

Rouge River Watershed

Scenario Modelling and Analysis Report

Section 4.7

Nature-based Recreation

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SECTION
4.7

NATURE-BASED RECREATION

4.7 Nature-based Recreation

4.7.1 Key Indicators

The nature-based recreation goals, objectives, indicators and targets developed for the Rouge River watershed are shown in Table 4.7-1. Of the indicators listed, the following ones were used in the analysis of the effects of future land use and management scenarios:

- variety of uses and experiences;
- access to greenspace¹; and
- trail network and its connectivity.

The adoption of standards of practice for managing recreational open space was viewed as a stewardship implementation activity that could be undertaken regardless of the effects of future scenarios and therefore this indicator was not useful for the relative scenario analysis.

Table 4.7-1: Nature-based Recreation Goals, Objectives, Indicators and Targets

GOALS	OBJECTIVES	INDICATORS (measures)	TARGETS
Nature-based Recreation			
Opportunities for public enjoyment that are compatible with, and raise awareness of, the watershed's natural and cultural heritage.	Ensure that recreation activities in the watershed are compatible with ecological and cultural integrity.	Adoption of standards of practice for managing recreational open space (e.g. parks operating under environmental management systems)	100%
	Provide opportunities for a variety of appropriate public uses and experiences in representative	Variety of uses and experiences (e.g., presence, distribution throughout watershed)	Protect and enhance key uses and experiences in representative areas:

¹ Greenspace is defined as all publicly-owned land available for nature-based recreation, including municipal parks and conservation lands, and valley and stream corridors, but not including golf courses, cemeteries, and municipal parks intended for intensive recreational use (e.g., soccer fields).

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GOALS	OBJECTIVES	INDICATORS (measures)	TARGETS
Nature-based Recreation			
	natural and cultural landscapes.		<p><i>Rouge Park/Urban Wilderness</i></p> <ul style="list-style-type: none"> • Boating, canoeing • Bird watching • Hiking, cross-country skiing & snowshoeing <p><i>Kettle Lakes/Countryside</i></p> <ul style="list-style-type: none"> • Agri-tourism, farm drives • Horseback riding • Cycling • Hiking, cross-country skiing & snowshoeing <p><i>Major Urban Parks</i></p> <ul style="list-style-type: none"> • Picnicking • Camping • Walking/hiking, cross-country skiing & snowshoeing
		Access to greenspace (e.g., proximity of greenspace to residential areas; per capita greenspace resources)	<p>Greenspace located within 2 km of all homes</p> <p>Maintain or increase the number of hectares of greenspace per 1000 residents</p>
	Develop a continuous trail network linking Lake Ontario to the Oak Ridges Moraine, with connections to local communities, neighbouring watershed trails systems, and natural and cultural heritage features.	Trail network (length and accessibility of trail as defined in trail plan)	<p>100% completion of planned trail systems (may set incremental targets; based on trails plan)</p> <p>All trails to be surveyed and posted by Universal Trail Assessment Process.</p>
		Connectivity (e.g. degree of completion of key links, as defined in trail plan.)	100% of planned trail linkages

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4.7.2 Scenario Analysis Methods

Scenarios of Focus

The nature-based recreation analysis evaluated all land use and management scenarios with the exception of scenarios 3 (End of pipe stormwater retrofit) and 5 (End of pipe stormwater retrofit with expanded natural cover). These scenarios deal mainly with stormwater retrofits, which will not have a significant impact on recreation activities in the watershed. The expanded natural cover aspect of Scenario 5 is addressed by the Scenario 4 analysis.

Scenario variables for analysis

With respect to nature-based recreation, the main variables considered within the scenarios were the increased population base associated with the urban growth scenarios, changes in land use (i.e., expanded urban areas or natural cover), and climate. Demographic information, including age and culture, was also considered. This information was used to describe how the scenarios might affect both future demand for recreational activities and the opportunity to provide these activities.

While some information is known about the projected population that may be represented by future urban growth scenarios, no quantitative information is available regarding current or potential future demand for recreational activities. Therefore, it was assumed that current recreational experiences in the watershed would continue to be of interest and that interest would grow in proportion to population increases.

Demographic changes associated with population growth, in terms of the aging population and shifts in cultural diversity, were described with reference to information obtained from municipal public health departments. These same sources were also used to assess the implications for changing demand for recreational activities associated with these demographic shifts.

