

Watershed-based Resource Management Strategy

Approved by Board of Directors: Effective Date: Motion No:

Land Acknowledgment:

We would like to take this time to recognize that the land on which we gather is in the traditional territory shared between the Haudenosaunee (ho - din - oh - show - knee) confederacy, the Anishinabe (ah - nih - shih - nah - bai) nations, and the Attiwonderonk Neutrals. First Nations people have longstanding relationships to the land, water and Southwestern Ontario and we are thankful for the opportunity to live, learn and share with mutual respect and appreciation.

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The authors of the CCCA Strategy are Peter Dragunas, Water Management Technician and Dusty Underhill, General Manager/ Secretary - Treasurer.

Thank you to everyone who took the time to contribute to the Strategy through public consultation that occurred from June 17, 2024 to July 26, 2024 with final review and approval from the CCCA Board of Directors on August 8, 2024.

1.0 INTRODUCTION

1.1 Purpose

The purpose of the Watershed Based Resource Management Strategy is to assist the Catfish Creek Conservation Authority (CCCA) with developing or improving the delivery of programs and services and their effectiveness in supporting Mandatory Category 1 Programs.

As part of the Strategy, each Conservation Authority (CA) across the province will develop guiding principles and objectives that inform the design of our programs and services. This document is a summary of information the CCCA can rely upon to directly inform and support program and service delivery, and identify any issues and risks which may limit the delivery of Category 1 programs/services, including actions to address such risks. As such, the Strategy may be used as a management and communications tool with the CCCA's member municipalities, all levels of government, and members of the community to identify actions and Category 2 and 3 programs and services that are recommended to support the delivery of mandatory CA programs and services if necessary. It provides a mechanism to update CCCA's Programs and Services Inventory and to identify where opportunities exist for improving and/ or maintaining watershed health.

To understand the environmental health of the Catfish Creek watershed and the Lake Erie tributaries within CCCA's jurisdiction all environmentally natural and developed artificial components within the watershed require consideration. The CCCA administrative area is comprised of many natural and urbanized elements, from agriculture to municipal to old growth forest, water resources and recreation all of which are comprised of individual ecosystems, together they make-up the watershed bionetwork.

1.2 Goal

The goal of the Strategy is to design and deliver cost effective programs and services that protect people and property from natural hazards and climate change impacts, protect municipal drinking water resources, conserve nature, and provide opportunities for outdoor recreation and education across the watershed. By considering the interconnectedness of the above noted components, this approach helps in achieving holistic and effective management of water resources and associated ecosystems.

1.3 About CCCA

The CCCA was established under Order in Council on February 23, 1950 by request from the Town of Aylmer and Malahide Township. Conservation Authorities protect, restore and effectively manage impacts on Ontario's water resources such as lakes, rivers, streams and groundwater. Conservation Authorities develop programs that protect natural heritage and habitats and promote watershed stewardship practices that lead to healthy watersheds. The CCCA is a local not for profit organization located in southwestern Ontario who implements programs and objectives to;

- 1) Protect life and minimize property damage from natural hazards and climate impacts,
- 2) Improve and protect the ecological health of the Catfish Creek watershed's increasing biodiversity, habitat connectivity, and natural cover,
- 3) Curate an appreciation and create equitable access to nature,
- 4) Ensure our Conservation Lands are protected and enhanced,

5) Operate a sustainable, fiscally responsible and adaptable organization.

1.4 Legislative Background

Proclaimed provisions within the Conservation Authorities Act (CAA) and accompanying regulations establish requirements for Mandatory Programs and Services (see Section 21.1 of the Act https://www.ontario.ca/laws/statute/90c27#BK29 and Ontario Regulation 686/21 (O.Reg 686/21) https://www.ontario.ca/laws/statute/90c27#BK29 and Ontario Regulation 686/21 (O.Reg 686/21) https://www.ontario.ca/laws/statute/90c27#BK29 and Ontario Regulation 686/21 (O.Reg 686/21) https://www.ontario.ca/laws/regulation/210686).

O.Reg. 686/21 sets out the Mandatory Programs and Services, which must be delivered by all Conservation Authorities in Ontario. Subsection 12(1)3 of the regulation requires all Conservation Authorities to prepare a WBRMS in accordance with subsections 12(4) through (9).

Proclaimed provisions within the Conservation Authorities Act and accompanying regulations establish a requirement for Transition Plans including a Program and Service Inventory and Agreements for Programs and Services (Category 1: Mandatory Programs and Services, Category 2: Municipal Programs and Services Provided on Behalf of a Municipality, Category 3: Programs and Services Advisable by the Conservation Authority). The Strategy may include both Category 2 (municipal - s21.1.1) and Category 3 (other - s21.1.2) programs and services provided by the CA, where the agreement which provides for the delivery of these programs or services permits the inclusion of these programs or services in the Strategy. The CCCA currently only has Category 1 Mandatory Programs and Services and Category 3, Other Programs and Services. The CCCA's Category 3 programs are cost recoverable or paid in full by monies not acquired from municipal levy such as grants, reserves and cost recovery.

2.0 VISION, MISSION, CORPORATE VALUE, STRATEGIC PILLARS, NEXT STEPS

2.1 CCCA's Strategic Plan 2024-2034 (Guiding Principles and Objectives)

In 2023 the Board of Directors approved a Strategic Plan to guide the CCCA from 2024-2034. The new ten (10) year Strategic Plan builds on previous successes and accomplishments, while moving the CCCA forward so we can modernize how staff operate. This will allow staff to be more responsive to changing watershed conditions and economic factors.

