

Lake Dalrymple Management Plan

2024



**KAWARTHA
CONSERVATION**

Discover • Protect • Restore

About Kawartha Conservation

Who we are

We are a watershed-based organization that uses planning, stewardship, science, and conservation lands management to protect and sustain outstanding water quality and quantity supported by healthy landscapes.

Why is watershed management important?

Abundant, clean water is the lifeblood of the Kawarthas. It is essential for our quality of life, health, and continued prosperity. It supplies our drinking water, maintains property values, sustains an agricultural industry, and contributes to a tourism-based economy that relies on recreational boating, fishing, and swimming. Our programs and services promote an integrated watershed approach that balance human, environmental, and economic needs.

The community we support

We focus our programs and services within the natural boundaries of the Kawartha watershed, which extend from Lake Scugog in the southwest and Pigeon Lake in the east, to Balsam Lake in the northwest and Crystal Lake in the northeast – a total of 2,563 square kilometers.

Our history and governance

In 1979, we were established by our municipal partners under the *Ontario Conservation Authorities Act*.

The natural boundaries of our watershed overlap the six municipalities that govern Kawartha Conservation through representation on our Board of Directors. Our municipal partners include the City of Kawartha Lakes, Region of Durham, Township of Scugog, Township of Brock, Municipality of Clarington, Municipality of Trent Lakes, and Township of Cavan Monaghan.

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Acknowledgements

This plan was facilitated by Kawartha Conservation and developed with significant input from a Guidance Group made up of local stakeholders, and the broader Lake Dalrymple watershed community. Funding for this project was provided by the municipality of the City of Kawartha Lakes.

We would like to acknowledge that many Indigenous Nations have longstanding relationships, both historic and modern, with the territories upon which we are located.

Today, this area is home to many Indigenous peoples from across Turtle Island. We acknowledge that our watershed forms a part of the treaty and traditional territory of the south-eastern Anishinaabeg.

It is on these ancestral and Treaty lands that we live and work. To honour this legacy, we commit to being stewards of the natural environment and undertake to have a relationship of respect with our Treaty partners.

The region of Kawartha Lakes was referred to as Gau-wautae-gummauh, a glistening body of water, in anishinaabemowin. We are thankful to have an opportunity to work with Indigenous Peoples in the continued stewardship and care of this beautiful region.

Executive Summary

Lake Dalrymple is situated within the municipalities of City of Kawartha Lakes and Ramara Township, in the Kawartha Lakes regions of Ontario.

The lake and its watershed (drainage basin) are highly valued by local residents, indigenous peoples, lake users, and local municipalities for its ambience and character, natural habitats, recreational opportunities, good water quality, and tourism and economic benefits.

The Lake Dalrymple Management Plan is a science-based, community-driven approach to maintain, and where possible improve healthy lake conditions. It was developed by Kawartha Conservation, with financial assistance from City of Kawartha Lakes, and significant input from the local community.

The companion document: [Lake Dalrymple Watershed Characterization Report](#), provides a technical summary of the 'state of the lake'. Based on 3 years of scientific study (from 2021 to 2023), the lake and its watershed are in 'fair' to 'good' condition when viewed under the lenses of: land and lake use, water inputs and levels, water quality, sediment quality, aquatic habitats and fish, and landscape ecology.

Several lake management challenges are evident, that if not adequately managed could jeopardize the health of the lake. Priority challenges include: intensification of shoreline development, agricultural runoff, invasive species, climate change, over-use and crowding, and quarry operations.

To address these challenges and meet local community needs, The Lake Dalrymple Management Plan contains 42 practical actions, grouped within the following eight recommendations:

- Protect the fishery from over-harvest.
- Protect important habitat and unique features during new development.
- Rehabilitate natural vegetation and habitats along the shoreline.
- Rehabilitate natural vegetation, habitats, and connectivity along streams.
- Communicate through lake associations: lake threats and solutions.
- Communicate through signage: lake threats and solutions.
- Communicate through public information sessions: lake threats and solutions.
- Monitor lake health conditions and fill data gaps.

Successful implementation of the plan will rely upon the collaboration, leadership, and assistance of 20 key partners. Periodic review and adjustments should be made accordingly to ensure the focus of implementation remains appropriate, relative to ever-changing local community concerns and lake health stressors.

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1.0 Setting the Context



[East side of Avery Point, Lower Lake Dalrymple]

1.1 Introduction

The Lake Dalrymple Management Planning project is a collaborative effort led by Kawartha Conservation, funded by City of Kawartha Lakes, and with input provided from a broad range of local individuals, communities, and stakeholders.

The science-based project was undertaken over 4-years (2021-2024) and involved routine monitoring of water quality and water quantity conditions, and focused studies on important lake watershed features to local communities such as: land use, fish habitats, aquatic plants, and landscape ecology.

The project also included comprehensive public engagements to better understand the lake management priorities of local communities and lake management organizations. A 'Working Group', made up of local community members and organizations met on a regular basis to help guide the project.

Key outcomes of the project are the Lake Dalrymple Management Plan (LDMP) and the Lake Dalrymple Watershed Characterization Report (LDWCR).

The LDMP is a 'public-friendly' publication that provides a high-level overview of key science-based and community-based issues and opportunities, and details numerous management recommendations that, if implemented, will help to maintain and where possible improve the health of the lake.

The LDWCR, is a 'technical' publication that provides background information on the current state of the aquatic and terrestrial ecosystems within the Lake Dalrymple watershed, as well as a summary of lake-based community concerns and values identified through public consultation. The report includes detailed information on Land Use and Lake Use, Water Inputs and Water Levels, Water Quality, Sediment Quality, Aquatic Habitats and Fish, and Landscape Ecology.

1.2 Objectives

The following objectives were developed at the project onset to guide the Lake Dalrymple Management Planning project.

- Implement and maintain for the duration of the study comprehensive water quality and water quantity sampling networks to provide a scientific basis to identify current and potential threats/stressors, hotspots, evaluate trends and key management issues, and identify options for priority actions.
- Provide a current and baseline scientific basis to support and inform municipal land use planning and policy tools within the City of Kawartha Lakes.

- Design and implement management activities to maintain or achieve Provincial Water Quality Objectives for the lake and its streams, and create greater confidence in the lake health in general.
- Protect and improve water quality for all uses.
- Foster community participation in the project and understanding of the Kawartha Lakes, their natural and historic heritage, and human impacts.
- Develop and coordinate the necessary partnerships for effective collaboration on all aspects of the planning process and plan implementation.
- Promote a greater dialogue and understanding of issues, conflicting needs, visions and resource uses.
- Identify specific items for ongoing monitoring and advanced university research, for example: quantifying impacts to the nearshore zone, identifying specific sources of pollution, considering impacts of climate change, and invasive species.

1.3 Study Area

Lake Dalrymple is in southern Ontario, Canada, just north-east of Lake Simcoe, and east of the Town of Orillia. It is on the far western boundary of what is locally referred to as the 'Kawarthas' region.

The project study area is the Lake Dalrymple watershed, which is 150.5 km² (Figure 1). This includes the lake, and all lands and waters that drain into the lake outlet, which exists at the north-west end of the lake. The surface area of the lake is 13.9 km², and its shoreline length is 40.6 km, making it the 6th largest lake wholly or partially within City of Kawartha Lakes in the Kawarthas.

There are two distinct 'basins' of Lake Dalrymple, separated by the 'narrows' at Kirkfield Road. Upper Lake Dalrymple lies south of Kirkfield Road and flows north into Lower Lake Dalrymple. Upper Lake Dalrymple is shallower (mostly 1 to 2 metres deep; maximum depth of 6 metres), has softer sediments and more prolific aquatic plant growth. Lower Lake Dalrymple is deeper (mostly greater than 3 metres deep; maximum depth of 10 metres) and has harder substrates and less aquatic plant growth.