Evaluation Approach

Variety of uses and experiences

The presence of existing and potential recreational uses and experiences was identified within each of three areas in the watershed: Rouge Park, kettle lakes and countryside, and major urban parks (see *Rouge River State of the Watershed Report*, TRCA, 2007). Key recreation uses and experiences targeted for protection or enhancement include non-motorized boating and swimming, bird watching, hiking, cross-country skiing and snowshoeing in Rouge Park; agri-tourism, farm drives, horseback riding, cycling, hiking, cross-country skiing and snowshoeing in the kettle lakes and countryside; and picnicking, camping, hiking, cross-country skiing and snowshoeing in major urban parks. It should be noted that there is overlap among the areas. For example, Rouge Park properties are also found in the Northern countryside area, and farms can still be found in Rouge Park in the Lower Rouge watershed. For each scenario, the location of these areas of unique recreational uses and experiences was assessed to identify land use or other changes that might facilitate or threaten the provision of these existing or

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new opportunities. Impacts on the quality of these recreation experiences also was considered. All of the analysis was based on professional judgment and drew on data collected internally by TRCA and data made available by municipalities, Rouge Park, and other organizations.

Access to greenspace

The evaluation of current conditions in this report is based on data collected internally by TRCA and data made available by municipalities, Rouge Park, and other organizations. Representing greenspace (shown in Figure 4.7-1) was challenging as the definition of greenspace incorporates aspects both of land use (nature-based recreation opportunity) and of land ownership (publicly-owned and -accessible). This figure was developed using parks and greenspace data layers² from TRCA, municipalities and others. Unfortunately, watershed municipalities do not all use the same definitions of parks and greenspace, therefore the map potentially includes lands not typically considered greenspace, such as municipal parks intended for intensive recreational use. Furthermore, some Rouge Park and TRCA lands are used for agricultural purposes and not all of the Federal Pickering Lands Site may be greenspace at this time. The estimation and analysis of access to greenspace includes lands recently secured by Rouge Park in 2007.

Access to public greenspace was indicated by the proximity of residential areas to greenspace patches of a range of sizes and per capita greenspace resources. To estimate proximity to greenspace, all medium and high density residential areas were identified within each scenario. As not all greenspace would qualify as “adequate” to provide the desired experience to residents, greenspace areas were divided into three categories based on size: 1) 5-10 ha in size (e.g., most municipal parks); 2) 10-50 ha in size (e.g., large municipal parks such as Toogood Pond); and 3) greater than 50 ha (e.g., Bruce’s Mill Conservation Area, Milne Park, Rouge Park). GIS buffer analysis was used to determine how many hectares of residential land had greenspace of different sizes within 1 km and 2 km proximity.

Per capita greenspace was calculated by dividing the total hectares of greenspace in the watershed by the watershed population. This measure illustrates how many hectares of greenspace are available per resident, as well as how many residents there are per hectare of greenspace. This information provides an indication of the degree of pressure/impact on greenspace and of the likely user experience. The per capita measure of greenspace access uses an estimation of watershed population of 242,631, based on interpretation of Statistics Canada’s 2001 Census of Population.

² TRCA-accessible data layers used to identify greenspace included: EPA areas from Markham and Richmond Hill (from official plans), parks and open space layer from Richmond Hill, property layer from Toronto, Rouge Park (as of 2007, including TRCA properties), Federal Airport Lands, and “Hrland” (an older property layer including municipal, TRCA, and provincial lands). Greenspace areas were checked against the 2002 orthophotography.

Figure 4.7-1: Nature-based Recreational Areas and Experience



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Trail network and its connectivity

The trails plan developed as part of the *Rouge River Watershed Plan – Towards a Healthy and Sustainable Future* (TRCA, 2007) illustrates existing and proposed inter-regional trails routes, major municipal trails (existing and proposed, where available), and key connections between trails systems (Figure 4.7-2). The trails plan was compared to each scenario to identify land use changes that might create circumstances that would facilitate or threaten the implementation of trails and key linkages. The assessment was based on professional judgment.

4.7.3 Baseline Conditions

In evaluating current watershed conditions in the *Rouge River State of the Watershed Report* (TRCA, 2007), a rating system was adopted based on categories of “poor”, “fair”, and “good”. Where the measures and targets were quantitative and data permitted, ratings were assigned, in part, to reflect the per cent satisfaction of the target. Comparisons to conditions in other watersheds in TRCA’s jurisdiction were made and informed evaluations where data were available, to reflect relative conditions. Where measures and targets were qualitative, or data were lacking, evaluations were subjective and based on professional judgment.