The strength and success of the CCCA has been the emphasis on local community involvement. The conservation movement has been a movement of, by and for the people over the past 75 years. We strive to create and implement programs to further the conservation, restoration, development, and management of the natural resources of the Catfish Creek watershed.

2.1.1 Our Vision:

Harmony between the social and ecological needs of the watershed of present and future generations.

2.1.2 Our Mission:

To communicate and deliver resource management services and programs in order to achieve social and ecological harmony for the watershed.

2.1.3 Our Corporate Values:

- 1. Committed; We are committed to conservation and work every day to improve the health and function of the Catfish Creek watershed, and to provide sustainable outdoor recreation opportunities and customer service that the community expects from us.
- 2. Creative; We are creative in our solutions and we understand the challenges of today's economy. We are committed to be creative and adaptive in our business solutions to ensure we are a sustainable organization for years to come.
- 3. Compassionate; We are compassionate towards landowners and we understand both their interests and those of a changing environment. We will continue our great history of working with landowners to find solutions that work for all parties.
- 4. Proud; We are proud of the Catfish Creek Conservation Authority and dedicating ourselves to the protection of the watershed. We will work hard to increase natural spaces so that future generations can also be proud of the watershed.

Please refer to <u>https://www.catfishcreek.ca/about-us/publications/</u> to view the 2024-2034 Catfish Creek Conservation Authority Strategic Plan in its entirety.

3.0 GOVERNANCE/JURISTICDTION

3.1 Conservation Authorities Act (CAA)

The Conservation Authorities Act was created by the Ontario Provincial Legislature in 1946 to ensure the conservation, restoration and responsible management of hydrological features through programs that balance human, environmental and economic needs. The Act authorizes the formation of Conservation Authorities on a watershed basis.

The purpose of the Conservation Authorities Act is to provide for the organization and delivery of programs and services that further the conservation, restoration, development and management of natural resources in Ontario watersheds.

The CCCA was formed under The CAA by Order in Council on February 23, 1950. Ted Clement, Walter Curtis and Stu McBrien wanted an Authority, which would find water. The Town of Aylmer and Malahide Township petitioned the Minister of Public Works to form an Authority on Catfish Creek. At the time there were six member municipalities including the Town of Aylmer, the Village of Springfield, Townships of Malahide, Dereham, South Dorchester and Yarmouth. Today the CCCA watershed encompasses all or portions of the Town of Aylmer (100%), The Township of Malahide (82%), The Township of Southwest Oxford (8%), The Municipality of Central Elgin (40%), and The City of St Thomas (4%).

3.2 Clean Water Act

The Catfish Creek Source Protection Plan was approved on September 19, 2014 and came into effect on January 1, 2015. The Ontario government passed the Clean Water Act in 2006 to implement some of the recommendations of the Walkerton Inquiry. The Act ensures communities protect their municipal drinking water supplies through prevention by developing collaborative, watershed-based source protection plans based on science. The Act created source protection areas and source protection regions. A source protection region can have one or more source protection areas. The Act also created

a local multi-stakeholder source protection committee for each region. These committees identify significant existing and future threats to their municipal drinking water sources and develop plans to address those threats. The CCCA watershed has one municipal drinking water system in the village of Brownsville in the Township of South-West Oxford. The system has two wells that provide water to about 500 people. The Elgin Area Primary Water Supply System also provides municipal water to a number of communities in the watershed, including the Town of Aylmer, Port Bruce and Copenhagen both in the Township of Malahide. The CCCA Source Water Protection Assessment Report can be viewed at; https://www.sourcewater.ca/en/source-protection-areas/Catfish-Creek-Source-Protection-Plan.aspx#gsc.tab=0.



3.3 Jurisdiction

(CCCA Sub-watershed Resource Management Units Map 1)

The Catfish Creek watershed is located in the heart of the Carolinian zone in southwestern Ontario. The CCCA administrative boundary is divided into ten sub-watershed management units (CCCA Sub-Watershed Resource Management Units Map 1). Catfish Creek and its tributaries drain an area of approximately 490 square kilometres in Elgin and Oxford counties. The Catfish Creek and seven of the encompassing sub-watershed management units enters Lake Erie at Port Bruce. Much of the land of the watershed is used for agriculture. The City of St. Thomas and the Town of Aylmer are the major urban areas, with other settlements in Malahide such as Springfield and Port Bruce. The Town of Aylmer, the City of St. Thomas, the Township of Malahide, the Township of South-West Oxford, and the Municipality of Central Elgin are our participating municipalities. The total population in the watershed as of 2023 was an estimated 22,000.

3.3.1 Town of Aylmer

Centrally located in the Catfish Creek basin, Aylmer is a charming small town found in Elgin County in Southwestern Ontario. The Town of Aylmer is the largest urban municipality in the CCCA watershed. There are 7,695 residents in Aylmer, with an average age of 40.6. Males make up 48.2% of the population, while females account for 51.8%. Locals under 14 years old represent the largest age group in Aylmer (1,560 individuals), followed by those aged over 65 (1,550 people). Typically, urban centers face a number of challenges with regard to protecting water quality in developed landscapes. Municipalities in the watershed have developed policies for the treatment of stormwater. Requirements are consistent with the concepts and technological requirements established by the Province through its stormwater management quality guidelines and planning and design manual. The Town of Aylmer is also faced with the challenges of promoting the principals/benefits of stormwater management with existing (or retrofitting) infrastructure in older urban areas.

