></p>	<p>Encourage the area municipalities in collaboration with the conservation authorities to comprehensively review areas of existing development that are flood vulnerable and to evaluate and implement flood remediation measures to decrease the level of risk as appropriate.</p> <p>The Region of Peel is committed to collaborating and working with key stakeholders, such as the area municipalities, senior levels of government, the building and development industry, service and support agencies, housing providers, and community organizations</p> <p>Collaborate with the area municipalities and other stakeholders such as the conservation authorities, the building and development industry, and landowners to encourage new residential development, redevelopment and intensification in support of Regional and area municipal official plan policies promoting compact forms of development and residential intensification.</p> <p>Identify and promote, in collaboration with the area municipalities, energy and water efficient technologies in new residential development, redevelopment, and intensification to the development industry.</p>

		<p>Identify actions based on a broad collaborative approach with stakeholders and encourage all levels of government to address and remove barriers through various means, including public education strategies.</p> <p>Work collaboratively with the area municipalities, conservation authorities, neighbouring municipalities, other government agencies, stakeholders and the public to review the Region's natural heritage systems policy framework; identify policy gaps; and develop a Regional Greenlands Strategy outlining tools, actions and resources to address future natural heritage systems planning needs in the region, including:</p> <p>Collaborate and develop, with the area municipalities, conservation authorities, the Province, other government agencies, and the community, appropriate indicators to analyze the effectiveness of this Plan and to serve as a basis for any policy adjustments which results from this analysis.</p>
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Advocacy

Credit Valley Conservation Authority	<i>Credit Valley Conservation Watershed Planning and Regulation Policies 2010</i>	In this regard, CVC advocates for an integrated and comprehensive approach to planning and managing natural hazards and natural resources, features, areas and systems, including their functions, consistent with direction provided by the PPS.
Oak Ridges Moraine Land Trust	<i>The Official Newsletter of the Oak Ridges Moraine Land Trust Fall 2013</i>	Charitable organizations like the Trust have limited ability to lobby and advocate. Individuals are much better positioned to contact governing authorities.
Credit Valley Conservation Authority	<i>Our Future Taking Shape: Strategic Plan 2020-2022</i>	Engage and coordinate a committed volunteer base that advocates for and builds a healthier environment, including building innovative volunteer management tools and processes.
Toronto and Region Conservation Authority	<i>Planning and Development Procedural Manual 2008</i>	Through the watershed planning process, TRCA obtains a broad understanding of ecosystem function and status, and advocates that management recommendations be implemented at an early stage in the planning process.
County of Dufferin	<i>Dufferin County Corporate Strategic Plan 2015-2018</i>	Provide a strong voice for advocating to the province
Toronto and Region Conservation Authority	<i>Conservation Matters 2020 Annual Report</i>	To foster engagement of community members, TRCA needs to build civic capacity by providing the tools and opportunities needed for community members to transition from participants into advocates and leaders.
County of Northumberland	<i>Northumberland County 2019-2023 Strategic Plan</i>	Strengthen capacity to advocate for Northumberland and promote awareness of specific issues facing the community

Regional Municipality of Peel	<i>Region of Peel Official Plan 2018</i>	<p>Advocate to the Province to explicitly provide municipalities the authority to use inclusionary zoning as a tool to require affordable housing.</p> <p>Promote and advocate for sustained Federal, Provincial, and Municipal incentives and programs that improve energy efficiency and design for housing to Peel residents.</p> <p>Advocate to the Federal and Provincial government to provide economic incentives and funding for housing projects that have implemented minimum green and sustainable building guidelines to help mitigate the effects of any added financial costs brought by such initiatives.</p>
Regional Municipality York	<i>The Regional Municipality of York Official Plan 2019</i>	<p>To advocate for adequate funding of human services from senior levels of government to meet the needs of York Region’s residents.</p> <p>To advocate the Province and Federal government to: a. commit to integrated and sustainable provincial and national housing strategies; b. provide long term, stable and flexible funding for the provision and maintenance of affordable housing; and, c. reinstate programs to support and promote the development of affordable housing options such as co-operative housing projects and rental housing developments.</p> <p>To advocate the Province and Federal government to examine a new funding formula for expanding Regional funding sources to accommodate growth.</p> <p>In addition to achievable near-term waste diversion targets, the Region will advocate for waste prevention at source, consistent with the principles of the zero waste ideal.</p>

8.1.2 CIVIL SOCIETY

Stakeholders

Regional Municipality York	<i>2019 to 2023 Strategic Plan</i>	Develop partnerships with stakeholders to leverage resources and extend program reach.
County of Northumberland	<i>Northumberland County Official Plan 2016</i>	Challenge stakeholders to provide new and better solutions.
Lake Simcoe Region Conservation Authority	<i>Lake Simcoe Region Conservation Authority Guidelines for the Implementation of Ontario Regulation 179/06, 2014</i>	This document will be posted on the LSRCA’s website (www.lsrca.on.ca) to serve as a source of information for landowners, developers, municipalities, real estate agents and other stakeholders.

Municipality of Port Hope	<i>Port Hope Strategic Plan 2019-2022</i>	<p>As such, this Strategic Plan is focused on the Municipality's priorities over the next several years, but it builds off of Port Hope's experience and expertise by directly engaging and consulting with the community, Municipal Council, interested stakeholders and Municipal Staff.</p> <p>The document serves as a reference point to help inform and guide Port Hope Council, Staff and the community. Its success will be dependent upon the extent to which it is supported and implemented by community stakeholders.</p>
Kawartha Region Conservation Authority	<i>2017-2021 Strategic Plan</i>	<p>To create a relevant plan, we have engaged dozens of stakeholders, municipal leaders, agency representatives, and other community leaders in our process.</p> <p>Maintain and create relationships with community groups, government organizations, stakeholders and the agricultural and other industry sectors to better understand their interests, concerns and opportunities.</p>
Central Lake Ontario Conservation Authority	<i>Policy and Procedural Document For Regulation and Plan Review 2014</i>	The purpose of the Oak Ridges Moraine Conservation Plan (2002) is to provide 'land use and resource planning direction to a multitude of agencies and stakeholders, on how to protect the Moraine's hydrological and ecological features and functions'.
County of Peterborough	<i>Strategic Plan 2015-2019</i>	Develop an internal and external Communications Strategy that provides direction for effective communication between County management and staff, residents, stakeholders and partners. This strategy should utilize a wide array of outreach tools including social media, e-newsletters and interactive webbased formats and proactive County services campaign.
Toronto and Region Conservation Authority	<i>Planning and Development Procedural Manual 2008</i>	TRCA works with municipalities and public stakeholders to ensure that our watershed ecosystems become an important component of Official Plan policies, development plans, and projects.
City of Vaughan	<i>City of Vaughan Official Plan 2010</i>	<p>A visionary plan that could be supported across the City required extensive input from the public and key stakeholders. In order to gather such input, a new and visionary approach to public consultation was implemented. The innovative approach to consultation, taken under Council direction and described below, garnered Vaughan a 2009 Award for Excellence in Communications and Public Education from the Ontario Professional Planners Institute.</p> <p>As detailed analyses were prepared, two comprehensive open houses were held to inform the public and stakeholders of key issues and areas of discussion. At these events, representatives of all supporting studies related to the preparation of the Official Plan were on hand to share findings and solicit feedback.</p>
County of Simcoe	<i>Strategic Plan 2015-2025</i>	<p>Strategic planning systematically addresses the County's purpose, internal and external environment, value to stakeholders, plans for action and long term financial planning</p> <p>By looking ahead and asking our stakeholders what they need, we establish a vision for what level of service we will provide, along with an understanding of what resources will be necessary to provide them.</p>

		<p>Create and strengthen partnerships with key stakeholders to support communities through the delivery of sustainable services.</p>
Regional Municipality of Durham	<i>Durham Regional Official Plan</i>	<p>The Region, in cooperation with the Province and other stakeholders, shall participate in the development and administration of effective and accessible data management systems for the Oak Ridges Moraine's natural heritage, groundwater, surface water and land use information.</p> <p>The Region, in cooperation with the Province and other stakeholders, shall participate in the development of a series of indicators to monitor the longterm health of the Moraine and to assist in public education.</p> <p>The Region shall support the Province, in consultation with the area municipalities and other stakeholders, in the preparation of guidelines that assist in implementing the Oak Ridges Moraine Conservation Plan.</p>
Municipality of Clarington	<i>Municipality of Clarington Official Plan 2018</i>	<p>The Municipality will implement a Green Development Program. The Green Development Program will:</p> <p>a) Be developed in consultation with the public and key stakeholders</p>
Credit Valley Conservation Authority	<i>Our Future Taking Shape: Strategic Plan 2020-2022</i>	<p>Success can be attributed to the efforts of staff joining forces across departments and with multiple stakeholders. It exemplifies our organizational value of collaboration: To work together and with our volunteers, partners and the community to achieve shared goals.</p> <p>Lead or participate in joint research and knowledge transfer with our municipal and conservation authority partners, academia and other public and private sector stakeholders.</p> <p>Customer service and financial measures of success demonstrate our commitment to being a resilient and service-driven organization that meets the needs of our customers and stakeholders.</p>
County of Dufferin	<i>Dufferin County Corporate Strategic Plan 2015-2018</i>	<p>Feedback on the draft plan was sought from local Councillors at a joint meeting of all Councils and from the public and stakeholder groups via an online survey.</p> <p>Community plans are intended to have impact beyond the County organization and require participation and buy-in from stakeholder and community groups, local municipalities, and residents.</p> <p>Balancing the needs of many stakeholders means being considerate of different perspectives, effectively managing resources, and communicating the process and the results.</p>
Ganaraska Region Conservation Authority	<i>Ganaraska Region Monitoring Report 2018</i>	<p>Provide technically sound information to municipalities, governments, agencies, stakeholders, and the public.</p> <p>Collaboration with municipalities, provincial agencies, academic researchers and other stakeholders would be seamless and of great mutual benefit.</p>