The Lake Dalrymple watershed is located within two municipalities. Just over half of the watershed, including the entire Lower Lake Dalrymple, and one-third of Upper Lake Dalrymple, lies within the single tier municipality of the City of Kawartha Lakes. Additionally, most of the shoreline is within the

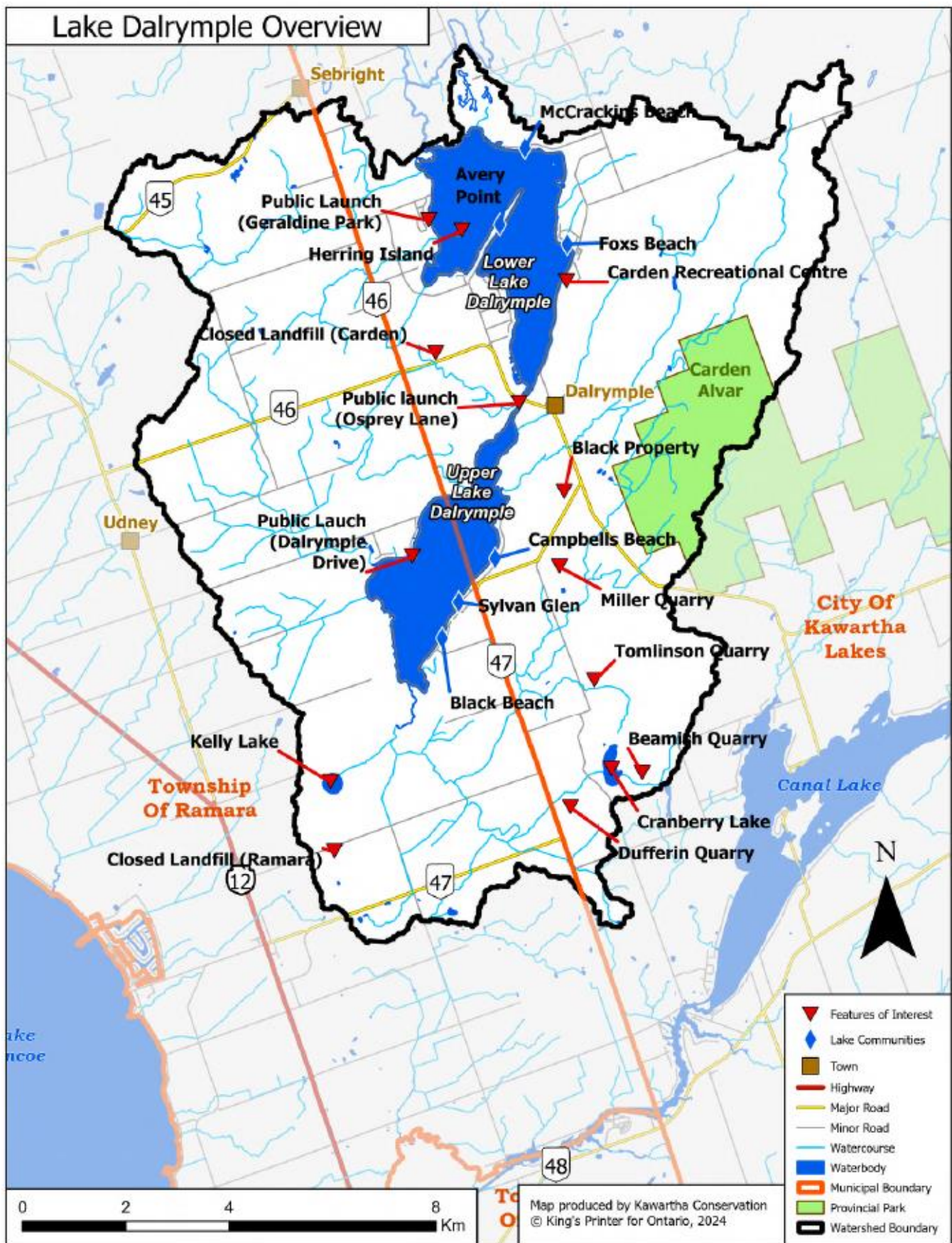


Figure 1. Study area and features of interest.

City of Kawartha Lakes. The remaining lands lie with the Township of Ramara, a lower tier municipality with the County of Simcoe.

Lake Dalrymple is a 'headwater lake', meaning it exists near the top of its drainage basin and does not have any major inputs of water from upstream sources, such as large lakes or rivers. The size of the lake relative to its watershed is high. It is a unique lake in the Kawarthas in that it exists through natural processes and is not regulated by human-made structures (dams). Lake Dalrymple outlets into the Head River, which drains in north-westerly direction into the Black River, and eventually into Georgian Bay.

The Lake Dalrymple watershed lies within the 'Land Between', a geological transition area between the Canadian Shield (a region characterized by relatively hard bedrock with bare or shallow soils), and the St. Lawrence Lowlands (a region characterized by relatively soft sedimentary bedrock with shallow to deep soils). The dominant 'landform' in the watershed is the Limestone Plains.

This area is also referred to as Carden Alvar and consists of mostly continuous limestone bedrock having extremely shallow soils. Another notable feature on the landscape is the presence of drumlins; humps of land orientated in a northeast to southwest orientation.

The region has a long history of human activity, including First Nations peoples and more recently European settlement. The close proximity to the Greater-Toronto-Area makes Lake Dalrymple an attractive development and recreational location.

1.4 Land Use and Other Management Pressures

The Lake Dalrymple watershed has expansive areas of forests, wetlands, and meadows. These areas provide 'natural' water quality protection benefits for the lake, by filtering and absorbing surface water runoff and groundwater draining through each of 21 unique sub-watersheds to the lake (Figure 2).

Land use practices that remove or significantly alter these natural spaces are the primary focus of lake management efforts. These areas comprise approximately 23% of the land area draining in the lake, and include developed areas (i.e., waterfront properties, active quarry operations, and rural residential properties), and agriculture.

Managing excessive nutrient and sediment inputs into the lake is a priority lake management concern. Nutrients (i.e., phosphorus) and sediment (i.e., soil), are a basic requirement to support life in a healthy lake, but too much can lead to excessive algae growth, and degrade habitats that fish and other aquatic life need to survive.

The following lake management pressures are the reason for the development of the Lake Dalrymple Management Plan. If not properly managed, these pressures will deteriorate lake health conditions.

Shoreline development.

Watershed development is concentrated along the lake, with 35% of the total shoreline considered developed (Figure 3). There are about 780 individual lots along the shoreline, of which only 15% remain vacant (undeveloped). Developed lots are an equal mix of seasonal and permanent homes, plus two trailer parks and one resort.

Development leads to a reduction in lake habitat quality and reduced capacity to filter contaminated runoff as mature trees and shrubs are removed to maintain manicured lawns, and aquatic plants are removed to maintain clear-water conditions. In an average year, wastewater from shoreline septic systems inputs an estimated 951 kg (30% of total) of phosphorus into the lake (Figure 4).

Waterfront lot developments are expected to increase, including the conversion of seasonal cottages into year-round homes, given how close the lake is to the rapidly urbanizing Greater-Toronto-Area.

Agriculture.

Cropland and livestock farming is widespread in the Lake Dalrymple watershed, comprising 17% of all lands draining into the lake.