The Town of Aylmer's Official Plan provides guidance for the physical development of the Town through the establishment of land use designations and development policies while having regard to relevant social, economic, and environmental issues for the planning period of 2011 to 2031, though policies will be reassessed every five years in accordance with the Planning Act. In more specific terms, the purpose of The Town of Aylmer's Official Plan is to provide a policy framework, which encourages growth and prosperity in Aylmer while preserving and enhancing the Town's unique small town character.

3.3.2 City of St. Thomas

St Thomas is located in the heart of Southwestern Ontario in beautiful Elgin County. Surrounding St. Thomas are numerous picturesque towns, lakeside villages and historic hamlets, each with their own unique charm. St Thomas is a quick hop from London, Ontario and the shores of Lake Erie. There are 42,840 residents in St. Thomas, with an average age of 43.0. Males make up 48.3% of the population, while females account for 51.7%. Locals over 65 years old represent the largest age group in St. Thomas (9,115 individuals), followed by those aged under 14 (7,155 people). A small (eastern) portion of the City of St. Thomas is within the watershed. The area is over 80 percent developed with a mixture of residential, commercial and industrial land uses. The final remaining parcel (agricultural land) in the watershed is designated for residential development and is currently proceeding by plan of subdivision on full services. The \$7-billion Volkswagen electric vehicle battery manufacturing plant is currently being built at an industrial park area in St. Thomas. The structure will cover an area of roughly 370 acres, equivalent to the size of more than 210 soccer or football fields. The site is approximately eighty percent (80%) in the CCCA watershed.

3.3.3 Township of Malahide

The Township of Malahide is located on the north shore of Lake Erie. The Township is directly linked to Canada's major transportation artery, Highway 401, with exchanges on Imperial Road (Hwy 73), Belmont Road (Hwy 74), Dorchester Road and Putnam Road. There are 9,310 residents in Malahide, with an average age of 37.9. Males make up 51.1% of the population, while females account for 48.9%. Locals under 14 years old represent the largest age group in Malahide (2,180 individuals), followed by those aged over 65 (1,450 people). The Township of Malahide encompasses 67% of the total land area within the watershed. The Official Plan emphasizes the predominant use of land in the Township will be related to agricultural activities. Policies have been developed to permit agriculture-related uses and compatible secondary land uses throughout the Township.

The policies and land use designations included in The Municipality of Malahide's Official Plan were prepared to guide development in the Township of Malahide for the twenty-year period between 2009 and 2029. In addition, every five years, the policies of the Official Plan are reviewed for their effectiveness and future utility. Background data is also updated at this point. For the most part, the Official Plan emphasizes that the predominant use of land in the Township will be related to agricultural activities. Several policies have been incorporated in the Official Plan for the specific purpose of preserving highly productive farmland for agricultural purposes. The Official Plan has also identified lands, which would be the most appropriate for non-farm development. These lands are adjacent to existing built-up areas and are designated as settlement areas for varying levels of growth and development. In all cases, historical communities and local urban areas have been identified and recognized as settlement areas in their Official Plan.

3.3.4 Township of Southwest Oxford

South-West Oxford is a township located within Oxford County. There are 7,585 residents in South -West Oxford, with an average age of 39.4. Males make up 51.4% of the population, while females account for 48.6%. Locals under 14 years old represent the largest age group in South - West Oxford (1,595 individuals), followed by those aged over 65 (1,260 people). A small portion of the County of Oxford is within the Catfish Creek watershed. The County is responsible for the preparation of Official Plan policies and for the appraisal of any proposed amendments. Oxford County Council through the Community and Strategic Planning Department develop land use strategies to help guide development of the member municipalities. Individual municipalities are responsible for the approval and enforcement of the Zoning By-law provisions, in this case all lands within the Corporation of the Township of South-West Oxford.

The Township of South-West Oxford comprises the extreme northeast quadrant of the watershed and corresponds to the headwaters of the main branch of Catfish Creek. Dominated by rural agricultural land uses, this area is designated 'Agricultural Reserve' in the County's Official Plan. The primary use permitted within this designation is farming, including general farming, animal or poultry operations, cash crop farming, nurseries, and agricultural research, together with agricultural residential uses required for the farm and farm buildings and structures necessary to the farming operation. Secondary uses include agricultural commercial/ industrial, resource extraction (sand and gravel), and protection of environmentally significant features.

3.3.5 Municipality of Central Elgin

Central Elgin is a township located in Elgin County on Lake Erie. There are 13,745 residents in Central Elgin, with an average age of 45.3. Males make up 50% of the population, while females account for 50%. Locals over 65 years old represent the largest age group in Central Elgin (3,155 individuals), followed by those aged 55 to 64 (2,490 people). The Municipality, consistent with directives in the Provincial Policy Statement- 2005, promotes efficient development in designated growth areas. The municipality is striving to ensure that necessary infrastructure and public services are in place to encourage future development to only proceed on full services (water/sewage). The designated growth priority areas are located outside the watershed. Expansion within the communities of Sparta (no municipal services) and New Sarum (partial services) is limited to minor infilling/ lot creation for single-family residential building lots.