<p>Nottawasaga Valley Conservation Authority</p>	<p><i>Nottawasaga Valley Conservation Authority Planning and Regulation Guidelines 2009</i></p>	<p>This information helps guide municipalities, landowners and watershed stakeholders in the land use planning and permitting processes.</p> <p>The propose of the Oak Ridges Moraine Conservation Plan is to provide land use and resource management planning direction to provincial ministries and agencies and other stakeholders on how to protect the Moraine’s ecological and hydrological features and functions.</p> <p>ESA will be defined by the Nottawasaga Valley Conservation Authority and other stakeholders through a public consultative process.</p>
<p>Credit Valley Conservation Authority</p>	<p><i>Credit Valley Conservation Watershed Planning and Regulation Policies 2010</i></p>	<p>To provide clearer and more consistent direction to CVC staff, partners and stakeholders recognizing the interdisciplinary nature of watershed planning, natural hazard management and the multitude of factors to be considered.</p> <p>This document promotes a natural heritage systems approach to watershed planning for CVC’s partnering agencies to build from; it provides guidance and direction for CVC staff when considering planning and development related matters; it provides a clear and consistent framework for applicants when preparing development proposals; and it clearly outlines CVC’s policy framework for stakeholders and the general public who have an interest in protecting, restoring and enhancing the watersheds within CVC’s jurisdiction.</p> <p>These programs and services promote community engagement and partnerships allowing CVC to work with municipalities and stakeholders in a cooperative and holistic approach to watershed management.</p> <p>In this regard, watershed plans are typically developed cooperatively by government agencies and stakeholders as a guide for managing planning related activities that may affect natural heritage systems and their functions.</p>
<p>Ganaraska Region Conservation Authority</p>	<p><i>Ganaraska Region Watershed Monitoring Plan: towards an integrated approach 2014</i></p>	<p>Along with monitoring and research, reporting of results to the public, partners, municipalities and stakeholders is an important step in ensuring planning tools are being implemented and positive changes are occurring.</p> <p>The intended audience of the Ganaraska Region Watershed Monitoring Program: towards and integrated approach document includes GRCA staff, GRCA Full Authority Board Members, municipalities and stakeholders involved in water resource management.</p> <p>Provide technically sound information to municipalities, governments, agencies/stakeholders and the public.</p> <p>Generally, the intended audience for the reporting format includes municipalities, the public, Conservation Ontario, and partners/stakeholders. In addition, the GRCA provides raw data to many stakeholders for their own use (e.g., municipalities, academia, and consultants).</p>

<p>EcoSpark</p> <p>Save the Oak Ridges Moraine Coalition</p>	<p><i>Citizens' Guide to the Oak Ridges Moraine</i></p>	<p>Our project objectives are:</p> <ul style="list-style-type: none"> • To increase awareness and understanding of the Oak Ridges Moraine • To work with stakeholders to gather relevant information about the Oak Ridges Moraine • To work towards a process where all Moraine stakeholders take responsibility in its safekeeping <p>Part of this preparation is outlined in the “Performance Indicators and Monitoring” section within the Implementation part of the ORMCP. It states that the Ontario Government shall:</p> <ul style="list-style-type: none"> • In consultation with municipalities, identify performance indicators to monitor the Plan’s effectiveness • In partnership with appropriate stakeholders, establish a monitoring network to collect, summarize and evaluate performance indicator data <p>We are uniquely positioned to work with Moraine stakeholders towards a meaningful ORMCP Review. The MTM Project Partners have a specialized ability to easily engage with multiple Moraine stakeholders (community groups, the general public, technical scientific audiences, municipalities, conservation authorities, and other Moraine-based ENGOs). We have developed our project in collaboration with many of these stakeholders.</p>
<p>Toronto and Region Conservation Authority</p>	<p><i>Conservation Matters 2020 Annual Report</i></p>	<p>TRCA is thankful to partner municipalities, in addition to our vast network of residents, businesses, professional associations, not-for-profit organizations and other stakeholders throughout our jurisdiction for their unwavering encouragement and support of our actions and our collaborative approach. The outpouring of support last year demonstrated that the people of Ontario understand the important impact of our conservation initiatives. It is in this spirit of togetherness that TRCA will continue to work with our partners and stakeholders to promote responsible development that will protect our important greenspaces, watersheds, and the Lake Ontario shoreline as we work together to build more sustainable and resilient communities.</p> <p>Through our partnerships, award winning programs and projects such as the Meadoway, the Sustainable Neighbourhood Action Program, Monarch Nation and others, TRCA remains at the forefront of change in applying our science based approach and best practices to protect and restore natural systems and to reduce our ecological impact. With the support of our partners and stakeholders, we look forward to continuing to demonstrate how TRCA’s important work matters in protecting our communities and our shared natural environment.</p> <p>Provide increased engagement opportunities for stakeholders of all ages that build environmental, sustainability and climate awareness and promote leadership within communities including training and capacity building.</p> <p>Increase collaboration with senior levels of government, academic institutions, private sector and not-for-profit stakeholders to develop leading-edge sustainability knowledge.</p>

		<p>Produce updated Watershed and Living City Report Cards on a regular basis and support community-led reporting to ensure stakeholders and community members understand the environmental health of TRCA watersheds.</p>
<p>Regional Municipality York</p>	<p><i>The Regional Municipality of York Official Plan 2019</i></p>	<p>This Official Plan represents York Region’s ongoing collaboration with its partners and stakeholders to rethink the way communities are designed, serviced and supported.</p> <p>To increase public awareness, foster stewardship and the understanding of watershed health and protection in partnership with local municipalities, conservation authorities and other stakeholders.</p> <p>To establish greenhouse gas reduction targets for York Region in partnership with community stakeholders and local municipalities.</p> <p>To work with local municipalities, agencies and stakeholders on the development and implementation of clean air initiatives.</p> <p>To work with other levels of government, agencies, and stakeholders to identify the links between climate change, community planning and public health.</p> <p>To work with other levels of government, agencies and stakeholders to develop climate change adaptation measures that address such issues as urban heat island effect, infrastructure resiliency, emergency preparedness, vector-borne diseases, and extremeweather event responses.</p> <p>To work with local municipalities, adjacent Regions, the Province and stakeholders in implementing the Oak Ridges Moraine Conservation Plan.</p> <p>To continuously engage and partner with communities, stakeholders and other levels of government.</p> <p>To provide sufficient information about amendment applications and engage the public using methods including public meetings, information centres, open houses, stakeholder workshops, newspaper, radio and television advertising, e-mail, internet, telephone and written correspondence.</p> <p>To develop an effective and publicly accessible data management system for natural heritage and water systems within the areas of the Oak Ridges Moraine Conservation Plan, the Greenbelt Plan and the Lake Simcoe Protection Plan in partnership with the Province and other stakeholders.</p> <p>To work with communities, agencies, local municipalities and the Province to better co-ordinate the planning review process by such measures as engaging stakeholders early in the process, eliminating duplication, co-ordinating reviews, simplifying procedures and resolving conflicts.</p>

Regional Municipality of Peel	<i>Region of Peel Official Plan 2018</i>	<p>The Region of Peel is committed to collaborating and working with key stakeholders, such as the area municipalities, senior levels of government, the building and development industry, service and support agencies, housing providers, and community organizations to provide for an appropriate range of housing types, sizes, densities and tenures; and, to achieve a supply of affordable, accessible, adequate and appropriate housing to meet the existing and projected requirements of current and future residents</p> <p>Collaborate with the area municipalities and other stakeholders such as the conservation authorities, the building and development industry, and landowners to encourage new residential development, redevelopment and intensification in support of Regional and area municipal official plan policies promoting compact forms of development and residential intensification.</p> <p>Encourage and facilitate the development of partnerships among housing providers, service providers, community organizations and other stakeholders to provide special needs housing and related services.</p> <p>Encourage and facilitate the involvement of service providers, community organizations and stakeholders to address identified issues related to housing barriers.</p>
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Community

Kawartha Region Conservation Authority	<i>2017-2021 Strategic Plan</i>	Maintain and create relationships with community groups, government organizations, stakeholders and the agricultural and other industry sectors to better understand their interests, concerns and opportunities
Credit Valley Conservation Authority	<i>Our Future Taking Shape: Strategic Plan 2020-2022</i>	An alliance of environmental and community organizations that work together to achieve shared goals.
County of Dufferin	<i>Dufferin County Corporate Strategic Plan 2015-2018</i>	Moving forward Council may wish to engage in a broad-based Community Strategic planning exercise that looks to a future view of the County as a region not just as a corporation. Community plans are intended to have impact beyond the County organization and require participation and buy-in from stakeholder and community groups, local municipalities, and residents. Ideally, a community strategic plan would link plans and initiatives from all Dufferin municipalities and community organizations.
<i>The Regional Municipality of York Official Plan 2019</i>	Regional Municipality York	<p>York Region’s Greening Strategy The Regional Greening Strategy has had a number of successes between 2001 and 2008 including:</p> <ul style="list-style-type: none"> · Over 750,000 trees and shrubs planted with annual planting numbers ranging from 50,000 to 100,000 trees and shrubs · Environmental education provided to over 10,000 participants, with approximately 1,000 participating every year · Partnerships with over 50 government and non-government organizations, stakeholders and community groups

		<p>· Public programs and stewardship initiatives, which include support for private rural reforestation projects, urban private-yard tree planting, community engagement, and more.</p>
EcoSpark Save the Oak Ridges Moraine Coalition	<i>Citizens' Guide to the Oak Ridges Moraine</i>	<p>the ORMCP, like any policy or regulation, is only as strong as the will of people to implement it. The future of the Moraine rests not solely with provincial or municipal governments but also with residents, community groups, environmental movement organizations and the private sector.</p> <p>Check Your Watershed Day is coordinated by EcoSpark in collaboration with multiple agencies and volunteers including the Ministry of Natural Resources, conservation authorities, other ENGOs, and community groups. Since 2006, we have worked with 390 volunteers to check 1529 sites, covering 11 watersheds.</p>
County of Dufferin	<i>Dufferin County Official Plan 2017</i>	The County and local municipalities will contribute to and promote a culture of water conservation among all public, private, and community groups and local citizens and aim to encourage the efficient and sustainable use and protection of water resources.