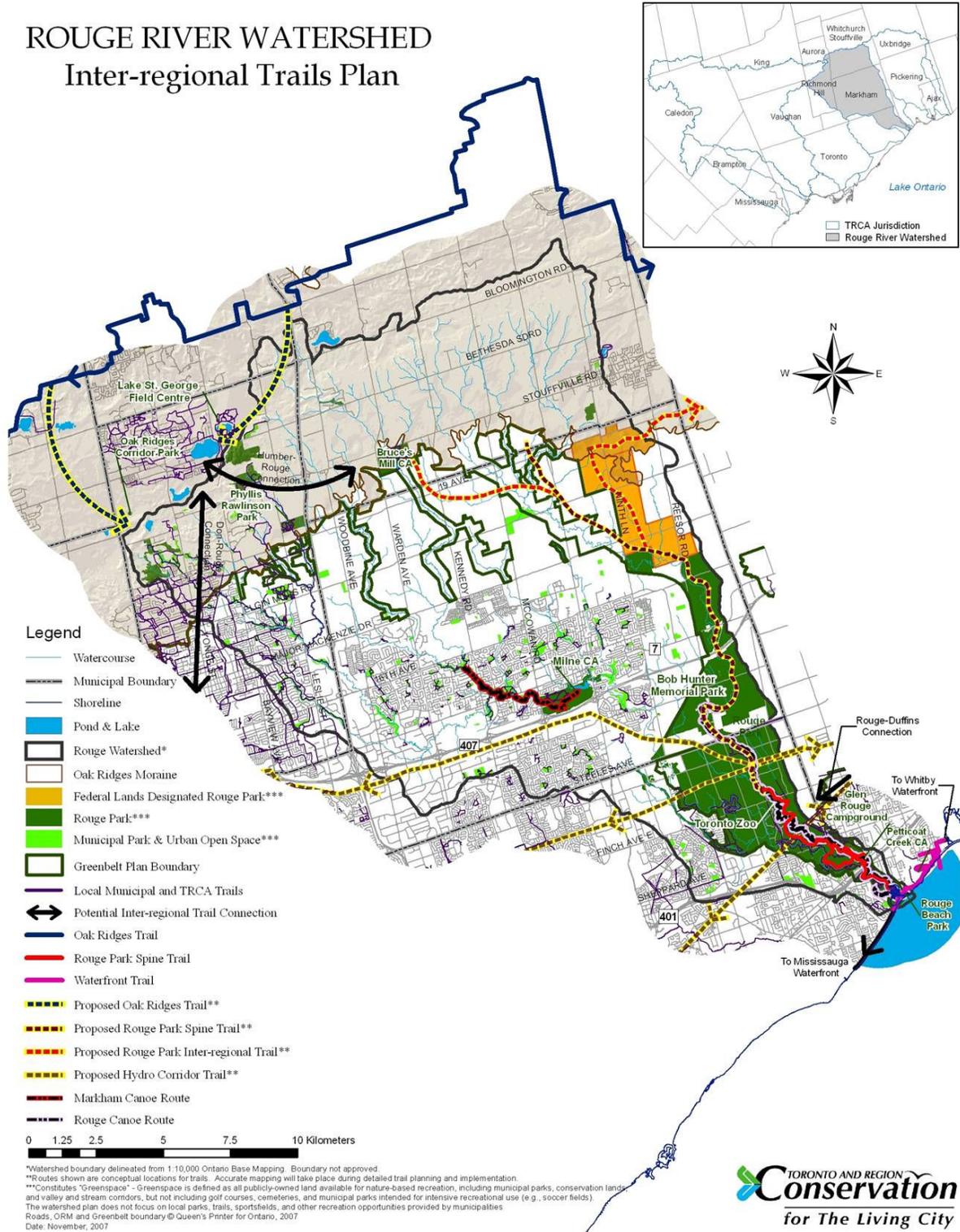
Variety of uses and experiences

The variety of opportunities present through the Rouge River watershed was characterized in the *Rouge River State of the Watershed Report* (TRCA, 2007) in three areas: Rouge Park, kettle lakes and countryside in the northern and eastern parts of the watershed, and major urban parks (Figure 4.7-1). Key recreation uses and experiences targeted for protection or enhancement include non-motorized boating and swimming, bird watching, hiking, cross-country skiing and snowshoeing in Rouge Park; agri-tourism, farm drives, horseback riding, cycling, hiking, cross-country skiing and snowshoeing in the kettle lakes and countryside; and picnicking, camping, hiking, cross-country skiing and snowshoeing in major urban parks.