3.4 Governance

The CCCA is governed by a Board of Directors, which is formed by a member from each of our member municipalities. Proportion of representation is based on population of the member municipalities located within the CCCA watershed. The CCCA Board of Directors is comprised of five members, which fulfills our legal requirement under the CAA. An Agricultural Representative can be appointed at any time under the Ministers Discretion.

- Township of Malahide one (1) member
- Town of Aylmer one (1) member
- Municipality of Central Elgin one (1) member
- Township of Southwest Oxford one (1) member
- City of St Thomas one (1) member

4.0 WATERSHED CHARACTERIZATION

4.1 Climate of Elgin County

The Catfish Creek watershed, situated on the north shore of Lake Erie, has a geographic location, which provides a more temperate climate compared to other parts of Southern Ontario. The temperate climate denotes moderate, even precipitation throughout the year, summers that are warm to hot and humid and freezing temperatures in winter. Winters are mild compared to the rest of Ontario due to the watersheds southerly location and the moderating effect of Lake Erie. Map 4 shows the location of precipitation monitoring stations in the watershed.

General weather patterns in this region consist of four seasons. Winter is generally considered to have temperatures lower than zero degrees Celsius, beginning in December and lasting until late February or early March. Spring lasts approximately two months, followed by four months (June to September) of summer and two months of autumn (Sanderson, 1998). The average annual temperature is about 7.5 degrees Celsius to 8.5 degrees Celsius. Extreme temperatures in this region have been known to reach as low as -32 degrees Celsius in January and as high as 38 degrees Celsius in July (Table 1). Lake Erie moderates the climate in this region by absorbing heat from the sun during the summer months and releasing it slowly throughout the winter months. Winds coming across the lake are

generally warmer than the land in winter and cooler in summer, thereby moderating the air temperature over the Catfish Creek watershed, adding to a longer frost-free growing season in the lowland plains.

Location	Temperature	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
	Daily Average (°C)	-6.3	-5.2	-0.1	6.5	13.5	18.4	20.8	19.8	15.4	9.1	3.1	-3	7.7
	Standard Deviation	2.9	2.9	2.1	1.6	2.2	1.3	1.1	1.2	1	1.4	1.6	2.8	
Cullodon	Daily Maximum (°C)	-2.9	-1.6	3.9	11.2	19	23.9	26.4	25.2	20.5	13.5	6.4	0.1	
Eacov	Daily Minimum (°C)	-9.8	-8.9	-4.1	1.8	8	12.9	15.2	14.3	10.3	4.6	-0.2	-6.1	
Lasey														
	Extreme Maximum (°C)	15	18	23	29	32	36	37	36	33	25	20.6	18	
	Extreme Minimum (°C)	-30	-28	-23	-13	-4	1	6	1	-2.2	-7.8	-15		
	Daily Average (°C)	-5.5	-5.2	0	6.1	12.4	17.2	20	19.4	15.6	9.4	4.1	-2	7.6
	Standard Deviation	2.7	2.7	1.9	1.4	1.6	1.2	0.8	1.1	0.9	1.7	1.4	2.7	1
Port	Daily Maximum (°C)	-1.7	-0.9	4.1	10.6	17.6	22.2	25.2	24.6	20.8	14.2	7.7	1.5	12.2
Stanley	Daily Minimum (°C)	-9.4	-9.5	-4	1.6	7.2	12.2	14.7	14.1	10.4	4.5	0.4	-5.4	3.1
,														
	Extreme Maximum (°C)	14.4	13	21	27.2	31.7	34.4	34.4	33.9	31.7	25.6	20	15.5	
	Extreme Minimum (°C)	-32.8	-32	-27.2	-16.7	-5	-0.6	3.3	0	-2.2	-8.3	-18.9	-31.7	
	Daily Average (°C)	-4.8	-3.7	1	7.4	13.8	18.6	21	20.2	16.1	10	4.1	-1.8	8.5
	Standard Deviation	2.7	2.6	1.9	1.4	2.1	1.3	1.1	1.3	0.8	1.5	1.4	3	1
St. Thomas	Daily Maximum (°C)	-0.9	0.6	5.6	12.9	19.9	24.5	26.8	25.8	21.5	15.1	7.8	1.7	13.4
WPCP	Daily Minimum (°C)	-8.6	-7.9	-3.7	2	7.8	12.6	15.2	14.6	10.7	4.9	0.3	-5.3	3.5
-														
	Extreme Maximum (°C)	14.5	18.5	24.5	29.5	32.5	38	37	34.5	32.5	26	21.5	18.5	
	Extreme Minimum (°C)	-31	-30	-23.5	-16	-3	1	6	0	-2	-/	-13.5	-27.5	
				A (~ ~ -						
	Daily Average (°C)	-6.3	-5.7	-0.1	6.7	13.2	18	20.7	19.7	15.5	9.2	3.3	-2.8	7.6
	Standard Deviation	2.9	2.7	2.1	1.6	1.9	1.3	0.9	1.1	1	1.8	1.5	2.5	1.2
Westminster	Daily Maximum (°C)	-2.7	-1.8	4	11.8	19.1	23.8	26.5	25.4	20.8	14	/	0.6	12.4
TWC WPCP	Daily Minimum (°C)	-9.9	-9.7	-4.2	1.6	7.3	12.1	14./	14	10.1	4.4	-0.3	-6.1	2.8
	Extreme Maximum (8C)	12.0	14	24	20	21 7	27	27	25	22 E	20.4	22.2	10 E	
	Extreme Maximum (°C)	13.9	20.6	24	29	31.7	3/	3/	35	32.5	29.4	12.2	18.5	
	Extreme Minimum (-C)	-32.2	-30.0	-27	-15	-5.0	-1.1	5.5	1	-3.9	-9.4	-13.5	-20.9	
	Daily Average (%C)	6.2	-5.5	-0.2	6.2	12	10	20.5	10.5	15.2	0	21	2	75
	Standard Doviation	-0.3	- 3.3	-0.3	1.7	2 1	1.4	20.5	19.5	1 1	17	1.6	27	7.5
		2.0	2.9	2.3	11.6	2.1	22.9	26.2	25.2	20.0	1.7	1.0	2.7	12.4
London A	Daily Maximum (°C)	-2.4	-1.4	4.2	11.0	19	12.1	14.6	12.7	20.9	14	0.9	-6.5	2.4
LUIUUII A		-10.1	-9.7	-4.7	1	/	12.1	14.0	15.7	9.0	4	-0.7	-0.5	2.5
	Extreme Maximum (%C)	16.7	17 9	24 9	20 /	32 /	38 3	36.7	37	34.4	30	24.4	18 5	
	Extreme Minimum (°C)	-31.7	-20 5	-24.0	-12.2	52.4	-0.6	50.7	J/ 15	-3.2	-11.1	-18.2	-26.0	
	Extreme minimum (-C)	-31.7	-29.5	-24.0	-12.2	-5	-0.6	5	1.5	-3.3	-11.1	-10.2	-20.9	