Citizens

Central Lake Ontario Conservation Authority	<i>Policy and Procedural Document For Regulation and Plan Review 2014</i>	The Planning Act sets out the ground rules for land use planning in Ontario and describe how land uses may be controlled, and who may control them. The Act also provides the basis for ensuring the rights of citizens and public agencies to be notified about planning proposals, to give their views to their municipal council and, where permitted, to appeal decisions to the Ontario Municipal Board Section 3(1) of the Planning Act provides for the issuance of policy statements on matters relating to municipal planning that are of provincial interest.
Township of Cramahe	<i>Strategic Plan 2019-2022</i>	Strategic planning is an important step for the Township of Cramahe to set priorities, allocate scarce resources, measure success, guide the work of staff and communicate to citizens.
Regional Municipality of Peel	<i>Region of Peel Official Plan 2018</i>	The social imperative is to create conditions conducive to healthy citizens and thriving communities committed to achieving social harmony and social inclusion so that individual, family, neighbourhood and community needs are met.
Oak Ridges Moraine Land Trust	<i>Caretakers: 2014 Annual Report</i>	<p>The Major Gifts and Bequests program launched in 2014 will continue with its goal of enabling Moraine citizens and supporters to create their own personal legacy of conservation.</p> <p>The Oak Ridges Moraine Land Trust was incorporated in 2000 by a group of citizens with a passionate belief that the Moraine's features and functions required protection for the benefit of generations to come. Directors are drawn from the community to direct and support the work of the Trust in a volunteer capacity. The Trust works closely with individual landowners and many organizations who believe in protection, conservation and sustainable use of the Moraine. Work is supported by grants, donations and specific project funding.</p>
County of Peterborough	<i>County of Peterborough Official Plan 1994</i>	Council shall undertake a program of public awareness of planning for the citizens of the County whenever opportunities may arise, with regard to any future amendments to this Plan. Public discussion of such amendments to the Plan shall be encouraged as required by the Planning Act and informed

		<p>opinions shall be solicited from local citizens prior to the adoption of such amendments.</p> <p>It is expected that the County will utilize a number of methods of public participation in its planning program in order to reach as broad a cross-section of residents as is possible. These methods may include, but are not limited to: i) public meetings; ii) drop-in centres; iii) graphic displays in convenient locations such as: community centres, schools, libraries and public offices; iv) published brochures and newspaper advertisements; and, v) seminars for interested citizens or special interest groups.</p>
City of Vaughan	<i>City of Vaughan Official Plan 2010</i>	<p>These changes include policies to further support the Province’s move toward healthy, sustainable communities by making the planning process more accessible for citizens and providing tools to help municipalities achieve their planning goals.</p> <p>Visioning Workshops were held in each of the communities to gather citizen input into the direction that the new Official Plan should take.</p>
Oak Ridges Moraine Land Trust	<i>Gratitude Report 2016</i>	<p>Reducing the impacts of climate change by protecting more land and habitat for all species, making connections between our natural environment and our health and engaging more local people with citizen science activities like the BioBlitzes, Eco Festivals and school events.</p> <p>Every gift we receive protects more land, saves more habitat for species and engages citizens in learning about the Moraine and Greenbelt.</p>
EcoSpark Save the Oak Ridges Moraine Coalition	<i>Citizens’ Guide to the Oak Ridges Moraine</i>	<p>The purpose of this Citizens’ Guide is to provide a starting point for people to more fully engage with the Oak Ridges Moraine.</p> <p>We recognize the value of local knowledge and the role that citizens must play in preserving our shared environment.</p> <p>In 2001, the Ontario Government enacted the Oak Ridges Moraine Conservation Act (ORMCA) followed by the Oak Ridges Moraine Conservation Plan (ORMCP) in 2002. The Plan is a result of the decadeslong efforts of concerned citizens, environmental organizations, conservation authorities and municipalities.</p> <p>During a review, the Minister has the discretion to consult with relevant provincial ministries, public bodies, and municipalities while ensuring opportunities for citizen participation.</p>
Regional Municipality York	<i>The Regional Municipality of York Official Plan 2019</i>	<p>The policies in this Plan will strengthen the connections between the natural and built environment, job opportunities, human services, transportation, public health and fiscal capacity. Making these connections will also foster citizen participation in the economic, social and cultural development of the Region’s communities.</p> <p>To encourage citizen engagement and shared responsibility in decisions affecting individual and community health and well-being.</p>
		<p>This Council is made up of engaged and experienced individuals. We must always be mindful that it is a privilege to serve. Through</p>

		<p>the democratic process, we have earned our mandates, and our seats in Council Chamber, from the citizens of this great city. It is our responsibility to set the vision for the next four years and beyond.</p> <p>As Vaughan grows, City staff play an instrumental role in guiding its potential and ensuring there are resources to support citizens.</p> <p>Through our commitment to “citizens first through Service Excellence,” we are creating a sustainable city where people want to live, raise families, invest, work and enjoy tourism and recreational opportunities</p> <p>It outlines Vaughan’s vision, mission and values and identifies the strategic key activities that staff will focus on to enable the execution and implementation of projects related to Council’s commitments to the citizens of Vaughan.</p> <p>A city of choice that promotes diversity, innovation and opportunity for all citizens, fostering a vibrant community life that is inclusive, progressive, environmentally responsible and sustainable.</p> <p>To ensure the safety and wellbeing of citizens, the City will commit to engagement and cohesiveness by supporting and promoting community events, arts, culture, heritage, sports and fire prevention awareness.</p>
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8.1.3 PARTICIPATION

Advocacy

Credit Valley Conservation Authority	<i>Credit Valley Conservation Watershed Planning and Regulation Policies 2010</i>	In this regard, CVC advocates for an integrated and comprehensive approach to planning and managing natural hazards and natural resources, features, areas and systems, including their functions, consistent with direction provided by the PPS.
Oak Ridges Moraine Land Trust	<i>The Official Newsletter of the Oak Ridges Moraine Land Trust Fall 2013</i>	Charitable organizations like the Trust have limited ability to lobby and advocate. Individuals are much better positioned to contact governing authorities.
Credit Valley Conservation Authority	<i>Our Future Taking Shape: Strategic Plan 2020-2022</i>	Engage and coordinate a committed volunteer base that advocates for and builds a healthier environment, including building innovative volunteer management tools and processes.
Toronto and Region Conservation Authority	<i>Planning and Development Procedural Manual 2008</i>	Through the watershed planning process, TRCA obtains a broad understanding of ecosystem function and status, and advocates that management recommendations be implemented at an early stage in the planning process.

County of Dufferin	<i>Dufferin County Corporate Strategic Plan 2015-2018</i>	Provide a strong voice for advocating to the province
Toronto and Region Conservation Authority	<i>Conservation Matters 2020 Annual Report</i>	To foster engagement of community members, TRCA needs to build civic capacity by providing the tools and opportunities needed for community members to transition from participants into advocates and leaders.
County of Northumberland	<i>Northumberland County 2019-2023 Strategic Plan</i>	Strengthen capacity to advocate for Northumberland and promote awareness of specific issues facing the community
Regional Municipality of Peel	<i>Region of Peel Official Plan 2018</i>	<p>Advocate to the Province to explicitly provide municipalities the authority to use inclusionary zoning as a tool to require affordable housing.</p> <p>Promote and advocate for sustained Federal, Provincial, and Municipal incentives and programs that improve energy efficiency and design for housing to Peel residents.</p> <p>Advocate to the Federal and Provincial government to provide economic incentives and funding for housing projects that have implemented minimum green and sustainable building guidelines to help mitigate the effects of any added financial costs brought by such initiatives.</p>
Regional Municipality York	<i>The Regional Municipality of York Official Plan 2019</i>	<p>To advocate for adequate funding of human services from senior levels of government to meet the needs of York Region's residents.</p> <p>To advocate the Province and Federal government to: a. commit to integrated and sustainable provincial and national housing strategies; b. provide long term, stable and flexible funding for the provision and maintenance of affordable housing; and, c. reinstate programs to support and promote the development of affordable housing options such as co-operative housing projects and rental housing developments.</p> <p>To advocate the Province and Federal government to examine a new funding formula for expanding Regional funding sources to accommodate growth.</p> <p>In addition to achievable near-term waste diversion targets, the Region will advocate for waste prevention at source, consistent with the principles of the zero waste ideal.</p>

Collaboration

Kawartha Region Conservation Authority	<i>2017-2021 Strategic Plan</i>	Enhance engagement, collaboration and knowledge sharing with our First Nation communities.
Township of Cramahe	<i>Strategic Plan 2019-2022</i>	<p>The work of the Township of Cramahe is guided by principles of:</p> <ul style="list-style-type: none"> • Accountability and Professional Integrity • Collaboration • Transparency and Honesty • Fiscal Responsibility • Respect

Ganaraska Region Conservation Authority	<i>Ganaraska Region Monitoring Report 2018</i>	Findings of this report may help to combine efforts for other adaptation measures to ensure compatibility and increase strategic planning with respect to robust resilient water management. Collaboration with municipalities, provincial agencies, academic researchers and other stakeholders would be seamless and of great mutual benefit.
Lower Trent Conservation Authority	<i>Lower Trent Region Conservation Authority Plan Review Manual 2019</i>	LTC recognizes the importance of communication with our municipal partners, developers, and the general public. We encourage and value collaboration and consultation opportunities when dealing with higher level land use planning matters and site-specific development applications, in the face of a changing policy regime as may be applicable from time to time.
Regional Municipality of Durham	<i>Durham Region Strategic Plan 2020-2024</i>	Service Excellence: We encourage professional excellence through collaboration, partnerships and teamwork in a culture that fosters trust and respect. Mission: Working together to deliver service excellence through leadership, collaboration, innovation and environmental stewardship.
		to promote informed stewardship in vulnerable areas in collaboration with the Province, area Municipalities and local Conservation Authorities. The County, in collaboration with the Province, the Conservation Authority, and local Municipalities, will promote good stewardship practices for lands and water within vulnerable areas.
Regional Municipality York	<i>The Regional Municipality of York Official Plan 2019</i>	This Official Plan represents York Region’s ongoing collaboration with its partners and stakeholders to rethink the way communities are designed, serviced and supported. For all development in York Region, the Region will continue to work with local municipalities, the development industry and other stakeholders to ensure: · a comprehensive, integrated and collaborative planning process; Identify specific short-term achievable actions that contribute towards a sustainability legacy · Set targets, monitor and report progress · Foster partnerships and public engagement · Create a spirit of stewardship, shared responsibility and collaboration · Raise the level of sustainability awareness through education, dialogue and reassessment · Promote sustainable lifestyles and re-evaluation of our consumption and expectations
County of Northumberland	<i>Northumberland County 2019-2023 Strategic Plan</i>	Council recognizes that partnership with staff, community groups, other levels of government and residents will be essential to moving the stated objectives herein from aspirations to accomplishments, ultimately delivering value to the community. We look forward to this ongoing collaboration to address identified priorities and to shape tomorrow’s Northumberland. Mission:

		<p>To be a best practices leader of County government, and a collaborative partner with our member municipalities and community partners.</p> <p>The County has a set of values—shared beliefs—that guide us toward our ultimate goals and unite us along the way. In all of our actions and decision-making, we reference these values:</p> <ul style="list-style-type: none"> • Accountability • Care and support • Collaboration and communication • Honesty and integrity • Innovation and excellence • Mutual trust and respect <p>Provide leadership and partner in the development of an overall health strategy for Northumberland, including:</p> <ul style="list-style-type: none"> • Participation in an Ontario Health Team proposal • Collaboration with partners on new and innovative approaches to the delivery of emergency services <ul style="list-style-type: none"> • Reinforce collaboration • Explore opportunities for additional voluntary shared services
<p>EcoSpark</p> <p>Save the Oak Ridges Moraine Coalition</p>	<p><i>Citizens' Guide to the Oak Ridges Moraine</i></p>	<p>The Monitoring the Moraine Project is a collaboration between EcoSpark (formerly Citizens' Environment Watch) and Save The Oak Ridges Moraine (STORM) Coalition.</p> <p>In response to the need for a comprehensive and collaborative policy, planning, and management approach for protecting the Oak Ridges Moraine, the Conservation Authorities Moraine Coalition (CAMC) was formed in 2000</p> <p>The Caring for the Moraine Project is a collaborative project that has delivered the support of 30 conservation and environmental organizations to more than 80,000 landowners on the Oak Ridges Moraine. The project aims to protect the sensitive environmental features of the Moraine by providing landowners with free property visits, technical advice, workshops, resource material and financial assistance. Engaging with landowners is particularly relevant and important to the protection of the Oak Ridges Moraine because more than 90% of the Moraine is privately owned.</p> <p>The Caring for the Moraine project is an excellent example of a successful, wide-ranging collaborative effort to protect the Moraine. The next section will discuss some opportunities for volunteer oriented projects on the Oak Ridges Moraine.</p> <p>Check Your Watershed Day is coordinated by EcoSpark in collaboration with multiple agencies and volunteers including the Ministry of Natural Resources, conservation authorities, other ENGOs, and community groups. Since 2006, we have worked with 390 volunteers to check 1529 sites, covering 11 watersheds (2539 square kilometers).</p> <p>We are uniquely positioned to work with Moraine stakeholders towards a meaningful ORMCP Review. The MTM Project</p>

		<p>Partners have a specialized ability to easily engage with multiple Moraine stakeholders (community groups, the general public, technical scientific audiences, municipalities, conservation authorities, and other Moraine-based ENGOs). We have developed our project in collaboration with many of these stakeholders.</p> <p>The project is a collaboration between EcoSpark and STORM Coalition.</p>
County of Dufferin	<i>Dufferin County Corporate Strategic Plan 2015-2018</i>	<p>The Corporation of the County of Dufferin delivers relevant, high quality services in collaboration with the community through innovative leadership, inclusive governance, effective resource management and ongoing evaluation.</p> <p>We believe in fostering an environment of collaboration that contributes to informed and thoughtful decisions that are reflective of the needs of those affected.</p> <p>Regular, two-way conversations encourage collaboration and innovation</p>
County of Peterborough	<i>Strategic Plan 2015-2019</i>	<p>Regionally collaborative projects, such as the Climate Change Action Plan of Sustainable Peterborough are viewed as innovative by our funding partners and provide a greater opportunity to work together towards common issues and goals. We see a great opportunity to continue to leverage partnerships at every level to achieve our goals.</p> <p>Our Key Principles Accountability: We will provide good governance, transparency and accountability. Commitment: We will be engaged, responsive and courteous. Value for Money: We will ensure service delivery is efficient, effective and economical. We will seek to continuously improve by applying best practices to all services. Collaboration: We will take a team approach to resolving issues, working in partnership within and outside the organization.</p>
Credit Valley Conservation Authority	<i>Our Future Taking Shape: Strategic Plan 2020-2022</i>	<p>Collaboration: We work together and with our volunteers, partners and the community to achieve shared goals.</p> <p>Success can be attributed to the efforts of staff joining forces across departments and with multiple stakeholders. It exemplifies our organizational value of collaboration: To work together and with our volunteers, partners and the community to achieve shared goals.</p> <p>Use collaboration tools that enable multi-disciplinary and cross-departmental teams to deliver integrated projects and programs efficiently and effectively.</p> <p>Work with other conservation authorities, watershed municipalities, government agencies and local environmental organizations to collaborate on similar programs and business areas to maximize efficiency of service delivery.</p>

<p>Toronto and Region Conservation Authority</p>	<p><i>Conservation Matters 2020 Annual Report</i></p>	<p>TRCA is thankful to partner municipalities, in addition to our vast network of residents, businesses, professional associations, not-for-profit organizations and other stakeholders throughout our jurisdiction for their unwavering encouragement and support of our actions and our collaborative approach.</p> <p>Increase collaboration with senior levels of government, academic institutions, private sector and not-for-profit stakeholders to develop leading-edge sustainability knowledge.</p> <p>Undertake pilot collaborations with industry, academic institutions and partners to determine and demonstrate which TRCA data are most useful in supporting sustainable practices, and how best to provide access to that data to achieve more sustainable development.</p> <p>To achieve shared goals of a green, sustainable, prosperous region, TRCA must build on its history of bringing stakeholders together from across watersheds in the jurisdiction to ensure regional-scale cross boundary collaboration on today’s challenges.</p> <p>TRCA staff continue to collaborate with our municipal partners and other conservation authorities to develop and refine Water Resource System mapping data layers such as wetlands and streams and other groundwater and surface water features and areas to support Municipal Comprehensive Reviews.</p> <p>TRCA has been a value-added collaborator throughout the three-year Provincial consultation process regarding the modernization of the CA Act.</p> <p>Conserve and restore natural resources and develop resilient communities through education, the application of science, community engagement, service excellence and collaboration with our partners.</p>
<p>Regional Municipality of Peel</p>	<p><i>Region of Peel Official Plan 2018</i></p>	<p>Encourage the area municipalities in collaboration with the conservation authorities to comprehensively review areas of existing development that are flood vulnerable and to evaluate and implement flood remediation measures to decrease the level of risk as appropriate.</p> <p>The Region of Peel is committed to collaborating and working with key stakeholders, such as the area municipalities, senior levels of government, the building and development industry, service and support agencies, housing providers, and community organizations</p> <p>Collaborate with the area municipalities and other stakeholders such as the conservation authorities, the building and development industry, and landowners to encourage new residential development, redevelopment and intensification in support of Regional and area municipal official plan policies promoting compact forms of development and residential intensification.</p>

		<p>Identify and promote, in collaboration with the area municipalities, energy and water efficient technologies in new residential development, redevelopment, and intensification to the development industry.</p> <p>Identify actions based on a broad collaborative approach with stakeholders and encourage all levels of government to address and remove barriers through various means, including public education strategies.</p> <p>Work collaboratively with the area municipalities, conservation authorities, neighbouring municipalities, other government agencies, stakeholders and the public to review the Region’s natural heritage systems policy framework; identify policy gaps; and develop a Regional Greenlands Strategy outlining tools, actions and resources to address future natural heritage systems planning needs in the region, including:</p> <p>Collaborate and develop, with the area municipalities, conservation authorities, the Province, other government agencies, and the community, appropriate indicators to analyze the effectiveness of this Plan and to serve as a basis for any policy adjustments which results from this analysis.</p>
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Engagement

Regional Municipality of Peel	<i>Term of Council Priorities 2018-2022</i>	The community’s expectations for government are changing: Peel’s community wants better services that are responsive to their diverse needs, better access to information and data, more engagement in two-way dialogue, and assurance of their tax dollars being spent well.
City of Vaughan	<i>2018-2022 Term of Council Service Excellence Strategic Plan</i>	Objective: To ensure the safety and wellbeing of citizens, the City will commit to engagement and cohesiveness by supporting and promoting community events, arts, culture, heritage, sports and fire prevention awareness.
Friends of the Greenbelt Foundation Conservation Authorities Moraine Coalition Oak Ridges Moraine Foundation	<i>Report Card on the Environmental Health of the Oak Ridges Moraine and Adjacent Greenbelt Lands</i>	the key recommendations are to engage all partners to fill monitoring gaps and to fund and employ the full range of tools and best management practices necessary to restore and enhance the environmental health of the Oak Ridges Moraine and adjacent Greenbelt lands.
Township of Cramahe	<i>Strategic Plan 2019-2022</i>	Establish new tools to communicate and engage
Ganaraska Region Conservation Authority	<i>Ganaraska Region Watershed Report Card 2018</i>	“To enhance and conserve across the Ganaraska Region Watershed by serving, educating, informing and engaging.”
Oak Ridges Moraine Land Trust	<i>Caretakers: 2014 Annual Report</i>	The success of a conservation organization isn’t measured just in land protected, but in its ability to engage people who will contribute to the vision of a vibrant, healthy and sustainable ecosystem.
Nottawasaga Valley Conservation Authority	<i>Nottawasaga Valley Conservation</i>	The purpose of this Bill is to “facilitate the development of a sustainable energy economy that protects the environment while streamlining the approval process, mitigate climate change,