The primary concern for lake management is agricultural runoff entering streams, which provide direct pathways to the lake. Farming practices upslope or adjacent to streams can introduce contaminated runoff into the lake in the form of elevated nutrients, sediment, and chemicals. Data indicates that there is poor water quality in some streams flowing through agricultural lands. In an average year, agriculture inputs an estimated 800 kg (26%) of phosphorus into the lake (Figure 4).

Roads.

There are 110 km of roads within the watershed, most of which are near the lake to accommodate waterfront access. Roads intersect streams at fifty-seven locations.

Road maintenance activities such as de-icing and ditch clearing can introduce salt and sediment into the lake. Vehicle traffic, especially along busy roads (e.g., Kirkfield Road) leads to roadkill of several important species of conservation concern (e.g., turtles). Further, several culvert stream-road crossings have perched outlet conditions, which restrict the free passage of fish to and from the lake.

Quarries

There are several active aggregate operations within the watershed. These are large open pit areas that draw large amounts of groundwater. In terms of water extraction, the impact on Lake Dalrymple is negligible because most of the extracted water is redirected back to local surface water streams that then flow into the lake.

Invasive Species.

Organisms that are non-native to the lake can cause significant environmental damage, by altering habitat and outcompeting the resources from native organisms. Once established, they are nearly impossible to eradicate. Several invasive species are now prolific in Lake Dalrymple, and given the lake is a popular angling and recreational destination, new introductions are highly likely.

Climate Change.

Under the 'business as usual' climate scenario (i.e., no significant reductions in global warming emissions), by 2050 the region is expected to experience an average increase in air temperature of 5.1°C and increase in precipitation of 7%. As the earth continues to warm, it will cause warmer and more extreme weather conditions in the Lake Dalrymple watershed.

Rising air and water temperatures cause shifts in the distributions of terrestrial and aquatic life and their habitat conditions. Higher intensity storms could lead to increased risk of erosion and more contaminated runoff entering the lake. Extreme variability in rain, snow, and melt conditions have direct implications for lake water levels.

Exploitation.

The lake is a popular angling, recreational, vacationing, and waterfront-living destination. There is already a perceived threat from community stakeholders that over-harvesting of local fish populations and crowding from boating is causing deteriorating lake health conditions. Fishing is an extremely popular activity on the lake, and fishing pressure is higher on Lake Dalrymple (especially in winter) than on other lakes within the Kawarthas. This will continue given how close the lake is to the rapidly urbanizing Greater-Toronto-Area.

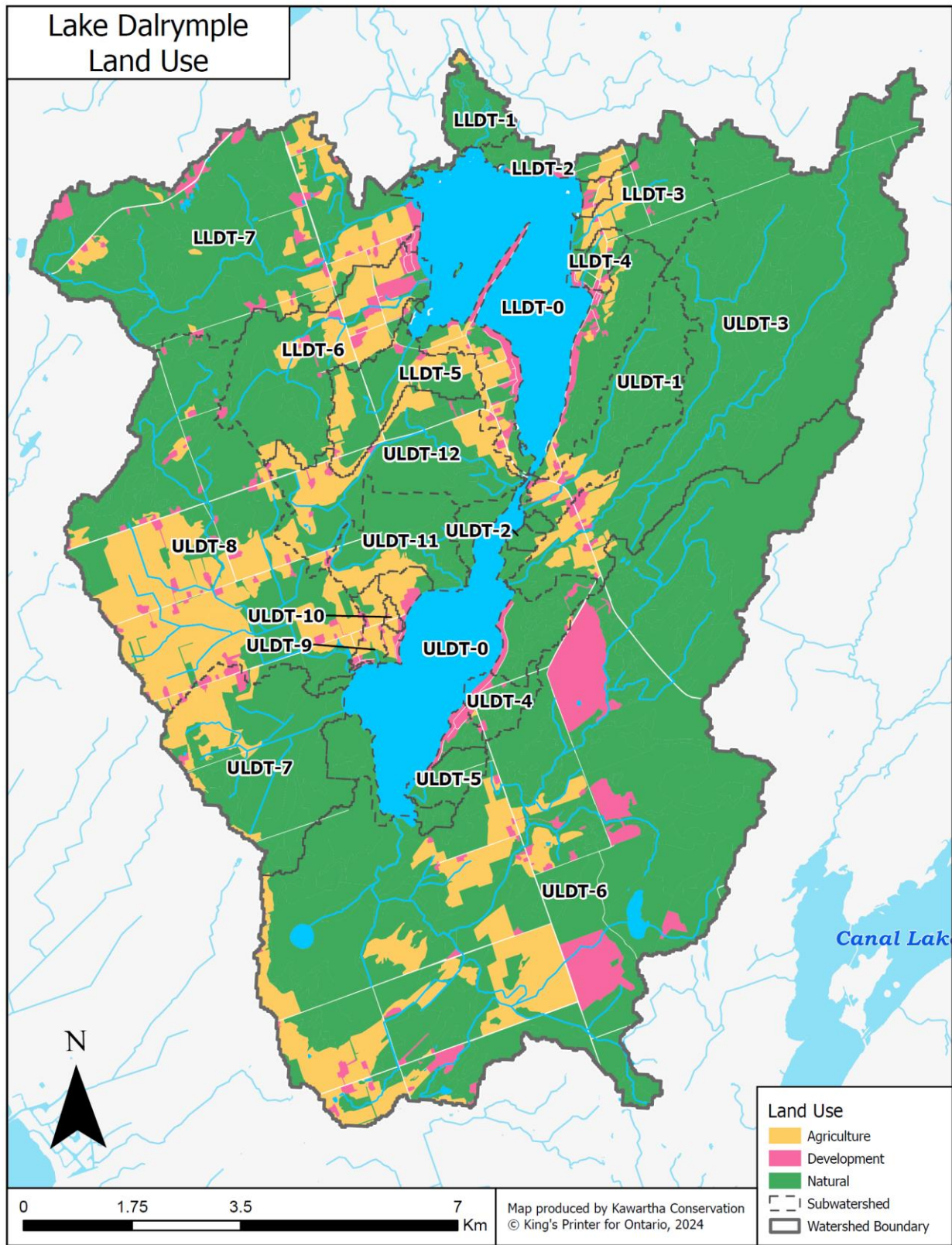


Figure 2. Land use and sub-watersheds.