Table 1: Temperature Characteristics Within The Catfish Creek Watershed

Annual average precipitation in the watershed is generally between 950 millimetres to 1,075 millimetres. A majority of winter precipitation falls as rain.

Precipitation is quite evenly distributed throughout the year, although the intensity, duration and frequency of precipitation are quite different among the seasons. The accumulation of snow in the winter months prolongs the effects of precipitation, as infiltration is delayed until a thaw. Spring thaw often brings long, low intensity rainfall and when coupled with the melting snow can make the spring season appear to be constantly wet and overcast. The summer often brings short, high intensity rainfalls with high evapotranspiration rates, which makes precipitation appear to be infrequent and less than the other seasons. As seen in Table 1: Temperature Characteristics Within the Catfish Creek Watershed, Figure 1: Normal Average Precipitation and Temperature for Catfish Creek Watershed, and Table 2: Precipitation Patterns within the Catfish Creek Watershed, precipitation amounts are quite evenly distributed throughout the year despite seasonal perception rates in this region.

The water requirements for human and environmental purposes over the course of the year are quite variable. The demands on climate to replenish the streams and groundwater aquifers are often not met during the summer months, while the winter and spring seasons often see a surplus of water for the watershed.



Figure 1: Normal Average Precipitation and Temperature for Catfish Creek Watershed

Table 2: Precipitation Patterns With in the Catfish Creek Watershed

Location	Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
	Rainfall (mm)	49	38.2	53.9	78.2	80.1	86.4	81.4	86.9	89.2	82.9	87.6	59.2	872.9
	Snowfall (cm)	37	27.7	19	3.7	0	0	0	0	0	0.3	7.4	21.2	116.3
Aylmer Ont	Precipitation (mm)	86.1	65.9	72.9	81.9	80.1	86.4	81.4	86.9	89.2	83.2	95.1	80	988.8
Hydro	Extreme Daily Rainfall (mm)	80	45.6	29.2	47.8	45.2	53.4	79.6	65.2	75.4	67	60.6	40	
	Extreme Daily Snowfall (cm)	20.2	29	16.4	11.4	0	0	0	0	0	2.5	12	19.4	
	Extreme Daily Precipitation (mm)	80	45.6	36.2	47.8	45.2	53.4	79.6	65.2	75.4	67	60.6	42	
	Rainfall (mm)	36.8	31.2	59	84.9	84.2	94.7	95.3	90.7	101.5	86	92.8	56	913.1
	Snowfall (cm)	43.7	28.8	22.9	5.3	0.2	0	0	0	0	0.9	13.5	39.1	154.4
Culloden	Precipitation (mm)	80.5	60	81.9	90.2	84.4	94.7	95.3	90.7	101.5	87	106.4	95.1	1067.7
Easey	Extreme Daily Rainfall (mm)	54.4	52.6	62	51.8	60.4	116	68.4	88.4	58.8	68.4	63.6	38.8	
	Extreme Daily Snowfall (cm)	30	19	20	12	5	0	0	0	0	6	17	25	
	Extreme Daily Precipitation (mm)	54.4	52.6	62	51.8	60.4	116	68.4	88.4	58.8	68.4	63.6	38.8	
	Rainfall (mm)	25.6	29.5	56.7	71.1	76.9	85	84.6	100.6	93.3	74.2	87	51.8	836.2
	Snowfall (cm)	46.3	33.7	18.6	4.9	0	0	0	0	0	1.2	9.6	38.4	152.7
Westminster	Precipitation (mm)	71.9	63.1	75.3	76	76.9	85	84.6	100.6	93.3	75.4	96.6	90.2	988.9
	Extreme Daily Rainfall (mm)	47.4	49.7	37.1	54.6	52.6	93	72.9	75	52.4	45	43	39.9	
ine mer	Extreme Daily Snowfall (cm)	32	51	17.5	14.5	1	0	0	0	0	6	26	40	
	Extreme Daily Precipitation (mm)	47.4	51	37.1	54.6	52.6	93	72.9	75	52.4	45	43	40	
	Extreme Snow Depth (cm)	51	60	22	14	0	0	0	0	0	5	6	51	
	Rainfall (mm)	31.1	29.1	53.8	73.8	82.6	86.8	82.2	85.3	97.7	74.9	73.7	47	817.9
	Snowfall (cm)	52.6	38.1	28.6	9.2	0.3	0	0	0	0	2.7	19.7	51.1	202.4
	Precipitation (mm)	74.2	60	78.4	82.2	82.9	86.8	82.2	85.3	97.7	77.6	91.1	88.6	987.1
London A	Extreme Daily Rainfall (mm)	45	58.8	43.2	66.4	58.2	82.8	63	69.9	89.1	56.9	56.5	45.6	
	Extreme Daily Snowfall (cm)	32.5	30	27.4	21.8	5.8	0	0	0	0	15.7	40.6	57	
	Extreme Daily Precipitation (mm)	46	58.8	44.2	66.4	58.2	82.8	63	69.9	89.1	56.9	56.5	45.6	
	Extreme Snow Depth (cm)	69	47	43	20	0	0	0	0	0	13	51	70	