	<i>Authority Planning and Regulation Guidelines 2009</i>	engage communities and build a world-class green industrial sector.”
Regional Municipality of Peel	<i>Region of Peel Official Plan 2018</i>	Also, the imperative seeks to create buildings and public spaces that are beautiful and accessible building on our distinctive human, cultural, historical and natural characteristics, where people take personal responsibility for the success of our community and promote civic engagement and social cohesion, placing value on the many diverse ethnic, religious, cultural groups that make up the rich fabric of Peel’s population.
Regional Municipality York	<i>2019 to 2023 Strategic Plan</i>	Engage public on intensification types and benefits
County of Northumberland	<i>Northumberland County 2019-2023 Strategic Plan</i>	Strengthen public engagement: <ul style="list-style-type: none"> • Develop a public engagement protocol to improve community engagement in shaping County programs and services
Oak Ridges Moraine Land Trust	<i>Gratitude Report 2016</i>	Reducing the impacts of climate change by protecting more land and habitat for all species, making connections between our natural environment and our health and engaging more local people with citizen science activities like the BioBlitzes, Eco Festivals and school events. Every gift we receive protects more land, saves more habitat for species and engages citizens in learning about the Moraine and Greenbelt.
		Our BioBlitzes are engaging and inspiring, and also allow us to collect valuable data to help us monitor and track species and ecosystem adaptations due to climate change. In 2017, we hosted a series of events and engaged citizens like you in conversations about climate change.
Credit Valley Conservation Authority	<i>Credit Valley Conservation Watershed Planning and Regulation Policies 2010</i>	While specific sections and policies may reference others or only apply under certain circumstances, this should not take away from the need to read the document as a whole. CVC has also developed a companion document titled ‘Stakeholder Engagement and Co-Creative Planning for Credit Valley Conservation’. The purpose of the companion document is to provide the context and outline the collaborative process used in developing the framework for the policies. In addition to reading this policy document in its entirety, it is also important to read it in the context of the companion document for perspective. These programs and services promote community engagement and partnerships allowing CVC to work with municipalities and stakeholders in a cooperative and holistic approach to watershed management. Subscribe to the belief that protection and restoration of watershed health is a broadly shared responsibility. We implement watershed management by working with partners and engage clients around shared interests and objectives. We strive for excellence in those relationships

Kawartha Region Conservation Authority	<i>2017-2021 Strategic Plan</i>	<p>To create a relevant plan, we have engaged dozens of stakeholders, municipal leaders, agency representatives, and other community leaders in our process</p> <p>Maintain relationships with municipal partners through regular and targeted communication and engagement with municipal councils and staff members.</p> <p>Maintain and create relationships with community groups, government organizations, stakeholders and the agricultural and other industry sectors to better understand their interests, concerns and opportunities.</p>
County of Peterborough	<i>Strategic Plan 2015-2019</i>	<p>Continue to engage and support our volunteer community – investigate opportunities for knowledge transfer and mentoring programs between volunteers and municipal staff.</p> <p>Opportunity to engage the expertise and varied talents in our demographics to build our community</p>
County of Dufferin	<i>Dufferin County Corporate Strategic Plan 2015-2018</i>	<p>Moving forward Council may wish to engage in a broad-based Community Strategic planning exercise that looks to a future view of the County as a region not just as a corporation. Community plans are intended to have impact beyond the County organization and require participation and buy-in from stakeholder and community groups, local municipalities, and residents. Ideally, a community strategic plan would link plans and initiatives from all Dufferin municipalities and community organizations.</p> <p>The Corporation of the County of Dufferin will engage in timely, two-way communications that create meaningful connections.</p>
City of Vaughan	<i>City of Vaughan Official Plan 2010</i>	<p>A Speaker’s Series kicked-off the consultation program, featuring invited experts speaking on a number of topics to engage and educate the public on issues of city-building.</p> <p>The Vaughan Tomorrow project and Official Plan Review included an extensive visioning process whereby Vaughan residents were engaged to help define the main principles that would guide the development of Official Plan policies and land-use planning decisions.</p>
Municipality of Port Hope	<i>Port Hope Strategic Plan 2019-2022</i>	<p>Municipal Staff will manage the implementation of projects, programs and initiatives, but we will continue to rely on community partnerships and consistent public engagement to help us achieve our goals.</p> <p>Your civic pride and engagement propels Council to be leaders who are committed to your needs and values.</p> <p>Recognizing that community engagement is a key element of Council’s decision-making process, the development of this strategic plan has advanced in a way that has been consultative, transparent and has offered multiple opportunities for public participation.</p> <p>The mission and vision statements for the Strategic Plan, 2019-2022 were developed over the course of the community engagement process, and include the priorities and themes that</p>

		<p>were highlighted as important to our residents and business community members throughout the development of the Strategic Plan.</p>
<p>Regional Municipality York</p>	<p><i>The Regional Municipality of York Official Plan 2019</i></p>	<p>The purpose of this Citizens' Guide is to provide a starting point for people to more fully engage with the Oak Ridges Moraine.</p> <p>In anticipation of the Oak Ridges Moraine Conservation Plan (ORMCP) Review in 2015, we are working to ensure that communities on and downstream of the Moraine are engaged, knowledgeable and mobilized to participate fully in defending and protecting the Oak Ridges Moraine.</p> <p>The Monitoring the Moraine (MTM) Project is building and sustaining a movement of engaged communities who can contribute to the long-term protection of the Oak Ridges Moraine.</p> <p>We are uniquely positioned to work with Moraine stakeholders towards a meaningful ORMCP Review. The MTM Project Partners have a specialized ability to easily engage with multiple Moraine stakeholders (community groups, the general public, technical scientific audiences, municipalities, conservation authorities, and other Moraine-based ENGOs). We have developed our project in collaboration with many of these stakeholders.</p> <p>The Monitoring the Moraine Project is building and sustaining a movement of engaged communities who can contribute to the long-term protection of the Oak Ridges Moraine.</p>
<p>Credit Valley Conservation Authority</p>	<p><i>Our Future Taking Shape: Strategic Plan 2020-2022</i></p>	<p>We support, engage and develop our people, fostering a culture of inclusiveness, health and safety, well-being, excellence, and leadership.</p> <p>In the first year of implementation, 2,700+ residents were engaged in 24 community events and projects. SNAP highlights to date include an award-winning low impact development stormwater management project, infrastructure retrofits, ecological restoration in local parks and on-the-ground engagement of residents and corporations.</p> <p>Develop a learning strategy to engage watershed residents, diverse watershed communities and park visitors through programming, infrastructure and innovative technology, including a baseline survey of watershed environmental and climate change literacy.</p> <p>Engage and coordinate a committed volunteer base that advocates for and builds a healthier environment, including building innovative volunteer management tools and processes.</p> <p>Develop a digital marketing and communications strategy to increase online engagement, program uptake and amplify our reach across all channels.</p> <p>Work with Brampton and other community partners to plan and develop a regionally significant hub for environmental learning, stewardship and public engagement.</p>

		<p>Deliver a new, state-of-the-art website that brings our brand to life while optimizing service delivery and user engagement.</p> <p>Implement the Youth Engagement Strategy by recruiting, training and mentoring youth, providing valuable work experience and inspiring youth to be future environmental champions.</p> <p>Develop public, community and Indigenous engagement guidance and build our capacity to deliver on our commitments.</p>
Toronto and Region Conservation Authority	<i>Conservation Matters 2020 Annual Report</i>	<p>Engage with local communities to increase awareness about issues facing water resources and their importance to the health and well-being of the jurisdiction.</p> <p>Engage with member municipalities, academic institutions, the development industry, and professional associations to deliver professional development programs, and conduct design charrettes and forums to achieve integrated sustainable community design in projects and plans.</p> <p>22,023 adults participated in a variety of environmentally themed courses, professional development opportunities, workshops, webinars and engaged with TRCA through educational social media posts and</p> <p>To foster engagement of community members, TRCA needs to build civic capacity by providing the tools and opportunities needed for community members to transition from participants into advocates and leaders.</p> <p>Provide increased engagement opportunities for stakeholders of all ages that build environmental, sustainability and climate awareness and promote leadership within communities including training and capacity building.</p> <p>Continue to engage the region’s diverse communities to tell their stories and recognize their contributions, and develop community events that celebrate cultural heritage.</p> <p>Through engagement with local communities, TRCA will increase awareness of the issues facing water resources and the health and well-being of the jurisdiction.</p> <p>With environmental and public health challenges, there is increasing recognition of the need for regional-scale coordination to protect and manage our natural resources. Greater responsibility is also being placed on government agencies to consult and engage more effectively.</p>