The Rouge Park/Urban Wilderness area received a rating of good to excellent as it provides extensive hiking trails, lots of bird watching opportunities (both formal and informal), picnic sites, angling opportunities, swimming and camping facilities. The rural lands north of Major Mackenzie and south of 19th Avenue received a rating of poor as they either provide very few formalized opportunities or data about existing opportunities is incomplete or difficult to obtain. The areas north of 19th Avenue received a rating of poor to fair. A number of sites in this area provide nature-based recreation opportunities, including Phyllis Rawlinson Park and Bruce’s Mill Conservation Area; however, few opportunities exist outside of these few facilities.

Figure 4.7-2: Inter-regional Trails Plan

ROUGE RIVER WATERSHED
Inter-regional Trails Plan



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Access to greenspace

There are 5,484 ha of greenspace in the Rouge River watershed, the majority of which is located in Rouge Park, in the Little Rouge and Lower Rouge subwatersheds. Overall, watershed residents have good access to greenspace (see Table 4.7-2). Only 10% of residential areas (524 ha of a total of 5,009 ha of residential areas) are further than 2 km from a patch of greenspace of any size; an estimate that includes areas at edges of the watershed that may be near greenspace in neighbouring watersheds. Almost 20% of residential areas are within 1 km and 46% are within 2 km of patches of greenspace larger than 50 ha.

Table 4.7-2: Proximity of residential areas to greenspace in the Rouge River watershed (baseline conditions).

Greenspace patch size	Number of patches	Total area (ha)	Residential areas within 1 km (ha)	Residential areas within 2 km (ha)	Residential areas further than 2 km (ha)
Any size		5,484	4,849	4,960	524
5-10 ha	37	241	3,579	4,610	874
10-50 ha	32	663	2,914	4,205	1,279
>50 ha	10	4,326	985	2,287	3,197

Residential areas along Rouge Park, in the eastern and lower parts of the watershed, and around Milne Park, in Markham, have the highest scores for proximity to greenspace. Overall, a subjective rating of “good” was given to the current condition, although this rating should be reviewed in the context of information from other watersheds and additional information about user satisfaction.

On average across the Rouge River watershed, there are 22.6 ha of greenspace for every 1,000 residents. There are 44 residents for each hectare of greenspace. In contrast, there are only 2.5 ha of greenspace per 1,000 residents, and over 400 residents per hectare of greenspace, in the Don River watershed.

Only population data for the watershed and municipal scales were available for this analysis. Future analyses would benefit from population estimates at the scales of the subwatershed or municipal portions within the watershed, to facilitate spatial analysis across the watershed. For example, this might highlight a lack of accessibility of greenspace resources in the northern reaches of the watershed, while showing a higher than average availability of resources in the southern portions due to the presence of Rouge Park. Since the Town of Markham is almost entirely contained within the Rouge River watershed, access data for this municipality can be compared to the Rouge watershed average. The number of people per hectare of greenspace is significantly higher than the watershed average in Markham at 77 people/ha³. For every 1,000 residents, there are only 13.1 ha of greenspace available.

³ Using the total 2001 population of the entire Town of Markham (208,615) and the area of greenspace in the Rouge Watershed portion of the Town (2,725 ha).

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Trail network and its connectivity

Regional trails are important for connecting and integrating local, primarily municipal, trails. In and near the Rouge River watershed, regional trails already are established running east-west across the Oak Ridges Moraine (Oak Ridges Trail, to the north of the Rouge River watershed), running north-south in Rouge Park (Rouge Park Spine Trail), and along the waterfront (Lake Ontario Waterfront Trail). Significant gaps still exist among these regional trails, and should be filled to create a continuous east-west and north-south trail system that connects the lakeshore to the Oak Ridges Moraine.

Current demographics

As of the 2001 Canadian census, the population of the Rouge River watershed was 242,631. About 17% of the population was over 55 years in age. The prevalent ethnic origins in the Rouge watershed were Canadian or British heritage (31%), followed by Chinese (21%) and East Indian (9%). Of the recent immigrants (i.e., those who immigrated to Canada between 1996 and 2001), the predominant countries of origin were: Hong Kong (27%), China (18%), and India (10%). The remaining new immigrants came from over 35 different countries.