4.1.1 Catfish Creek Precipitation

Climate change is overarching and influences resource issues. Changes to precipitation patterns, including storm intensity and frequency, temperature patterns (especially as they apply to snow accumulation, winter ice formation, and melt), and wind patterns all influence on-the-ground conditions. As hydrologic inputs change, the changes to flooding and low water (drought) conditions will follow. More intense rain events will increase the risk of flash floods. This is particularly true in urban areas where the land is impervious, and drainage is dependent on local storm sewers and their capacity to handle the event flow and their rate of discharge to local streams will determine flood risk. Changes to storm frequency can lead to longer periods of dry conditions, which is of concern for several municipal water supplies, as well as for the many residents who rely on private wells.

4.1.2 Catfish Creek Conservation Authority Natural Hazards

A fundamental resource management concept is to first understand the local conditions and the natural processes affecting a natural resource in order to choose a suitable planning and management approach.

The following is a list of natural hazards, which have affected or may affect the CCCA:

- Flooding hazards, lake and riverine
- Lake and riverine ice conditions
- Wave uprush, lake
- Storm surge, lake
- Dynamic beaches, lake
- Lake shore stability
- Riverine bank erosion
- Slope stability, lake, riverine and inland

Development shall generally be directed, in accordance with guidance developed by the province (as amended from time to time), to areas outside of:

- hazardous lands adjacent to the shorelines of the Great Lakes St. Lawrence River System and large inland lakes which are impacted by flooding hazards, erosion hazards and/or dynamic beach hazards;
- b) hazardous lands adjacent to river, stream and small inland lake systems which are impacted by flooding hazards and/or erosion hazards; and
- c) hazardous sites.

Development and site alteration shall not be permitted within:

- a) the dynamic beach hazard;
- b) defined portions of the flooding hazard along connecting channels (the St. Mary's, St. Clair, Detroit, Niagara and St. Lawrence Rivers);

- c) areas that would be rendered inaccessible to people and vehicles during times of flooding hazards, erosion hazards and/or dynamic beach hazards, unless it has been demonstrated that the site has safe access appropriate for the nature of the development and the natural hazard;
- d) and a floodway regardless of whether the area of inundation contains high points of land not subject to flooding.

4.1.3 Human-Made Hazards

Development on, abutting or adjacent to lands affected by mine hazards; oil, gas and salt hazards; or former mineral mining operations, mineral aggregate operations or petroleum resource operations may be permitted only if rehabilitation or other measures to address and mitigate known or suspected hazards are under way or have been completed.

Sites with contaminants in land or water shall be assessed and remediated as necessary prior to any activity on the site associated with the proposed use such that there will be no adverse effects.

Planning authorities should support, where feasible, on-site and local re-use of excess soil through planning and development approvals while protecting human health and the environment.

4.1.4 Flooding and Erosion

Managing the risk associated with flooding and erosion is one of the primary roles of the CCCA under the Conservation Authorities Act. The CCCA monitors and predicts flood flows and water levels yearround, operate one flood control structure and relay flood messages to local municipalities and emergency management officials. This information is used to keep people out of harm's way in advance of potential flood and erosion events.

4.1.5 Flood Management Activities of Conservation Authorities

Undertake floodplain mapping, modelling, and monitoring streamflow, rainfall and snowpack. Regulate development in flood prone areas in cooperation with municipalities and the Province. Provide planning support and advice to municipalities to minimize flood impacts and issue warnings. If able to, acquire important floodplain lands and flood vulnerable structures.

The CCCA brings added protection and benefits with our foundational watershed management activities, which include watershed-scale monitoring, data collection management and modelling, watershed-scale studies, plans, assessments and strategies, and watershed-wide actions including stewardship, communications, and outreach and education activities. For more information on our Flood Management efforts please see our Flood Management Manual at https://www.catfishcreek.ca/about-us/publications/.

4.1.6 Ice Management

Historically the Catfish Creek Conservation Authorities (CCCA) administrative area has predominantly been subject to ice jam induced flooding. Therefore, the CCCA administers the Catfish Creek Conservation Authority Ice Management Plan. This plan is considered a live document and is revised/updated as required; it is not a guarantee to prevent any future flooding within CCCA's administrative area.