Education

County of Simcoe	<i>Strategic Plan 2015-2025</i>	This Strategic Plan is intended to communicate, educate and promote an understanding of the County’s Vision, Mission, Core Values and Strategic Directions, along with the preferred methods for achieving those goals and cost to implement
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County of Northumberland	<i>Northumberland County Official Plan 2016</i>	To require that local decision-making processes are transparent and evident to the public through the provision of information, participatory tools, education, and an open process.
Credit Valley Conservation Authority	<i>Our Future Taking Shape: Strategic Plan 2020-2022</i>	Together, we conserve, restore, develop and manage the natural resources of the Credit River Watershed through the power of science, education, policy, planning and leadership.
Ganaraska Region Conservation Authority	<i>Ganaraska Region Monitoring Report 2018</i>	Continued monitoring is needed to provide a better understanding of the seasonal and annual fluctuations in this nutrient and its current and future potential to affect human consumption and aquatic resources. Ongoing stewardship and public education is required to mitigate increasing trends.
Nottawasaga Valley Conservation Authority	<i>Nottawasaga Valley Conservation Authority Planning and Regulation Guidelines 2009</i>	Communicate and educate the general public on proper pond development
Lower Trent Conservation Authority	<i>Lower Trent Region Watershed Report Card 2018</i>	Providing youth environmental education opportunities to foster environmental values in the next generation.
Oak Ridges Moraine Land Trust	<i>2018 Action Report</i>	With your renewed support, we want to host 14 educational workshops and 4 BioBlitz events in 2018!
Regional Municipality of Durham	<i>Durham Regional Official Plan</i>	<p>In the planning and development of the Region, the natural environment, which includes areas designated as Oak Ridges Moraine, Waterfronts and Major Open Space Areas as well as the Greenbelt Natural Heritage System and key natural heritage and hydrologic features, shall be given paramount consideration in light of their ecological functions and scientific, educational and health values.</p> <p>The Region, in cooperation with the Province and other stakeholders, shall participate in the development of a series of indicators to monitor the longterm health of the Moraine and to assist in public education.</p>
EcoSpark Save the Oak Ridges Moraine Coalition	<i>Citizens' Guide to the Oak Ridges Moraine</i>	<p>We give people the tools for education, monitoring, and influencing positive change. Together we create a healthy environment for all.</p> <p>To build partnerships to provide education, information, and land securement opportunities on the Oak Ridges Moraine.</p> <p>An assessment of the education and public awareness initiatives in the protection and enhancement of the Oak Ridges Moraine</p>
Toronto and Region Conservation Authority	<i>Conservation Matters 2020 Annual Report</i>	<p>As more Ontarians looked close to home for their vacation and recreation needs, TRCA's parks and trails were busier than ever. In addition, when the province restricted in-person learning, without missing a beat, our education programmers adapted to virtual delivery in response to changing learning needs to provide much needed online educational opportunities.</p> <p>Thanks to the tireless and award winning efforts of our staff, we were delighted to see GTA residents embrace their role</p>

		<p>as watershed stewards and engage in safe and meaningful activities including smaller scale community plantings, virtual information sharing forums, and online events all while adhering to government directives.</p> <p>33,470 participants in education programs at Kortright Centre for Conservation, Black Creek Pioneer Village, Tommy Thompson Park, TRCA’s field centres and in-class at schools and through language learning centres.</p> <p>22,023 adults participated in a variety of environmentally themed courses, professional development opportunities, workshops, webinars and engaged with TRCA through educational social media posts and video content.</p>
Kawartha Region Conservation Authority	<i>2017-2021 Strategic Plan</i>	<p>Outstanding water quality and quantity management, supported by healthy landscapes through planning, stewardship, science and education.</p> <p>Expand partnerships with local school boards to deliver accessible, affordable, innovative outdoor education programs utilizing our conservation lands as a classroom.</p> <p>Continue to pursue new funding relationships and opportunities, particularly relating to climate change, stewardship and education, source water protection implementation, conservation areas infrastructure and special project funding.</p>
Regional Municipality of Peel	<i>Region of Peel Official Plan 2018</i>	<p>Encourage environmental education to support land stewardship and to promote the value of natural heritage conservation to residents.</p> <p>To promote public awareness and education initiatives with respect to the protection and conservation of water resources.</p> <p>Promote public awareness and education initiatives jointly with the area municipalities and other relevant agencies, on matters related to energy conservation.</p>
City of Vaughan	<i>City of Vaughan Official Plan 2010</i>	<p>A Speaker’s Series kicked-off the consultation program, featuring invited experts speaking on a number of topics to engage and educate the public on issues of city-building.</p> <p>The youth of Vaughan were also engaged through the preparation of an educational package which was made available to all Public and Catholic secondary schools in Vaughan.</p> <p>To support an active and engaged approach to heritage conservation and interpretation that maximizes awareness and education and encourages innovation in the use and conservation of heritage resources</p> <p>To establish and implement a city-wide water and wastewater master plan to ensure the sustainable delivery of water and wastewater services, long term water efficiency, conservation, cost savings and public education.</p>

		To investigate the need for undertaking risk management planning, including spills response, contaminant recovery, aquifer rehabilitation plans and public education in consultation with other partners, where existing land uses involve the storage of contaminants identified in policy 8.3.1.14 in Wellhead protection areas.
Regional Municipality York	<i>The Regional Municipality of York Official Plan 2019</i>	<p>To undertake land securement, with partners, focused primarily within the Regional Greenlands System. Land securement can include conservation easements, donations, or land purchases, and education and stewardship promotion.</p> <p>Environmental education provided to over 10,000 participants, with approximately 1,000 participating every year</p> <p>That York Regional Forests shall be sustainably managed in a manner that enhances their ecological, educational and recreational functions to ensure their health in perpetuity.</p> <p>The Region will promote these types of housing through the use of targets, incentives, partnerships, community education and monitoring.</p> <p>Reference 7: 0.05% coverage York Region’s Water for Tomorrow Program is a comprehensive water conservation and efficiency program that aims to lower demand for water, increase the efficiency of water infrastructure through leakage reduction, provide water audits for large water users, retrofit residential and commercial buildings, and provide education and outreach. This program demonstrates York Region’s commitment to water conservation and efficiency.</p> <p>Raise the level of sustainability awareness through education, dialogue and reassessment</p>

8.1.4 SCIENCE

Monitoring

Organization	Document	Citation
Credit Valley Conservation Authority	Credit Valley Conservation Watershed Report Card 2018	“Continue to support monitoring the long-term changes in our environment to guide management recommendations.”
Oak Ridges Moraine Land Trust	The Official Newsletter of the Oak Ridges Moraine Land Trust Fall 2013	“The reward for such efforts? Great Blue Heron, Barn Swallow, Eastern Kingbird, Eastern Phoebe, Eastern Bluebird, Brown-headed Cowbird, Song Sparrow, Savannah sparrow, Grasshopper Sparrow, Chipping Sparrow, Indigo Bunting, American Goldfinch, American Crow and Monarch butterflies were all sited in the Trust’s 2012 monitoring visit to the property.”

Kawartha Region Conservation Authority	2017-2021 Strategic Plan	“Invest in our monitoring programs and networks to support our ability to track the impacts of climate change and changes in our environment and inform our adaptation strategies.”
Oak Ridges Moraine Land Trust	<i>2018 Action Report</i>	You helped us ‘bioblitz’ 3 properties this year, recording and tracking every single species we saw—birds, insects, amphibians, plants—oh my! Together, we identified over 730 species— almost 400 of which were not yet known to us! We found species at risk including Monarch, Bobolink, and even found the Eastern Wood-Pewee on all 3 properties! We also assess plant species along the edges of water bodies, as well as look for aquatic invertebrates like insects and worms. Our BioBlitzes are engaging and inspiring, and also allow us to collect valuable data to help us monitor and track species and ecosystem adaptations due to climate change
Oak Ridges Moraine Land Trust	<i>2002 Annual Report</i>	“2002 also marked the first full year of the ORMLT’s stewardship and property monitoring activities.”
Otonabee Region Conservation Authority	<i>Otonabee Region Watershed Report Card 2018</i>	“Otonabee Conservation’s monitoring programs increase our understanding of watershed stressors including climate change. Long term watershed monitoring helps us understand problems, prioritize management actions and track progress.”
Ganaraska Region Conservation Authority	<i>Ganaraska Region Watershed Report Card 2018</i>	“Support local initiatives that monitor water quality and quantity.”
Central Lake Ontario Conservation Authority	<i>Policy and Procedural Document For Regulation and Plan Review 2014</i>	“The information collected through the monitoring program provides the basic, and when required, detailed aquatic habitat conditions which support many CLOCA programs, projects and plans including: Watershed Plans, Fisheries Management Plans, Conservation Area Management Plans, Annual Monitoring Reports, Engineering and Operations projects, Groundwater programming, Stewardship, Outreach and Education services. Other efficiencies arising from CLOCA’s continuous long term monitoring program is the support provided to municipalities and the development industry enabling streamlining plan reviews, environmental studies, time sensitive projects and emergency works. Data collected also supports and helps expedite provincial and federal agency reviews related to the Endangered Species Act (ESA) and the Species at Risk Act (SARA) respectively.”
Credit Valley Conservation Authority	<i>Our Future Taking Shape: Strategic Plan 2020-2022</i>	“Leverage monitoring data and tools to make science-based decisions in land use planning and restoration and advance adaptive watershed management considering a changing climate.” “Support the implementation of best management practices on development and infrastructure sites through expertise, monitoring and compliance inspection.”
County of Simcoe	<i>Official Plan of the County of Simcoe 2008</i>	“The County in consultation with the conservation authorities, Provincial ministries and other interested groups and organizations will encourage the establishment of environmental monitoring programs in order to measure the effectiveness of the environmental policies within this Plan.”
Kawartha Region Conservation Authority	<i>Kawartha Conservation Watershed Report Card 2018</i>	“Support local initiatives to monitor water quality and quantity.”

Municipality of Clarington	<i>Municipality of Clarington Official Plan 2018</i>	“The Municipality will partner with conservation authorities, the provincial government and other appropriate stakeholders, to develop and maintain a data management system to collect, store, update and share natural heritage, water resources and geotechnical information needed to interpret, apply and monitor the policies within the Oak Ridges Moraine.”
Oak Ridges Moraine Land Trust	<i>Annual Report 2011</i>	“Additionally we ensure annual stewardship is in place for all protected properties held by the Trust and overview annual monitoring schedules.” “Conducted and prepared monitoring reports for 30 properties, the most in a single year since our first property was secured in 2001. Trust Directors attended annual property monitoring site visits with the Stewardship Manager and volunteer property stewards.”
Lower Trent Conservation Authority	<i>Lower Trent Region Watershed Report Card 2018</i>	“Due to the lack of consistent long-term data, groundwater has not been graded for our 12 monitoring wells.”
Regional Municipality of Durham	<i>Durham Regional Official Plan</i>	“The Region, in cooperation with the Province and other stakeholders, shall participate in the development of a series of indicators to monitor the longterm health of the Moraine and to assist in public education.”
Toronto and Region Conservation Authority	<i>Conservation Matters 2020 Annual Report</i>	“Monitor the health of the watersheds through the Regional Watershed Monitoring Program and through work with academic institutions.” “Work closely with member municipalities, academic institutions and private industry to monitor, evaluate, and pilot new innovative technologies in TRCA’s work.”
City of Vaughan	<i>City of Vaughan Official Plan 2010</i>	“Vaughan will also work with neighbouring municipalities and partners such as the Toronto Region and Conservation Authority to monitor and enhance water quality and natural stream flows throughout the Humber and Don watersheds.” “To support the Toronto and Region Conservation Authority in establishing programs for ongoing monitoring of ambient conditions as part of the Regional Watershed Monitoring Program, including evaporation, stream flow, channel form, groundwater levels, water quality and terrestrial communities and species to provide baseline data to facilitate an adaptive management approach.” “To work with the Toronto and Region Conservation Authority to monitor the effects of new development and redevelopment in Urban Areas on receiving Watercourses and the hydrologic balance in order to apply adaptive management measures as necessary to maintain water balance and evaluate flooding on downstream flood vulnerable areas.”
Friends of the Greenbelt Foundation Conservation Authorities Moraine Coalition	<i>Report Card on the Environmental Health of the Oak Ridges Moraine and Adjacent Greenbelt Lands</i>	“to provide science-based monitoring data and analysis to help inform the 10-year review of the Provincial land use plans for the Oak Ridges Moraine and Greenbelt” “the key recommendations are to engage all partners to fill monitoring gaps and to fund and employ the full range of tools and best management practices necessary to restore and enhance the environmental health of the Oak Ridges Moraine and adjacent Greenbelt lands.”