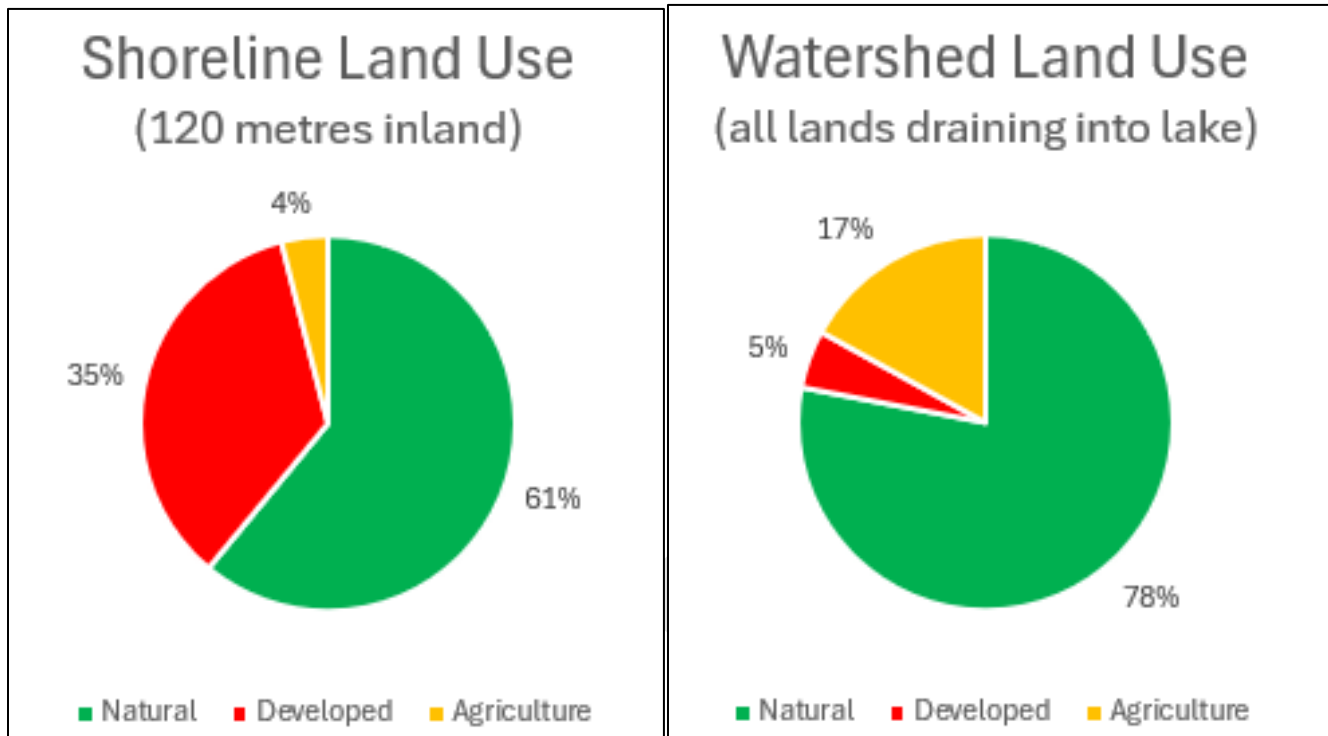


Figure 3. Shoreline and watershed land use.

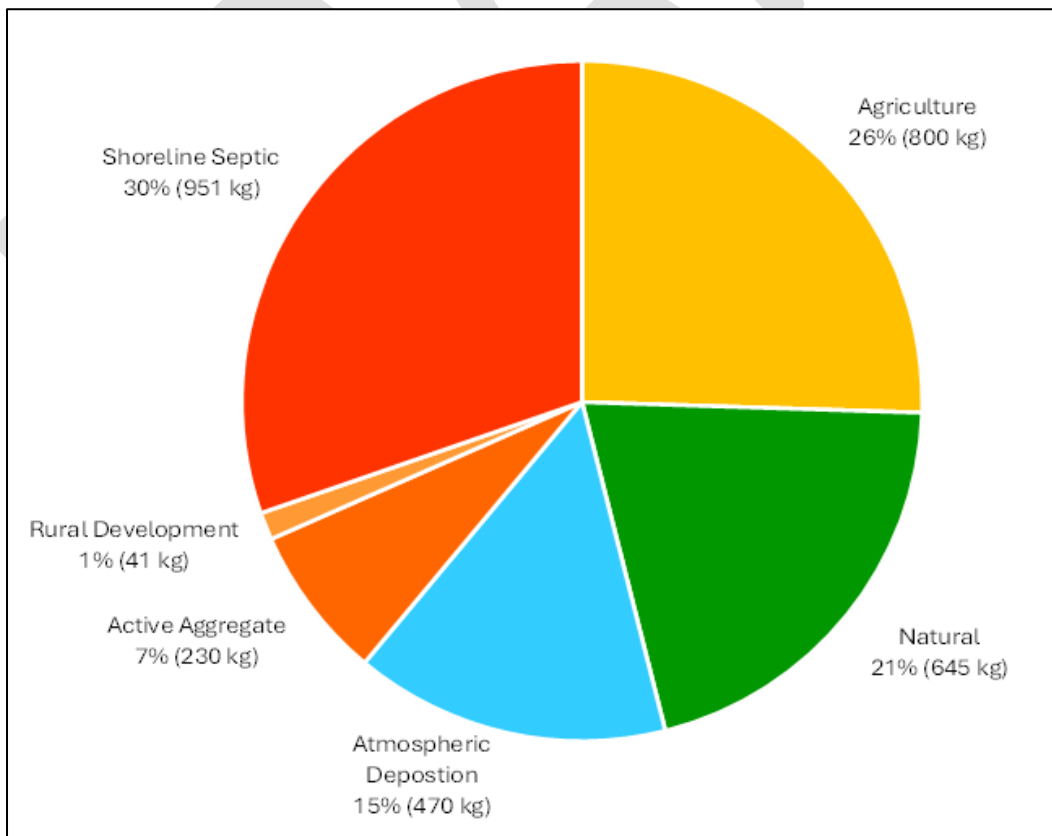


Figure 4. Phosphorus inputs to the lake, in an average year (2021-2024).

1.5 Community Concerns and Values

Through extensive public outreach including open houses, Working Group sessions, and stakeholder feedback surveys, several key lake management concerns (Table 1) and lake values (Table 2) were confirmed.

Table 1. Main concerns identified through public engagement.

Community Concern	Specific Examples
Aquatic plants and algae	<ul style="list-style-type: none"> • Mid-summer algae blooms. • Excessive aquatic plant growth. • Nutrient enrichment.
Dug canal on Kirkfield Road	<ul style="list-style-type: none"> • Potential impact on water levels. • Destroying stream and wetland habitats.
Dump site on County Road 47	<ul style="list-style-type: none"> • Potential for contaminated soils leaching into lake.
Fisheries	<ul style="list-style-type: none"> • Overfishing; no fish stocking. • Heavy ice fishing pressure. • Catching less fish; fewer Walleye and Muskellunge.
Invasive species	<ul style="list-style-type: none"> • General concern for invasive species. • Zebra mussels.
Lack of a united ‘voice’	<ul style="list-style-type: none"> • Need to have a combined interest group from all areas around the lake that would address lake issues common to all.
Lack of enforcement	<ul style="list-style-type: none"> • Lack of presence of Conservation Officers. • Lack of action on environmental damage violations.
Navigation in narrows	<ul style="list-style-type: none"> • Rock hazards during low water levels.
Old landfills	<ul style="list-style-type: none"> • Leaching contamination into lake.
Overcrowding	<ul style="list-style-type: none"> • Overcrowding by powerboats. • High speed boating close to shore. • Crowded public boat launches.
Pollution in lake	<ul style="list-style-type: none"> • Litter along shoreline.
Quarries	<ul style="list-style-type: none"> • Perceived impact on water levels. • Runoff quality.
Runoff quality	<ul style="list-style-type: none"> • Shallow soil increases runoff. • Salt application.
Septic systems	<ul style="list-style-type: none"> • Old systems leaching contaminants into lake.
Shoreline development	<ul style="list-style-type: none"> • Potential destruction of natural shorelines from new development. • Less natural shorelines; more shoreline hardening. • Dumping sand in lake.
Shoreline erosion	<ul style="list-style-type: none"> • Preventing shoreline erosion. • Erosion of Avery Point.
Water level change	<ul style="list-style-type: none"> • Beavers causing flooding of farmland. • Large fluctuations from spring to fall.

Table 2. Main community values identified through public engagement.

Community Value	Specific Examples
Ambience and Character	<ul style="list-style-type: none">• Community feeling, and family friendly.• Natural beauty of the area.• Peaceful, quiet, and safe.
Family History	<ul style="list-style-type: none">• Family history and memories on the lake.• Protection of the lake for future generations.
Nature and Habitat	<ul style="list-style-type: none">• Geography, habitat, and nature.• Wildlife, plants, and biodiversity.
Recreation	<ul style="list-style-type: none">• Boating, kayaking and water sports.• Swimming and other recreational lake activities.
Water Quality and Quantity	<ul style="list-style-type: none">• Clean water.• Comfortable water temperature.• Water quality, clarity, level, and health.