The purpose of the Ice Management Plan is to provide the Conservation Authority, its member municipalities Emergency Coordinators and any applicable government agencies the basic and recommended tools during flooding within the CCCA administrative area. All agencies public or private who are likely to be involved with flood emergencies must be aware of their agency responsibilities at times of emergency response due to flooding. Additionally, watershed residents who have been warned/notified of Flood Watch or Flood Warning watershed conditions must assume the responsibility to safeguard their personal safety and belongings. It is highly recommended that residents pay close attention during their fall/ winter preparations that properties and belongings are flood proofed.

The Ontario Ministry of Natural Resources & Forestry is the provincial agency responsible for flood emergencies. Within the CCCA administrative boundary, this role is assigned to the CCCA, and staff are tasked with the responsibility for alerting member municipalities and applicable agencies of possible flooding within its administrative area.

An internal Flood Operations Plan has been compiled to provide a systematic procedure for the Authority Flood Co-coordinator and staff to consult during flood emergencies. The flood operations manual can be found at https://www.catfishcreek.ca/about-us/publications/.

A minimum requirement of the Flood Management Program necessitates that the Flood Operation Plan be reviewed annually or additionally if required.

The Conservation Authority is not responsible for notifying individual citizens of the watershed. This responsibility lies with the applicable municipal Emergency Coordinator. It is this position who has responsibility to ensure the notification of its citizens.

Understanding of Catfish Creek channel hydraulics and Port Bruce local knowledge has identified that keeping the channel flowing within Port Bruce during break-up is an effective method of reducing flood damage due to ice jams. A component of the Ice Management Strategy is for Malahide Township to contract equipment on standby (icebreaker and/or dragline) to help keep the channel clear of ice jams, principally in the area of Rocabore Bay and the Harbour. Provided Lake Erie ice does not plug Port Bruce Harbour, this would provide in-channel ice flow unobstructed passage to Lake Erie.

4.1.7 Drought or Low Water Response

The Ontario Low Water Response (OLWR) was developed to ensure provincial preparedness, to assist Government Agencies in the co-ordination and to support local response in the event of low water and drought conditions.

The Ontario Government announced that there was no provincial funding available for OLWR for 2019 or beyond, consequently the Catfish Creek Conservation Authority formally terminated the program but by default maintained the monitoring of water flows within the Catfish Creek.

Under the amended Conservation Authorities Act, Ontario Regulation 686/21, Mandatory Programs and Services the OLWR has been restored and;

3. (1) An authority shall provide programs and services to support its functions and responsibilities to facilitate drought and low water forecasting and warning as set out in subsection (2).

(2) The authority's functions and responsibilities with respect to drought and low water forecasting and warning mentioned in subsection (1) are the following:

1. Maintaining information on surface water hydrology and the areas within the authority's area of jurisdiction that are vulnerable to drought or low water events.

2. Maintaining a stream flow-monitoring network that, at a minimum, includes stream flow gauges available as part of the provincial-federal hydrometric network and, where the authority considers it advisable, includes additional local stream flow gauges.

3. Monitoring of weather and climate information, snow surveys and water levels and flows utilizing local, provincial and federal data sources.

4. Analysis of local surface water hydrologic conditions related to risk of drought and low water events.

5. Gathering information to determine when low water levels exist within the authority's area of jurisdiction and initiating and maintaining the appropriate response to confirmed low water levels in accordance with the document entitled Ontario Low Water Response, dated March 2010, and available on request from the Ministry of Northern Development, Mines, Natural Resources and Forestry, as amended from time to time.

6. Communications to inform persons or bodies that the authority considers advisable of the potential or actual impact of drought and low water events in a timely manner.

7. Provision of ongoing information and advice to persons and bodies mentioned in paragraph 6 to support,

- i. emergency and drought or low water activities during a drought or low water event, and,
- ii. documentation of drought and low water events.

The CCCA historical/ existing OLWR plan is and was based on current legislation and regulations. The Authority has presently reviewed and updated the Low Water Response Plan to assure it complies with the current Section 28 regulations.

CCCA will be reinstating all applicable committees/ teams relative to low water response. Historically a Provincial Low Water Level Response Task Force was formed to coordinate an inter-ministry response to low water levels and to make recommendations for sustained management of low water conditions. Through this the OLWR plan recognizes the partnership between provincial government agencies and local authorities that sustainable environmental management must be approached at all levels of government, agriculture, recreation and special interest groups to maintain beneficial access to water.

The province provides overall direction and coordinates policies, science and information systems. In extreme circumstances the province, has in the past, provided support where local declarations of an emergency have been made.

At the local level, applicable agencies are directed to collect information, interpret policy and deliver programs to minimize the effects of low water condition levels. The three condition levels are Level I (10% voluntary conservation), Level II (20% voluntary conservation) and Level III (Conservation, Restriction and Regulation).

Precipitation and streamflow indicators are used to determine the OLWR condition level for watersheds. Guidelines/thresholds for these indicators are provided in the OLWR manual along with the procedure to determine when a watershed moves from one level into another. Agency roles and responsibilities for each level are also identified within the manual, Ontario Low Water Response, 2010. For more information on the CCCA's Ontario Low Water Response, please see <u>https://www.catfishcreek.ca/about-us/publications/</u>.