4.7.4 Effects of Conventional Urban Development

Scenario 2 (Official Plan Build-out) and Scenario 6 (Full Build-out) are addressed together, in recognition of their common effects on nature-based recreation. The primary variables of interest in these scenarios are the expanded urban areas and the associated population growth within the watershed. At least an additional 96,500 people are expected to settle in the Rouge River watershed by 2026, mostly in Markham, based on estimates from the York Region Official Plan projections. This population growth will likely be even greater in response to the provincial Growth Plan targets, which are still being allocated and assessed throughout the Region, and will create additional demand for recreational opportunities.

A key demographic issue will be aging of the population. For example, Statistics Canada projects that the proportion of York Region's population over the age of 55 will rise from 19% to 32% between 2005 and 2031. A similar trend is expected in the City of Toronto. The nature-based recreation needs of an aging population may be expected to differ from the current demographic, requiring adaptation of services (e.g., accessibility, level of trail difficulty) (City of Toronto, 2003).

Between 1996 and 2001, the predominant countries of origin of immigrants to the Rouge River watershed were Hong Kong (27%), China (18%), and India (10%). Across Ontario, population growth over the next couple of decades is expected to be driven by immigration (Ontario Ministry of Finance, 2005). Therefore, the nature-based recreation needs and preferences of immigrant populations will become increasingly important.

Further study is needed to assess anticipated changes to nature-based recreation needs in the Rouge River watershed due to the aging population and changes in cultural demographics. For example, a recreation needs and opportunities assessment was undertaken as part of the *Heart Lake Conservation Area Master Plan* (Heart Lake

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CA is in the Etobicoke and Mimico Creek watershed). The report notes that research on the topic of the recreational preferences of new Canadians is limited and the literature varies in its applicability. Potentially relevant findings include:

- “Canadians of Anglo-European descents prefer nature-based, individualistic recreation activities such as walking, hiking, and biking. These individuals are more likely to value time alone, individual activities and participate in outdoor recreation activities for exercise, fitness and fun.
- New Canadians of East and South Asian descent prefer organized passive and social outdoor activities such as picnics, barbeques, and social gatherings. These activities are focused around the community and the extended family and they reinforce cultural values, social interaction, language and religion. Large group picnics, festivals, and cultural events would be in highest demand.
- Second generation new Canadians find themselves caught between the conflicting pressures...there is growing interest in sports and athletics as these individuals attempt to integrate into mainstream society
- The literature emphasizes the recreational and social-cultural roles that festivals play in the lives of new Canadians by reinforcing ties to language, religion, and culturally significant customs and values...” (Heart Lake Conservation Area Master Plan Advisory Committee and TRCA 2006, pages 132-133).

There are currently opportunities for all of the above-mentioned recreational activities in the Rouge River watershed; however, increased demand for some of these activities may strain the capacity of existing facilities in the future.

Variety of uses and experiences

A recent J.D. Power survey found that 70% of new homebuyers in the Greater Toronto Area rate proximity to a park, common outdoor area or natural area as important or extremely important in their purchase decisions (J.D. Power and Associates, 2006). This is a strong indication of the increased demand for nature-based recreational opportunities that will accompany the urban growth. The increased demand will place additional pressure on the existing facilities, thus risking impairment of natural and cultural heritage landscapes associated with overuse (e.g., informal trail development, litter, introduction of invasive species, etc.) and affecting the quality of the user's experience, if additional facilities are not provided.

The variety of opportunities present through the Rouge River watershed under baseline conditions was characterized according to three areas: Rouge Park, kettle lakes and countryside in the northern and eastern parts of the watershed, and major urban parks. Lands in the existing major urban parks and in the Rouge Park area will continue to be protected from urban development, under the Official Plan build out (Scenario 2), therefore there may be very little impact on the public use opportunities available in this area, other than the pressure of increased use noted above. Under full build out (Scenario 6) additional lands will be set aside for Rouge Park as development proceeds, thus expanding the opportunities for hiking along connected greenspace in the middle tributary and Little Rouge subwatersheds. Bird-watching and nature-viewing opportunities may be impacted as increased development may lead to loss of habitat and urban matrix impacts on bird populations and other forms of flora and fauna.