1.6 State of the Lake

For three years (2021 to 2023), Kawartha Conservation collected data on environmental conditions in the lake and its watershed. This information is a documentation of baseline lake health. It is used to identify key lake health observations and lake management concerns, against which future assessments can be compared.

Overall, the lake and its watershed are in a fair-to-good condition. The following provides a summary of the state of the lake, separated into: Water Inputs and Water Levels, Water Quality, Sediment Quality, Aquatic Habitats and Fish, and Landscape Ecology.

Water Inputs and Water Levels

The condition of water inputs and water levels are good. Given the lake is not regulated by a dam, its water level regime follows a natural seasonal pattern. Water levels fluctuate around one metre during a typical year. With so much of the watershed having natural cover, land use disturbance has negligible effects on water input and water levels.

An estimated 71 million cubic metres of water, per year, flows through the lake. Given the karst (fractured bedrock) conditions, groundwater is thought to comprise a significant portion of flows into and out of the lake. Most of the overland drainage (77% of total) enters Upper Lake Dalrymple, which then drains into the Lower Lake. It takes about 200 days for the lake to flush (replenish with water),

which is a longer residence time than most other Kawartha Lakes, given that Lake Dalrymple is a headwater lake.

A key lake management issue is the uncertain impact that climate change will have. Given the lack of long-term data on water inputs and water levels, detailed 'scientific modelling' of changes in lake conditions from climate change are not possible at this time.

Water Quality

The condition of water quality is fair. Usually, the lake and most sampled streams exhibited good conditions for key indicators of lake health, including water clarity, dissolved oxygen, nutrients (phosphorus and nitrogen), pH, and chloride. The large portion of natural cover in the watershed, as well as the abundance of aquatic plants in the lake, help to prevent wide-spread water quality deterioration.

There was a recent (September 2024) blue-green algae bloom in Upper Lake Dalrymple, localized to the south-east shoreline of near the Black Beach area. A public health advisory was issued to advise lake users to avoid contact with the potentially 'toxin' producing lake water. These events do not commonly occur on the lake but may become more prevalent in the future with climate change.

A key lake management issue is that phosphorus concentrations are elevated (Figure 5). Average lake phosphorus typically met provincial objectives, but not consistently (25 to 46% of samples failed in meeting objectives). In 2023 average phosphorus did not meet objectives and was almost 50% higher than in preceding years. Stream phosphorus was also elevated, and streams within sub-watersheds ULDT-8 and LLDT-6 failed to meet objectives 90 to 100% of the time. These poor-quality streams drain through agricultural areas.

Chloride levels in the lake and in the streams have increased since 1972, from continuous domestic and transportation salt usage for the winter period, but chloride levels have not reached lethal doses.

Sediment Quality

The condition of sediment quality is good. Generally, most of the key indicators of sediment quality (e.g., contamination from metals and polycyclic aromatic hydrocarbons), met federal and provincial objectives.

The public boat launch at Osprey Lane was found to be marginally polluted with polycyclic aromatic hydrocarbons, which is likely due to consistent boat launching exposing the area to oils, grease, petroleum, and engine emissions.

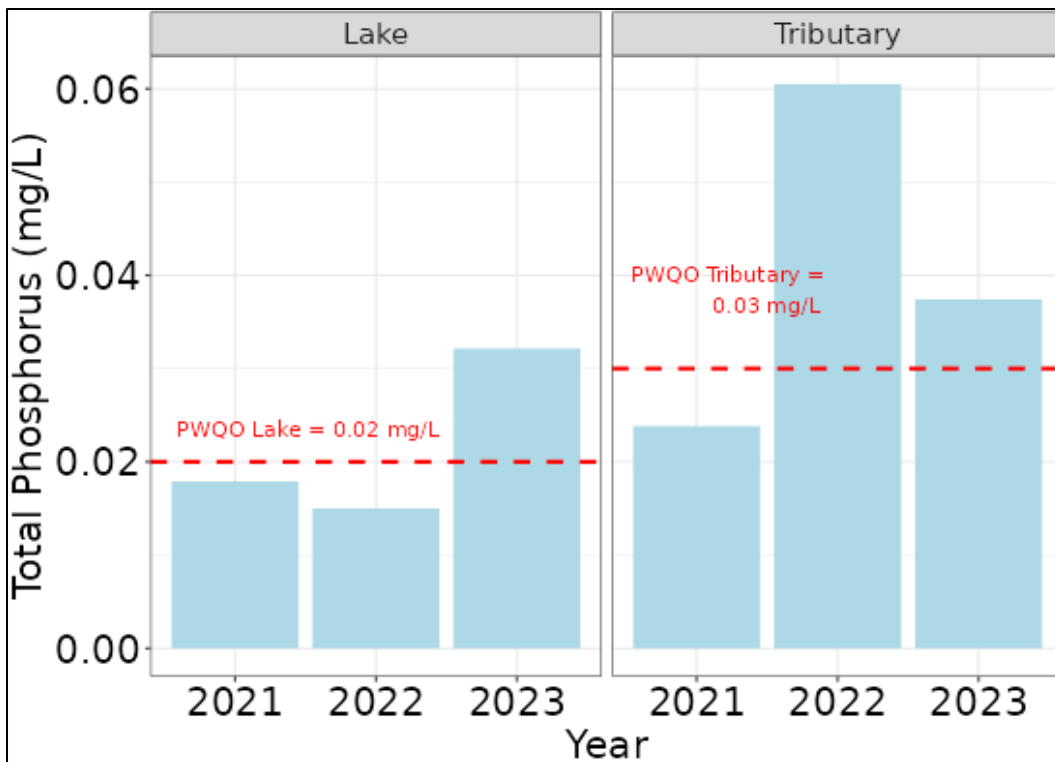


Figure 5. Average phosphorus in the lake and streams, 2021 to 2023, compared to provincial water quality objectives (PWQO).

Aquatic Habitat and Fish

The condition of aquatic habitats and fish is fair. Aquatic plants provide excellent aquatic habitat; they occupy 64% of the lake surface area in the summer. Upper Lake Dalrymple is heavily vegetated with wild rice, an indicator of good habitat quality. Streams generally meet minimum habitat requirements and provide important habitat corridors for aquatic life. There is at least one sensitive coldwater stream (within subwatershed LLDT-3).

Approximately 38 fish species live in the lake and streams, many of which support a popular open water and winter fishery. No fish stocking takes place. The warmwater fish community (e.g., bass) has started to increase its overall representation of the fish community, which is consistent with much of Southern Ontario’s fish communities and is expected to continue with climate change. Overall, while angling effort is high, there is no significant concern.

A key lake management issue is aquatic invasive species. There are at least seven (zebra mussel, quagga mussel, rusty crayfish, banded mystery snail, Chinese mystery snail, Eurasian watermilfoil, and starry stonewort), all of which can cause, or have already caused, shifts in aquatic habitat conditions.

Although most streams meet minimum recommended guidelines for aquatic habitat conditions, those within subwatersheds ULTD-8, LLDT-3, and LLDT-6 do not meet these guidelines. They have large sections lacking natural vegetation that flow through croplands. There are at least three perched culverts (within sub-watersheds LLDT-6 and LLDT-3) that are seasonal impediments to the free movement of fishes to and from the lake.

Data is lacking on fish spawning habitat, muskellunge population status, and the presence/absence of grass pickerel, a species of conservation concern.