<p>Oak Ridges Moraine Foundation</p>		<p>“Data limitations are evident with a lack of sufficient ongoing monitoring coverage in one fifth of subwatersheds and only one year of data in other subwatersheds.”</p> <p>“Ongoing groundwater monitoring by the CAMC and partners is needed to be able to better characterize environmental groundwater quality changes over time across the broader Greenbelt landscape.”</p> <p>“Support long term funding for programs such as environmental monitoring, land stewardship and securement, environmental farm plans and environmental restoration activities.”</p>
<p>EcoSpark Save the Oak Ridges Moraine Coalition</p>	<p><i>Citizens’ Guide to the Oak Ridges Moraine</i></p>	<p>“The Monitoring the Moraine (MTM) Project Partners strongly believe in a model of shared responsibility for the Moraine. We recognize the value of local knowledge and the role that citizens must play in preserving our shared environment. In anticipation of the Oak Ridges Moraine Conservation Plan (ORMCP) Review in 2015, we are working to ensure that communities on and downstream of the Moraine are engaged, knowledgeable and mobilized to participate fully in defending and protecting the Oak Ridges Moraine.”</p> <p>“Community Guide to Monitoring on the Moraine: A resource for groups who want to self-organize and strategically plan their Moraine monitoring activities to achieve local impact.”</p> <p>“The Monitoring the Moraine Project Partners have developed and adapted programs and protocols that support volunteers in collecting local information about the Moraine.”</p> <p>“Tracking Land Use Planning on the Oak Ridges Moraine is a how-to guide for community members to monitor land use planning activity and the performance of their municipal government on Moraine-“</p> <p>“In consultation with municipalities, identify performance indicators to monitor the Plan’s effectiveness”</p> <p>“In partnership with appropriate stakeholders, establish a monitoring network to collect, summarize and evaluate performance indicator data”</p> <p>“Since the Monitoring the Moraine Project was established in 2005, we have been a key player in stimulating dialogue, gathering data and sharing information about the Oak Ridges Moraine.”</p>
<p>Regional Municipality of Peel</p>	<p><i>Region of Peel Official Plan 2018</i></p>	<p>“Work jointly with the conservation authorities, the area municipalities and, where applicable, the Niagara Escarpment Commission to integrate subwatershed planning and monitoring information on a regional and watershed basis, in order to assess the cumulative effects of land use changes and the implementation of subwatershed plans.”</p> <p>“To increase the collective knowledge of water resources in and adjacent to Peel through the study, analysis and monitoring of these resources.”</p>

		<p>“Initiate, promote and support efforts to further identify, study, analyze and monitor water resources, jointly with the area municipalities, conservation authorities and other related agencies to ensure water quantity and quality meet provincial and regional standards.”</p>
Regional Municipality York	<i>The Regional Municipality of York Official Plan 2019</i>	<p>“To continue the partnership with the Regions of Peel and Durham, the City of Toronto and the conservation authorities to study, analyze and monitor regional groundwater and surface water resources to ensure a unified approach to protecting and enhancing water quality and quantity.”</p> <p>“To work with the Province, local municipalities, conservation authorities and other agencies to develop and support monitoring programs, identify emerging issues, support the adaptive management approach of the Lake Simcoe Protection Plan and to implement a phosphorus reduction strategy for the Lake Simcoe watershed.”</p>
Ganaraska Region Conservation Authority	<i>Ganaraska Region Monitoring Report 2018</i>	<p>“The Ganaraska Region Conservation Authority (GRCA)’s Monitoring report is to present a summary on the interactions and interdependencies of land use and water resources within the GRCA watershed.”</p> <p>“Monitoring programs are fundamental to understanding watershed health in any watershed. Collecting baseline data gathers necessary information in order to provide answers for ecological and hydrological processes within the watershed, quantify various watershed parameters, and assist setting realistic and achievable future program targets to ensure meaningful management actions.”</p> <p>“The purpose of the Ganaraska Region Monitoring Program is to support the conservation, enhancement and management of local watersheds and resources for current and future generations through data collection, evaluation, synthesis and reporting.”</p> <p>“The goal of the GRCA watershed monitoring program is to collect scientifically defensible, locally relevant, data and information on abiotic and biotic features and functions in an effective and efficient manner.”</p> <p>“Monitoring results of this report will help to build adaptive capacity by awareness raising and provides relevant information on advice for best farming practices and management.”</p>
Ganaraska Region Conservation Authority	<i>Ganaraska Region Watershed Monitoring Plan: towards an integrated approach 2014</i>	<p>“GRCA monitoring programs have been implemented to:</p> <ul style="list-style-type: none"> • describe baseline conditions (e.g., parameter concentration comparison to provincial standards); • answer specific watershed health or ecosystem state questions in relation to changes in land uses (e.g., absence or presence of particular species, or species assemblages); • assist in primary Authority functions (e.g., flood forecasting and warning, regulations and planning); or • provide data for larger research questions (e.g., water budget, watershed health, and climate change effects evaluation).” <p>“With the implementation of the numerous management plans and reports, there is a need to re-evaluate monitoring programs in order</p>

		<p>to: 1. Determine if the implementation of recommended strategies are having a desired effect on the local environment and watershed(s). 2. Determine if recommended strategies are appropriate. 3. Continually understand baseline conditions, and changes to those conditions. 4. Conduct large scale/topic specific research projects to fill identified knowledge gaps.”</p> <p>“Along with monitoring and research, reporting of results to the public, partners, municipalities and stakeholders is an important step in ensuring planning tools are being implemented and positive changes are occurring.”</p> <p>“At its core, a monitoring program is designed to assist those with a vested interest in appropriately managing, conserving and protecting local watersheds, natural resources and the environment. In order to assist those individuals, agencies or government bodies, the GRCA is a logical organization to design and implement a local watershed monitoring program (Figure 2). Data collected can be used, analyzed, or reported to a variety of audiences or data users.”</p> <p>“The purpose of monitoring is to support the conservation, enhancement and management of local watersheds and resources for current and future generations through data collection, evaluation, synthesis and reporting.”</p> <p>“The goal of the GRCA watershed monitoring program is to collect scientifically defensible and locally relevant data and information on abiotic and biotic features and functions in an effective and efficient manner.”</p> <p>“If data is collected outside of a formal monitoring protocol (e.g. data collected through educational or public information programs) the limitations of use of the data must be clearly defined.”</p> <p>“The importance of partnering cannot be understated in implementation of the GRCA Watershed Monitoring Plan. The GRCA, in implementing any of its resource management programs, always looks to partner to expand the impact of available resources. Monitoring is no different. It is recommended that the GRCA continue to actively look for partnerships and that monitoring programs continue to be based on a partnership foundation.”</p>
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Methods

Toronto and Region Conservation Authority	<i>Conservation Matters 2020 Annual Report</i>	Introduce streamlined methods for communicating the organization’s key successes and areas for improvement, both internally and for stakeholders.
County of Northumberland	<i>Northumberland County 2019-2023 Strategic Plan</i>	Ecological Land Classification is a standardized method to characterize vegetation communities and is the best source of information to assess wetland and forest conditions.
Regional Municipality of Peel	<i>Region of Peel Official Plan 2018</i>	<p>“To establish an effective method for involving the public in the planning review process.”</p> <p>“Established standards and procedures: those principles, methods, tests, procedures and operations routinely used and applied within any professional discipline and generally</p>

		acknowledged or approved by the governing bodies or professional associations of such disciplines.”
Nottawasaga Valley Conservation Authority	<i>Nottawasaga Valley Conservation Authority Planning and Regulation Guidelines 2009</i>	<p>The guidelines present procedures, computation methods, and input parameters that are commonly accepted by NVCA staff, however it is still the designer's responsibility to recommend and justify the most appropriate methods. If the designer determines that alternative procedures, computation methods, or parameters are required to best describe the development site, an explanation of the rationale acceptable to the NVCA must be provided.</p> <p>Technical studies should be carried out by a qualified professional, with recognized expertise in the appropriate discipline, and should be prepared using established procedures and recognized methodologies to the satisfaction of the conservation authority.</p> <p>Recognized analytical methods should be utilized</p>
Ganaraska Region Conservation Authority	<i>Ganaraska Region Watershed Monitoring Plan: towards an integrated approach 2014</i>	A Water Quality Index (WQI) is applied employing the methodology published by the Canadian Council of Ministers of the Environment (CCME) in 2001 for assessing water quality conditions relative to water quality objectives. The calculator is a guideline driven tool, providing means for the user to analyze large amounts of data into a single, easy to understand score