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Bacteria levels will continue to rise in association with urban stormwater runoff and will impair swimming opportunities at Rouge Beach, unless greater precautions are taken to reduce the source of this pollution.

Opportunities for countryside experiences will be virtually eliminated in Richmond Hill in the upper Main Rouge and slightly reduced in the immediate vicinity of the Town of Stouffville in the upper Little Rouge, with implementation of the Official Plan.

Countryside areas north of Major Mackenzie Drive in Markham in the middle tributary subwatersheds and part of the Little Rouge will be lost as full build out proceeds. Kettle lakes settings and countryside landscapes on the Oak Ridges Moraine and Greenbelt corridors will continue to be protected under countryside designations of the Greenbelt Plan, however with increased population growth locally and throughout the GTA there will be pressure to widen rural roads to accommodate traffic volumes. Consideration should be given to the protection of roads and road rights-of-way that form part of valued rural landscapes. Traffic densities will also pose a threat to the quality of countryside drives, cycling, visits to farm markets and road-side vendors, unless master plans can be prepared well in advance to assist in defining and protecting these valued landscapes.

Overall, it will be challenging to maintain the number and quality of existing opportunities under the growth scenarios. Additionally, the list of desired opportunities may increase as the demographics in the region change. It is likely that the score for this indicator will decrease over time unless care is taken to provide for these opportunities as the development takes place.

Access to greenspace

With the increase in population under Scenario 2 (OP Build-out), the per capita greenspace will decrease, although additional lands are expected to be brought into public ownership as a result of valleyland, Rouge Park and municipal park policies pertaining to land use change. Furthermore, the pressure on greenspace (# of residents per ha) will increase, and likely also lead to a decrease in quality of the existing/remaining greenspace. This will be true across the watershed, but will likely be felt most markedly in Rouge Park North/Little Rouge Corridor as there will be significant development growth in Markham and Stouffville.

Proximity to greenspace will increase across the watershed as residential areas expand closer to greenspace – again, increases will be most noticeable in Markham and Stouffville as their residential boundaries expand. For these new developments, they will indeed be closer to greenspace, though the quality of that greenspace experience may be low due to the increased pressure discussed above. There may actually be some decrease in proximity to greenspace for existing residential areas (existing under scenario one), due to changes in accessibility that aren't apparent from scenario mapping, such as:

- The build-out scenarios assume no loss of greenspace in currently built areas, but development infilling may reduce the quantity or quality of existing greenspace. Furthermore, with increasing population pressures, some existing

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- greenspace could be converted to more intensive recreational uses, resulting in a loss of areas for more nature-based recreation.
- Although private lands aren't considered to be "public greenspace", residents might currently be accessing private undeveloped lands as greenspace. Those lands may be urbanized in the future, resulting in a "loss" of local greenspace.

Effects of full build out (Scenario 6) are expected to be similar to Scenario 2, but more extreme – as per capita greenspace decreases, pressure on remaining greenspace will increase. Proximity to greenspace will increase as residential areas expand, but there will undoubtedly be losses of greenspace as open spaces are built.

Trail network and its connectivity

The inter-regional trails proposed in the trails plan for the Rouge River watershed could be affected by expanded development in Scenario 2 (Official Plan build-out). The southern-most proposed hydro corridor trail will likely be unaffected. Some vacant lands around the proposed hydro corridor trail north of Finch would become residential. The northern-most proposed hydro corridor trail would see some conversion of vacant, agriculture, and meadow lands to industrial, commercial, and residential uses. These land use changes may impact the "experience" of the proposed trails, although much of the surrounding lands are already developed. There would be no major land use changes affecting the proposed extension of the Rouge Park Spine Trail.

The Scenario 6, full build-out would result in few additional land use changes affecting the proposed hydro corridor trails. However, the proposed extension of the Rouge Park Spine Trail would be bordered on its east side by a potential urban area north of Major Mackenzie. Links to the east would need to be routed through the urban area (east branch of the proposed Rouge Park Inter-regional Trail). The link west to Bruce's Mill Conservation Area should still be feasible due in part to protected Greenbelt and Oak Ridges Moraine lands (west branch of the proposed Rouge Park Inter-regional Trail).

While the proposed interregional trails are still feasible under the development scenarios, careful planning of conceptual routes will be necessary well in advance of full build-out. In particular, where proposed trails and links will cross potential urban areas, issues of access to private lands and the need to set aside lands for trails during the development process will be central.