Landscape Ecology

The condition of the landscape is good. The watershed contains extensive natural cover supporting both healthy and diverse terrestrial and aquatic ecosystems. The areas around Lake Dalrymple contain large tracts of forest, wetland and alvar and have benefitted from Couchiching Conservancy, the Nature Conservancy of Canada and the formation of the Carden Alvar Provincial Park and their combined efforts to set aside lands for protection and stewardship.

There is an abundance of wetlands, the majority being swamp. Wetlands serve several functions within a watershed, especially functioning to improve water quality. Swamps often contain dense forests, which act to slow the movement of water through watersheds and act as groundwater recharge areas.

A key lake management issue is that thirty-six species of conservation concern (organisms that are vulnerable to habitat loss or at risk of disappearing) have been identified in the watershed. There is a general lack of understanding of the population status of these species.

There is an overall limited understanding of the health and quality of terrestrial ecosystems in the watershed, given they have not been inventoried in detail to determine their health. Further, no assessment of the resiliency of the terrestrial ecosystem to climate change has been completed.

2.0 Management Recommendations



[Litter at Osprey Lane boat launch]

2.1 Protect the fishery from over-harvest

- ❖ There is a significant concern among the lake community that the lake is being ‘over-fished’, that there is illegal fishing activity, and that there is a general lack of presence and enforcement from Compliance Officers. **The lake is no longer stocked with fish, yet the general sentiment from the community is that fish stocking should be taking place to help improve the quality of the fishery.**
- ❖ Data indicates Lake Dalrymple experiences significantly more fishing pressure than other lakes in Zone 17. Currently, fish community indicators suggest no significant concern for depleted fish populations.
- ❖ There are several known areas within the lake that function as high quality fish spawning habitat, that might benefit from protection from anglers during sensitive time periods.

Action Item	Lead Responsibility (Partner)	Area of Focus
<ul style="list-style-type: none"> • Ensure sport fish can support current and future levels of high angling activity. 	<i>Ministry of Natural Resources (Advisory Council for Fisheries Management Zone 17)</i>	Ice fishing
<ul style="list-style-type: none"> • Consider stocking the lake to increase the quality of the fishery. 	<i>Ministry of Natural Resources (Advisory Council for Fisheries Management Zone 17)</i>	Upper and Lower Lake
<ul style="list-style-type: none"> • Establish fish sanctuaries at important sport fish spawning locations. 	<i>Ministry of Natural Resources (Advisory Council for Fisheries Management Zone 17)</i>	Narrows
<ul style="list-style-type: none"> • Increase patrols and presence from Conservation Officers. 	<i>Ministry of Natural Resources</i>	Osprey Lane boat launch, Kirkfield Road bridge

2.2 Protect important habitat and unique features during new development.

- ❖ There are several ‘un-developed’ vacant lots around the lake, that are attractive building locations. New development typically results in land clearing, and the destruction of important natural features such as trees, shrubs, grasslands, logs, and rocks that would otherwise help to protect water quality and provide habitat.
- ❖ The unique karst/alvar landscape means there are shallow soils, making some areas prone to increased runoff. Thin soils make re-planting trees extremely difficult, therefore it is better to preserve existing vegetation.
- ❖ Natural areas are more resilient than disturbed areas in terms of mitigating impacts from lake stressors, such as climate change, invasive species, and contaminated runoff. It is more cost effective to preserve existing natural features, than to recreate them.

Action Item	Lead Responsibility (Partner)	Area of Focus
<ul style="list-style-type: none"> • Require the preservation of in-water logs/rocks, overhanging vegetation, and wetland plants along shorelines. 	<i>Municipalities (Ministry of Natural Resources)</i>	Water’s edge
<ul style="list-style-type: none"> • Secure for the long term environmentally sensitive areas of shoreline, forest, wetlands, and alvars. 	<i>Land Trusts</i>	Watershed-wide; undeveloped shorelines
<ul style="list-style-type: none"> • Update mapping for locations of karst bedrock. 	<i>Kawartha Conservation (Ministry of Natural Resources)</i>	Watershed-wide
<ul style="list-style-type: none"> • Enforce the current regulations associated with land clearing and dumping contaminated fill. 	<i>Municipalities (Ministry of the Environment, Conservation and Parks)</i>	Watershed-wide; Black property
<ul style="list-style-type: none"> • Install effective erosion and sediment control measures for construction works near water. 	<i>Municipalities; Landowners</i>	Projects near lake, streams, or wetlands

2.3 Rehabilitate natural vegetation and habitats along the shoreline.

- ❖ Natural shorelines, consisting of trees, shrubs and grasslands are better than artificial shorelines at filtering contaminants entering the lake and provide higher quality fish and aquatic habitat conditions.
- ❖ There are several low-cost options to improve conditions along the shoreline, and there are several cost offsetting programs available to help with more expensive projects.
- ❖ Wastewater from septic systems is estimated to contribute a disproportionately high amount of nutrients into the lake, which leads to accelerated algae growth.

Action Item	Lead Responsibility (Partner)	Area of Focus
• Install and maintain logs, mature trees, shrubs and pollinator gardens along the water's edge.	<i>Landowners (Master Gardeners)</i>	Water's edge
• Practice 'no-mowing' and leave a natural vegetative buffer strip near the water's edge.	<i>Landowners</i>	Water's edge
• Take advantage of WATER Fund financial assistance program to offset costs.	<i>Landowners (Kawartha Conservation)</i>	City of Kawartha Lakes
• Undertake garbage pickup events at community spaces, and public boat launches.	<i>Lake Associations (Landowner)</i>	Osprey Lane Boat Launch
• Ensure garbage receptacles are accessible at every public access area, and routinely changed.	<i>Municipalities</i>	Osprey Lane Boat Launch; Geraldine Park
• Reduce road-salt application or use alternatives products for winter de-icing operations.	<i>Municipalities</i>	Roads near water
• Undertake routine inspections and pump-outs of septic systems.	<i>Landowners</i>	Water's edge
• Take advantage of Septic Rehabilitation Loan Program financial assistance to offset costs of replacing faulty systems.	<i>Landowners (Municipalities)</i>	City of Kawartha Lakes
• Enroll in the Clean Marine program to reduce/prevent pollution associated with recreational boating activities in Ontario.	<i>Marinas and Trailer Parks (Boating Ontario Association)</i>	Marine businesses

2.4 Rehabilitate natural vegetation, habitats, and connectivity along streams.

- ❖ Streams are important habitat and travel corridors for lake dwelling fish. They are also pathways of potential contamination to the lake, through surface water runoff.
- ❖ Data indicates that streams flowing through agricultural lands have poorer water quality than other streams. These streams have elevated phosphorus and degraded aquatic habitat conditions.
- ❖ There are several cost offsetting programs available to help farmers implement agricultural-based best management practices. Addressing bare soil, and separating streams from croplands and pasture fields can help manage runoff from routine farming practices.

Action Item	Lead Responsibility (Partner)	Area of Focus
<ul style="list-style-type: none"> • Maintain a zone of natural vegetation along streams to buffer impacts from crop farming and cattle grazing. 	<i>Farmers</i>	West side of lake (Subwatershed UDLT-6; Subwatershed LLDT-6)
<ul style="list-style-type: none"> • Undertake agricultural best management practices to reduce erosion and contaminant runoff from farms. 	<i>Farmers</i>	West side of lake (Subwatershed UDLT-6; Subwatershed LLDT-6)
<ul style="list-style-type: none"> • Fix perched culverts (i.e., those with a ‘waterfall’ drop at the outlet) to ensure fish can freely pass under roads. 	<i>Municipalities</i>	Subwatershed LLDT-6 (McNabb Road and Kirkfield Road); Subwatershed LLDT-3 (Lake Dalrymple Road)
<ul style="list-style-type: none"> • Take advantage of the WATER Fund and programs through Ontario Soil and Crop Improvement Association to offset costs. 	<i>Farmers (Kawartha Conservation)</i>	Watershed wide

2.5 Communicate through lake associations: lake threats and solutions.

- ❖ Lake Associations are the primary implementors and advocates of the lake management plan. They have an active membership through which they can readily disseminate plan information through email, social media, word-of-mouth, and community gatherings.
- ❖ Generally, people want to do the right thing to improve lake health conditions. They require specific information in an easy-to-digest format, on where and how to focus their efforts.
- ❖ Currently there are several independent lake associations around the lake. Collaboration amongst these groups would lead to better plan implementation success.