Data

County of Dufferin	<i>Dufferin County Official Plan 2017</i>	Introduce open government initiatives, ie. Open data
Central Lake Ontario Conservation Authority	<i>Policy and Procedural Document For Regulation and Plan Review 2014</i>	<p>In acting as Source Protection Authorities under the CWA, during the source protection plan development phase, tasks included:</p> <ul style="list-style-type: none"> • Collection, analysis and compilation of technical and scientific information and data (watershed characterizations, water budgets, etc.) • Local engagement, consultation, information management and communications • Key supporting role to respective Source Protection Committees which includes funding • Policy formulation and coordinating technical work with municipalities and others
Oak Ridges Moraine Land Trust	<i>2018 Action Report</i>	Our BioBlitzes are engaging and inspiring, and also allow us to collect valuable data to help us monitor and track species and ecosystem adaptations due to climate change.
City of Vaughan	<i>2018-2022 Term of Council Service Excellence Strategic Plan</i>	<p>“Objective: To continue to foster a culture of continuous improvement, the City will support competencies and practices in innovation and process efficiencies.</p> <p>Themes:</p> <ul style="list-style-type: none"> • Leverage data-driven decision-making • Promote innovation and continuous improvement”
Regional Municipality of Durham	<i>Durham Regional Official Plan</i>	The Region, in cooperation with the Province and other stakeholders, shall participate in the development and administration of effective and accessible data management

		systems for the Oak Ridges Moraine's natural heritage, groundwater, surface water and land use information.
Municipality of Clarington	<i>Municipality of Clarington Official Plan 2018</i>	The Municipality will partner with conservation authorities, the provincial government and other appropriate stakeholders, to develop and maintain a data management system to collect, store, update and share natural heritage, water resources and geotechnical information needed to interpret, apply and monitor the policies within the Oak Ridges Moraine.
Regional Municipality of Peel	<i>Region of Peel Official Plan 2018</i>	Study and create databases for the larger environmental systems. Work, jointly with the area municipalities and conservation authorities to identify data gaps when selecting indicators and establish consistent methodologies for data collection so that information can be compared and uniform across the Region.
Kawartha Region Conservation Authority	<i>2017-2021 Strategic Plan</i>	Identify and address science and information data gaps. Remain the go-to organization in the watershed for science and research based information and data, mapping and GIS – generated resources and make that information easily accessible and understandable to the general public.
Regional Municipality of Peel	<i>Term of Council Priorities 2018-2022</i>	The community's expectations for government are changing: Peel's community wants better services that are responsive to their diverse needs, better access to information and data, more engagement in two-way dialogue, and assurance of their tax dollars being spent well.
Regional Municipality York	<i>2019 to 2023 Strategic Plan</i>	Continue to implement Open Data platform to support maintaining an open and transparent government
County of Peterborough	<i>Strategic Plan 2015-2019</i>	Partnership development program – create long term plan to develop partnerships and relationships, create database, funding opportunities, private partnership program and continued lobbying and interaction with senior levels of government.
City of Vaughan	<i>City of Vaughan Official Plan 2010</i>	To use environmental data gathered through land-use planning studies, Environmental Assessments, infrastructure development, development applications, and other means, to maintain and update Vaughan's natural heritage inventory and Schedule 2 of this Plan, as appropriate. To support the Toronto and Region Conservation Authority in establishing programs for ongoing monitoring of ambient conditions as part of the Regional Watershed Monitoring Program, including evaporation, stream flow, channel form, groundwater levels, water quality and terrestrial communities and species to provide baseline data to facilitate an adaptive management approach.
Credit Valley Conservation Authority	<i>Our Future Taking Shape: Strategic Plan 2020-2022</i>	Leverage monitoring data and tools to make science-based decisions in land use planning and restoration and advance adaptive watershed management considering a changing climate. Internal focus is on advancing data, information, documents and records management along with the introduction of electronic workflows.
County of Peterborough	<i>County of Peterborough</i>	In partnership with the University Of Ontario Institute Of Technology and the City of Oshawa, we initiated the Oshawa

	<i>Official Plan 1994</i>	<p>Creek Water Quality study in 2013 to collect water quality data throughout the Oshawa Creek watershed.</p> <p>Only 1 watershed, the Oshawa Creek, has data to represent all 3 indicators.</p>
Regional Municipality York	<i>The Regional Municipality of York Official Plan 2019</i>	<p>The Regional Greenlands System has been assembled with data from the Province, the Toronto and Region Conservation Authority and Lake Simcoe Region Conservation Authority, and local municipal natural heritage studies.</p> <p>To work with conservation authorities, local municipalities and the Province in establishing, maintaining and improving a database on the Regional Greenlands System.</p> <p>Established in 2001, the YPDT and CAMC program is focussed on compiling and managing groundwater resource information, including the long-term management of groundwater-related data, maps, reports and resource knowledge for the purposes of effective resource stewardship and management. The program builds, maintains and provides partner agencies with the regional geological and hydrogeological context for ongoing groundwater studies and management initiatives within the partnership area. The primary objectives of the program are to:</p> <ul style="list-style-type: none"> · collect, analyse and maintain data; · develop and coordinate consistent approaches to water management across political boundaries; and, · liaise with federal and provincial governments to share data, promote an overall water management approach to upper levels of government, and to seek sources of funding. <p>To develop an effective and publicly accessible data management system for natural heritage and water systems within the areas of the Oak Ridges Moraine Conservation Plan, the Greenbelt Plan and the Lake Simcoe Protection Plan in partnership with the Province and other stakeholders.</p>
EcoSpark Save the Oak Ridges Moraine Coalition	<i>Citizens' Guide to the Oak Ridges Moraine</i>	<p>In partnership with appropriate stakeholders, establish a monitoring network to collect, summarize and evaluate performance indicator data</p> <p>Collect data on baseline conditions 7. Interpret & analyze data over time</p> <p>Since the Monitoring the Moraine Project was established in 2005, we have been a key player in stimulating dialogue, gathering data and sharing information about the Oak Ridges Moraine.</p> <p>The MTM Project offers volunteer programs so you can contribute data in preparation for 2015.</p> <p>A personal narrative of the Moraine can have just as much impact as scientific data during the review process.</p>
Lower Trent Conservation Authority	<i>Lower Trent Region Watershed Report Card 2018</i>	<p>Due to the lack of consistent long-term data, groundwater has not been graded for our 12 monitoring wells.</p>

<p>Friends of the Greenbelt Foundation</p> <p>Conservation Authorities Moraine Coalition</p> <p>Oak Ridges Moraine Foundation</p>	<p><i>Report Card on the Environmental Health of the Oak Ridges Moraine and Adjacent Greenbelt Lands</i></p>	<p>“to provide science-based monitoring data and analysis to help inform the 10-year review of the Provincial land use plans for the Oak Ridges Moraine and Greenbelt.”</p> <p>They were able to supplement their data with additional field work in 2013 with funding from the Friends of the Greenbelt Foundation. Still other subwatersheds had insufficient or inconclusive data and could not be graded in accordance with protocols.</p> <p>A further one fifth of subwatersheds had insufficient or inconclusive monitoring data available to grade them.</p> <p>Data limitations are evident with a lack of sufficient ongoing monitoring coverage in one fifth of subwatersheds and only one year of data in other subwatersheds.</p>
<p>Toronto and Region Conservation Authority</p>	<p><i>Conservation Matters 2020 Annual Report</i></p>	<p>22 data sets have been provided to partner municipalities to support municipal planning for natural heritage and climate change resiliency planning.</p> <p>Undertake pilot collaborations with industry, academic institutions and partners to determine and demonstrate which TRCA data are most useful in supporting sustainable practices, and how best to provide access to that data to achieve more sustainable development.</p> <p>Improve and enhance the Centralized Planning and Reporting (CPR) database by developing consistent reporting measures including key performance indicators and targets to measure progress towards strategic outcomes and to report on the impact of TRCA work.</p> <p>These actions have enabled TRCA to maintain its commitment to long-term data collection in support of watershed planning and reporting, and to support the uninterrupted planning, permitting and implementation of many capital infrastructure projects for TRCA and our partner municipalities.</p> <p>TRCA staff continue to collaborate with our municipal partners and other conservation authorities to develop and refine Water Resource System mapping data layers such as wetlands and streams and other groundwater and surface water features and areas to support Municipal Comprehensive Reviews.</p>
<p>Ganaraska Region Conservation Authority</p>	<p><i>Ganaraska Region Monitoring Report 2018</i></p>	<p>Collecting baseline data gathers necessary information in order to provide answers for ecological and hydrological processes within the watershed, quantify various watershed parameters, and assist setting realistic and achievable future program targets to ensure meaningful management actions.</p> <p>The findings presented are gathered on a coordinated, partnership basis using data and information from various sources including Ganaraska Region Conservation Authority (GRCA) monitoring recordings, provincial and federal data collections, research findings, and Ontario terrestrial and aquatic databases.</p>

		<p>The purpose of the Ganaraska Region Monitoring Program is to support the conservation, enhancement and management of local watersheds and resources for current and future generations through data collection, evaluation, synthesis and reporting.</p> <p>The goal of the GRCA watershed monitoring program is to collect scientifically defensible, locally relevant, data and information on abiotic and biotic features and functions in an effective and efficient manner. The data and information collected is to be the basis for understanding current watershed conditions, predicting trends, evaluating local regulations, programs and management plans, predicting effects from climate change, and reporting.</p> <p>However, at present, data are limited and more monitoring is needed to fully assess groundwater quantity and quality within the GRCA for future generations.</p> <p>The Ganaraska Region Watershed has experienced a change of land use over the past decades and has significant expertise and data collected to help answer questions regarding different agricultural practices that may influence the water quality and quantity of this area.</p>
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Citizen Science

Kawartha Region Conservation Authority	<i>2017-2021 Strategic Plan</i>	Develop and Implement a Citizen Science program to increase knowledge.
Oak Ridges Moraine Land Trust	<i>Gratitude Report 2016</i>	<p>Reducing the impacts of climate change by protecting more land and habitat for all species, making connections between our natural environment and our health and engaging more local people with citizen science activities like the BioBlitzes, Eco Festivals and school events</p> <p>Our community bioblitzes were designed to connect people to citizen science.</p>

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