Overall, increased population numbers will lead to increased use of existing trails and demand for additional trails. This increased pressure has the potential to lead to more user conflict, create more wear on the trails, and lead to more impact on the natural systems that host these trails.

As development increases it is possible that more local trails will be created within residential areas as municipalities and developers try to create attractive communities. It will be important for municipalities to ensure that these trails are well-planned in early stages of the development planning process and connected in order for the trails to function well as part of a larger trail system, as well as to provide a positive experience for users. Trails also help to create more walkable, sustainable communities.

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4.7.5 Effects of End of Pipe Stormwater Retrofit

Stormwater retrofits were not deemed to have a significant impact on recreation activities in the watershed, and therefore this scenario was not reviewed further.

4.7.6 Effects of Expanded Natural Cover

Overall, the increased natural heritage system in Scenario 4 may serve to off-set some of the recreation impacts from the expanded development and growth from Scenario 2. As was discussed above, the greatest overall impact of Scenario 2 will be the increased demand for public use opportunities, and the associated pressure that will place on greenspace resources. By increasing the natural heritage system, it may be possible to either provide additional opportunities, or at least focus public use in areas that are less sensitive due to the increased area of cover to work with.

Variety of uses and experiences

In terms of the three unique recreational experience areas: Rouge Park and to a lesser extent major urban park experiences and opportunities will be significantly enhanced with implementation of the expanded terrestrial natural heritage system. The improved quality of habitat will support an increased diversity of species, that will enrich bird-watching and nature viewing activities. The connected and expanded public greenspace system will extend opportunities for hiking, picnicking, angling, etc.

Countryside experiences may be somewhat reduced in the northern parts of the watershed, as some agricultural lands are targeted for inclusion in the terrestrial natural heritage system.

Access to greenspace

In terms of access to opportunity, there may be a range of impacts under Scenario 4. Proximity to greenspace will certainly increase as the residential areas expand (see Scenario 2) and the natural heritage system increases. Per capita greenspace will also increase, though the rate of change will depend on the amount of increase for each factor. Perhaps the most interesting change under this scenario will be for the variety of public use opportunities available in the watershed. The increased natural heritage system will create more potential for nature-based, low-impact activities such as hiking, bird watching and picnicking. At the same time, it will become important to concentrate these activities in less sensitive areas – away from watercourses, for example. While this will be possible due to the increase in the size of the system, the accompanying increase in the quality of the system may actually create more sensitive areas to be avoided by public use. In this case it will remain extremely important for municipalities to continue to provide facilities outside of the natural heritage system for higher impact activities.

Trail network and its connectivity

The expanded natural heritage system will be conducive to a better and higher quality trail system. Many of the trail connections and expansions proposed in the trail plan will

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be possible under the expanded system in Scenario 4. However, given the potential for increased quality and sensitivity of habitats and species, it will be important to consider compatibility of uses – for example, in ecologically sensitive areas it might be advisable to eliminate or reduce the quantity of trails. In other cases, multi-use trails might be limited to single uses.

4.7.7 Effects of Sustainable Communities

Variety of uses and experiences

The effects of Scenario 7 (Sustainable Communities) on the three main recreational areas are expected to be similar to those under Scenario 4 (Expanded natural cover), except for countryside areas. Under the Sustainable Community Scenario, although there will be a loss of countryside just north of Major Mackenzie Drive in the middle tributary subwatersheds, associated with the potential full build out lands, assumptions were made about the improved support for local agriculture. This scenario assumes that local country markets and community supported agricultural arrangements are fostered, such that there will likely be a greater extent of developed agricultural related recreational experiences.

Access to greenspace

Proximity to greenspace will be similar to or improved over Scenario 4. However, the health of the natural areas will be improved, due to assumptions about improved management of matrix (i.e. surrounding land use) impacts and stewardship of natural areas under the sustainable community scenario.

Trail network and its connectivity

This scenario assumes the proposed inter-regional trail network is implemented and that connections with local community trail systems are well-established, thus contributing to more “sustainable” communities.

4.7.8 Effects of Climate Change

The effects of warmer, wetter conditions were considered in terms of the conventional full build out (Scenario 6) and sustainable community (Scenario 7). Climate change effects would not be relevant to the access and trails indicators, however they would impact upon the variety and quality of recreation uses and experiences. Expanded natural cover would be particularly important in helping to provide shade and respite from the increased temperatures and risk of solar radiation during outdoor recreational pursuits.