Action Item	Lead Responsibility (Partner)	Area of Focus
<ul style="list-style-type: none"> • Distribute the Lake Dalrymple Management Plan, and advocate for its implementation. 	<i>Lake Associations (Kawartha Conservation)</i>	Watershed-wide
<ul style="list-style-type: none"> • Unite existing ‘lake/road associations’ under an umbrella ‘Dalrymple Lake Association’ to implement lake management planning recommendations. 	<i>Lake Associations (Federation of Ontario Cottagers’ Association)</i>	Existing road and community associations
<ul style="list-style-type: none"> • Distribute easy-to-understand fact sheets to raise public awareness of key lake health threats and solutions. <ul style="list-style-type: none"> ○ Aquatic plants and wetlands ○ Cost-share programs and collaborative organizations ○ Management Plan overview ○ Nutrient and runoff management ○ Preventing invasive species ○ Reporting illegal activity ○ Responsible boating ○ Shoreline management ○ Sport fish catch and release tips ○ Water level fluctuations 	<i>Lake Associations (Kawartha Conservation)</i>	Waterfront communities
<ul style="list-style-type: none"> • Distribute ‘new resident package’ to inform new landowners of lake health best practices. 	Real Estate Industry (Kawartha Conservation)	City of Kawartha Lakes

2.6 Communicate through signage: lake threats and solutions.

- ❖ Signage at high use areas, such as public access locations and high traffic boating areas, reminds lake users to be vigilant about key lake health threats.
- ❖ Given invasive species, once introduced into the lake are impossible to eradicate, public awareness is key to preventing their introduction and spread.
- ❖ Well maintained buoys are crucial for preventing boating accidents, which can lead to human injury and lake contamination.

Action Item	Lead Responsibility (Partner)	Area of Focus
<ul style="list-style-type: none"> • Install invasive species awareness signage at public access locations. 	<i>Lake Associations (Invading Species Awareness Program)</i>	Osprey Lane public boat launch; Geraldine Park, Dalrymple Drive public boat launch
<ul style="list-style-type: none"> • Install ‘Know the Difference Pike vs. Muskellunge’ signage at public lake access locations. 	<i>Lake Associations (Muskie Canada)</i>	Osprey Lane public boat launch; Geraldine Park, Dalrymple Drive public boat launch
<ul style="list-style-type: none"> • Install signage at crowded locations to remind boaters to adhere to safe practices (e.g., no wake zones, speed limit zones, habitat protection zones, etc.). 	<i>Lake Associations (Transport Canada)</i>	Osprey Lane public boat launch; narrows; adjacent to populated shorelines
<ul style="list-style-type: none"> • Ensure buoys are maintained and well-visible at key hazard areas (e.g., Avery Point shoal, boulders in Narrows, etc.). 	<i>Lake Associations (Transport Canada)</i>	Narrows; tip of Avery Point
<ul style="list-style-type: none"> • Install ‘turtle crossing’ signage along roads. 	<i>Lake Associations (The Land Between)</i>	Roads adjacent to water

2.7 Communicate through public information sessions: lake threats and solutions.

- ❖ Public information sessions are a means to actively engage the lake community on topics of lake management interest, in a collaborative environment.
- ❖ Industry professionals can assist the lake community with practical solutions to address key lake management threats.
- ❖ The lake community should continue to attend external information sessions and committees on topics of watershed health, for example ongoing sessions related to quarry operations.

Action Item	Lead Responsibility (Partner)	Area of Focus
<ul style="list-style-type: none"> • Organize public information sessions by industry professionals on topics of interest to lake health 	<i>Lake Associations (Industry Professionals)</i>	Septic systems; fish populations; shoreline naturalization; invasive species
<ul style="list-style-type: none"> • Continue to participate in Quarry Stakeholder meetings to champion water quality and water quantity protection from operations. 	<i>Lake Associations (Quarry Operators)</i>	Quarries

2.8 Monitor lake health conditions and fill data gaps.

- ❖ There are no routine (e.g., yearly) governmental monitoring programs active on the lake, therefore routine tracking of lake health conditions is the primary responsibility of the lake community.
- ❖ There are several free volunteer-based lake health monitoring programs and tools available in which the public can participate. Ongoing monitoring of lake health conditions allows for early detection of problems and adds some accountability to the plan.
- ❖ Several data gaps exist, particularly with respect to the status of fish populations and fish habitats.

Action Item	Lead Responsibility (Partner)	Area of Focus
<ul style="list-style-type: none"> • Participate in the free Lake Partner Program to track lake water quality (nutrients, clarity, calcium, and chloride). 	<i>Lake Associations (Federation of Ontario Cottagers' Association)</i>	Upper Lake deep spot; Lower Lake deep spot
<ul style="list-style-type: none"> • Report sightings of exotic/invasive organisms through 'EddmapS' online invasive species tracking tool. 	<i>Landowners (Invading Species Awareness Program)</i>	Public access locations
<ul style="list-style-type: none"> • Continue to track environmental conditions at 'closed' landfill sites and make information publicly available. 	<i>Municipalities</i>	Carden (City of Kawartha Lakes; Ramara (Simcoe County)
<ul style="list-style-type: none"> • Continue to track fish populations, and angling activity through the Broad-scale Monitoring Program. 	<i>Ministry of Natural Resources</i>	Sport fish; ice fishing activity
<ul style="list-style-type: none"> • Use the staff gauge at the Kirkfield Bridge (narrows) to track lake water levels. 	<i>Lake Associations (Kawartha Conservation)</i>	Weekly water levels
<ul style="list-style-type: none"> • Identify and map critical fish habitats (e.g., spawning and nursery areas) around the lake and in connecting tributaries. 	<i>Ministry of Natural Resources</i>	Shoreline; outlets of major tributaries
<ul style="list-style-type: none"> • Undertake sampling to confirm or discount presence of Grass Pickerel, a fish of conservation concern. 	<i>Fisheries and Oceans Canada (Ministry of Natural Resources)</i>	Upper Lake
<ul style="list-style-type: none"> • Submit Muskellunge catch records to Muskies Canada Angler Log Program. 	<i>Muskies Canada</i>	Lake-wide
<ul style="list-style-type: none"> • Implement a lake surveillance program to track key indicators of lake health. 	<i>Kawartha Conservation (Municipalities)</i>	Lake-wide

3.0 Successful Implementation



[Lower Lake Dalrymple]

3.1 Key Partners and Implementation Roles

Successful implementation relies on ‘everyone’ doing their part. There are numerous organizations, stakeholders, and authorities that are in position to lead or partner in undertaking the lake management recommendations.

The following section provides a list of twenty organizations listed in the plan, along with their prospective role in implementation.

It is strongly advised to engage local First Nations communities on plan implementation efforts. Obtaining their input and perspectives regarding land and water stewardship, Treaty Rights, and traditional ecological knowledge is essential.

Advisory Council for Fisheries Management Zone 17

- Assist Ministry of Natural Resources to: (1) ensure sport fish can support current and future levels of high angling activity; (2) establish fish sanctuaries at important sport fish spawning locations.

Boating Ontario Association

- Assist Marinas and Trailer Parks to: (1) enroll in the Clean Marine program to reduce/prevent pollution associated with recreational boating activities in Ontario.

Farmers

- Provide leadership to: (1) maintain a zone of natural vegetation along streams to buffer impacts from crop farming and cattle grazing; (2) undertake agricultural best management practices to reduce erosion and contaminant runoff from farms; (3) take advantage of the WATER Fund and programs through Ontario Soil and Crop improvement Association to offset costs.

Federation of Ontario Cottagers’ Association

- Assist Lake Associations to: (1) unite existing ‘lake/road associations’ under an umbrella ‘Dalrymple Lake Association’ to implement lake management planning recommendations; (2) participate in the free Lake Partner Program to track lake water quality.

Fisheries and Oceans Canada

- Provide leadership to: (1) undertake sampling to confirm or discount presence of Grass Pickerel, a fish of conservation concern.

Landowners

- Provide leadership to: (1) report sightings of exotic/invasive organisms through 'EddmapS' online invasive species tracking tool; (2) install and maintain logs, mature trees, shrubs and pollinator gardens along the water's edge; (3) practice 'no-mowing' and leave a natural vegetative buffer strip near the water's edge; (4) take advantage of WATER Fund financial assistance program to offset costs; (5) undertake routine inspections and pump-outs of septic systems; (6) take advantage of Septic Rehabilitation Loan Program financial assistance to offset costs of replacing faulty systems.

Industry Professionals

- Assist Lake Associations to: (1) organize public information sessions by industry professionals on topics of interest to lake health.

Invading Species Awareness Program

- Assist Lake Associations to: (1) install invasive species awareness signage at public access locations.
- Assist Landowners to: (1) report sightings of exotic/invasive organisms through 'EddmapS' online invasive species tracking tool.

Kawartha Conservation

- Provide leadership to: (1) implement a lake surveillance program to track key indicators of lake health.
- Assist Landowners to: (1) take advantage of WATER Fund financial assistance program to offset costs.
- Assist Farmers to: (1) take advantage of the WATER Fund and programs through Ontario Soil and Crop Improvement Association to offset costs.
- Assist Lake Associations to: (1) distribute easy-to-understand fact sheets to raise public awareness of key lake health threats and solutions; (2) distribute the Lake Dalrymple Management Plan, and advocate for its implementation; (3) use the staff gauge at the Kirkfield Bridge to track lake water levels.
- Assist Municipalities and Real Estate Industry to: (1) distribute 'new resident package' to inform new landowners of lake health best practices.

Lake Associations

- Leadership role to: (1) undertake garbage pickup events at community spaces, and public boat launches; (2) distribute the Lake Dalrymple Management Plan, and advocate for its implementation; (3) unite existing 'lake/road associations' under an umbrella 'Dalrymple Lake Association' to implement lake management planning recommendations; (4) distribute easy-to-

understand fact sheets to raise public awareness of key lake health threats and solutions; (5) install invasive species awareness signage at public access locations; (6) install 'Know the Difference Pike vs. Muskellunge' signage at public lake access locations; (7) install signage at crowded locations to remind boaters to adhere to safe practices; (8) ensure buoys are maintained and well-visible at key hazard areas; (9) install 'turtle crossing' signage along roads; (10) organize public information sessions by industry professionals on topics of interest to lake health; (11) continue to participate in Quarry Stakeholder meetings to champion water quality and water quantity protection from operations; (12) participate in the free Lake Partner Program to track lake water quality; (13) use the staff gauge at the Kirkfield Bridge to track lake water levels;

Land Trusts

- Provide leadership to: (1) secure for the long term environmentally sensitive areas of shoreline, forest, wetlands, and alvars.

Marinas and Trailer Parks

- Provide leadership to (1) enroll in the Clean Marine program to reduce/prevent pollution associated with recreational boating activities in Ontario.

Master Gardeners

- Assist Landowners to: (1) install and maintain logs, mature trees, shrubs and pollinator gardens along the water's edge.

Ministry of Natural Resources

- Provide leadership to: (1) ensure sport fish can support current and future levels of high angling activity; (2) consider stocking the lake to increase the quality of the fishery (3) establish fish sanctuaries at important sport fish spawning locations; (4) increase patrols and presence from Conservation Officers; (5) continue to track fish populations, and angling activity through the Broad-scale Monitoring Program; (6) identify and map critical fish habitats around the lake and in connecting tributaries.
- Assist Municipalities to: (1) require the preservation of in-water logs/rocks, overhanging vegetation, and wetland plants along shorelines.
- Assist Kawartha Conservation to: (1) update mapping for locations of karst bedrock.
- Assist Fisheries and Oceans Canada to: (1) undertake sampling to confirm or discount presence of Grass Pickerel, a fish of conservation concern.

Ministry of the Environment, Conservation and Parks

- Assist Municipalities to: (1) enforce the current regulations associated with land clearing and dumping contaminated fill.

Municipalities

- Provide leadership to: (1) require the preservation of in-water logs/rocks, overhanging vegetation, and wetland plants along shorelines; (2) enforce the current regulations associated with land clearing and dumping contaminated fill; (3) install effective erosion and sediment control measures for construction works near water; (4) ensure garbage receptacles are accessible at every public access area, and routinely changed; (5) reduce road-salt application or use alternatives products for winter de-icing operations; (6) fix perched culverts to ensure fish can freely pass under roads; (7) continue to track environmental conditions at 'closed' landfill sites and make information publicly available.
- Assist Landowners to: (1) take advantage of Septic Rehabilitation Loan Program financial assistance to offset costs of replacing faulty systems.
- Assist Kawartha Conservation to: (1) implement a lake surveillance program to track key indicators of lake health.

Muskies Canada

- Provide leadership to: (1) submit Muskellunge catch records to Muskies Canada Angler Log Program.
- Assist Lake Associations to: (1) install 'Know the Difference Pike vs. Muskellunge' signage at public lake access locations.

Quarry Operators

- Assist Lake Associations to: (1) continue to participate in Quarry Stakeholder meetings to champion water quality and water quantity protection from operations.

Real Estate Industry

- Provide leadership to: (1) distribute 'new resident package' to inform new landowners of lake health best practices.

The Land Between

- Assist Lake Associations to: (1) install 'turtle crossing' signage along roads.

Transport Canada

- Assist Lake Associations to: (1) install signage at crowded locations to remind boaters to adhere to safe practices; (2) ensure buoys are maintained and well-visible at key hazard areas.

3.2 Partner Collaborating and Plan Updating

The Lake Dalrymple Management Plan provides a solid framework for a coordinated approach to maintain, and where possible enhance, the health of the lake for all uses. Successful implementation will require ongoing commitments (financial and otherwise) from all identified partners to build momentum, and fully realize a sustainable healthy lake environment.

Creating and maintaining effective partnerships is essential to the success of this management plan. The more stakeholders, resources, and knowledge applied to each action item, the better the result. Everyone around the lake is accountable for responsible lake management.

The bulk of the recommendations require commitments from Lake Associations or Landowners. Given that there is no single Lake Association, implementation is best served through coordinated individuals from each group.

Early implementation efforts should highlight small successful projects to build momentum.

To assess implementation progress and remain accountable, the plan should be reviewed and updated, on a five-to-ten year time period. Adjustments should be made accordingly to ensure the actions remains appropriate and relevant to changing local community concerns and new lake health stressors.