Shifts in the composition of flora and fauna and agricultural crops that may accompany climate change, and which are more thoroughly discussed in Section 4.5 of this report, would have implications for changes in focus for bird-watching, angling and nature-viewing activities. Reduced baseflow in the River will undoubtedly impact its navigability, and so may limit canoeing in some lower tributaries. Warmer water

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temperatures will foster the survival and reproduction of bacteria, thus posing a greater loss of swimming days through closures at the Rouge Beach.

4.7.9 Summary and Conclusions

Scenarios 2 (OP Build-out) and 6 (Full Build-out) have a strong potential to affect nature-based recreation in the Rouge River watershed. These urban growth scenarios would result in increasing population, changing demographics (aging population, immigration), and shifts in land use from rural to urban, with implications for the variety of nature-based recreational uses and experiences available in the watershed; and the adequacy, accessibility, and condition of greenspace and the trails network.

Rapid urban growth, particularly in Markham and Stouffville, is expected to result in rising demand for nature-based recreation and falling per capita greenspace resources. This will be felt most strongly in Rouge Park North/Little Rouge Corridor. More intense use of greenspace could result in proliferation of informal trails, invasive species, dumping and litter, and damage to sensitive natural areas, with associated impacts on the quality of the recreational experience. Similarly, urban development on lands adjacent to proposed inter-regional trails could affect the use experience, particularly along hydro corridors (scenarios 2 and 6) and the Rouge Park Spine Trail (Scenario 6). Changing demographics will be expressed in shifting demands for particular types of recreational uses (e.g., East Asian and South Asian immigrant population preference for social gatherings, such as picnics) and needs (e.g., better access for the elderly).

Scenarios 4 (Expanded Natural Cover) and 7 (Sustainable Communities), with their increase in natural cover, could help to offset or dilute some of the growth-related impacts of scenarios 2 and 6. Expanded natural cover may enhance some nature-based recreation experiences (e.g., hiking, bird watching) and may provide a large enough greenspace land base to protect more sensitive natural areas from incompatible uses (e.g., mountain biking). These improvements would be most noticeable in the Rouge Park area and to a lesser extent in the Countryside, if the viability of agriculture isn't maintained or enhanced.

The impact of scenario 8 (Climate Change) on nature-based recreation in the Rouge River watershed is difficult to assess. The potential impacts are broad and far reaching, as changes in hydrology, water quality, and air temperatures may affect the extent and composition of flora, fauna, and agricultural crops across the watershed. These altered conditions would affect the quality of a range of recreational experiences, including canoeing, bird watching, and swimming. The expanded natural cover associated with the Sustainable Community climate change scenarios could help to offset some of these impacts.

4.7.10 Management Considerations

The Province's Growth Plan suggests that population growth in the Rouge River watershed is likely to be substantial over the next two decades. Careful planning and management of the greenspace and trails system will be needed to meet growing and changing demand for nature-based recreation and to balance public use with protection of sensitive natural areas. Key management considerations include:

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- There is a need for greater recognition of the overall regional nature-based recreation system, including Rouge Park, inter-regional trails, conservation areas and major municipal parks. The role of individual sites and trails needs to be recognized for its contribution to the system.
- Public lands that make up the regional nature-based recreation system need to be regarded as public assets and, like other public infrastructure, need to have adequate funding to support their monitoring, maintenance and management.
- A recreation strategy should be developed for the Countryside area. Special measures, such as protecting roads and road right-of-ways, may be needed to protect Countryside experiences as urban development proceeds.
- Rouge Park is strategically located as the major natural environment area for passive uses. The Park's wilderness experience should be protected as a crucial element of the system.
- Little is known about current levels of nature-based recreation. Conduct monitoring and assessment of current use and demand for recreational activities.
- Carry out a literature review and field study to improve the understanding and prediction of future recreational use demand, user conflicts, and the carrying capacity of natural and cultural heritage features. Develop guidelines to assist future planning.
- Further study is needed to better understand how changing demographics (aging population, immigration) will affect future recreational needs and preferences.
- Planning for creation of new greenspace and implementation of inter-regional and local trails should occur in advance of development.
- Protected lands under the *Greenbelt Act* and *Oak Ridges Moraine Conservation Act* will provide opportunities for greenspace and trail development, but agreements with private land owners will likely be necessary to create a well-connected system.

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4.7.11 References

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