4.2 Water Resources/ Management

Water management is a truly important program of the Catfish Creek Conservation Authority. It involves various characteristics of surface and groundwater management, relating to water quality and quantity. Other programs within CCCA, Ministry of the Environment, Conservation and Parks (MOECP), local municipalities, and Ministry of Natural Resources and Forestry (MNRF) are associated with the CCCA Water Management Program. In order to sustain water quantity to an acceptable recognized quality, co-operation amongst the aforementioned agencies is necessary (Catfish Creek Conservation Authority, Watershed Plan, Draft No.1 April, 1983).

The Authorities jurisdictional boundary was defined at the inception of the Authority. Today the Authority manages, in principal, the waters within the hydrological boundaries of the Catfish Creek watershed, coupled with a small number of adjacent Lake Erie tributaries.

Flood control, source water protection, surface water and ground water recharge, wetland area protection, surface and groundwater quality and quantity are all components of the current CCCA Water Management Program. Future significance is expected on each of these, through assorted government funded programs, administered through Conservation Authority advancements, particularly in water quality and quantity

4.3 Benefits

If natural ecosystems are maintained and degraded ecosystems are rehabilitated, then the areas resources can be naturally managed. Natural ecosystems manage our natural resources by regulating the areas environment through the extent and variety of the regions flora and fauna. A diverse flora ecosystem will minimize the impact of not only extreme weather but also normal weather patterns by reducing the erosion effect of rain on areas not covered by vegetation and increasing infiltration in areas, which have vegetation cover.

Environmental nature-based solutions can help to:

- Sustain (clean) water supplies by increasing the water infiltration and storage capacity of wetlands/soils and the recharge of aquifers.
- Mitigate drought by releasing water from natural storage features, including soil and groundwater, surface water and aquifers.
- Prolong the life of reservoirs by reducing siltation.

At high rainfall storm intensities, a percentage of the rainfall flows directly off the land into a watercourse and while some penetrates the soil, where plants may take it up. A portion moves in the soil towards rivers and streams and another fraction penetrates deeper into the ground, replenishing groundwater. Steady release of water stored underground and in wetlands serves to maintain river flows long after rainfall events. These ecosystem services regulate the impacts of rainfall events and directly moderate the supply of water in the basin.

In conjunction with these water flows, the condition of the water in the system may vary dramatically. In a high rainfall event where a catchment has degraded land, the run-off water may have very high turbidity from eroded soils and pollutants that have washed off the land. This results in siltation of water storage systems and increased costs to water treatment systems. Water that penetrates the ground or is held on floodplains and wetlands allows much of the silt and pollution to be deposited or removed. Water passing through the soil or wetlands is cleaned by physical and biological processes and requires less treatment to reach potable and or recreational quality. The quality of a catchment therefore directly affects water quality.

Nature-based solutions can help to:

- Treat polluted water from point and non-point sources by trapping and/ or containing sediments, pollutants in sediments, soils and vegetation (filtration and chemical conversion).
- Protect groundwater from contamination by removing sediments, heavy metals and other pollutants.
- Relieve pressure on existing water treatment infrastructure through bio retention and infiltration.
- Improve the quality of wastewater, e.g. using constructed wetlands alone or in conjunction with conventional wastewater treatment plants.

(UN Environment-DHI, UN Environment and IUCN 2018. Nature-Based Solutions for Water Management: A Primer.)

5.0 WATER USE INVENTORY

This section is a summary of the water uses within the Catfish Creek watershed for 2005 as found in a report entitled "Water Use in the Catfish Creek Watershed" (Wong and Bellamy, 2005). Water use estimates are broken down into four subgroups: Municipal Supply, Agricultural, Un-serviced Population and Other Permitted Takings (larger than 50,000 L/day). The water use estimates were determined using the best available data, including Census of Population, Census of Agriculture, municipalities, and the Permit to Take Water (PTTW) database. A phone survey of the permit holders was completed to refine water use estimates based on their records, with a 50 percent response rate. The analysis of all water use data identified the water uses and percentages within the basin.

Table 3: Total Water Use Comparison (in cubic metres)													
Water Use Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
1 Agricultural - Irrigation						637,750	1,275,500	637,750					2,551,000
2 Municipal	103,960	97,260	105,440	91,940	120,160	115,240	141,280	114,560	115,090	104,000	89,980	118,050	1,316,950
3 Rural Domestic	87,160	78,720	87,160	84,350	87,160	84,350	87,160	87,160	84,350	87,160	84,350	87,160	1,026,200
4 Agricultural	40,150	36,260	40,150	38,850	40,150	38,850	94,770	94,770	93,470	40,150	38,850	40,150	636,560
5 Aquaculture	33,800	30,530	33,800	32,710	33,800	32,710	33,800	33,800	32,710	89,975	32,710	33,800	397,920
6 Water Supply Communal	6,630	5,610	6,790	6,570	7,370	6,890	8,040	8,280	7,620	7,870	6,970	6,960	97,540
7 Golf Course Irrigation					1,180	1,140	1,180	1,180	1,140	1,180			7,000
TOTAL	271,700	248,380	273,340	254,420	289,820	916,930	1,641,730	977,500	334,380	330,335	252,860	286,120	6,033,170





5.1 Municipal Water Supply

Municipal water use is the supply of water provided through a central distribution system operated by a municipality. Municipal water use includes urban domestic use, whether indoor or outdoor, and includes uses for industrial, commercial, institutional or other uses that rely on municipalities for their water supply.

Brownsville (approximately 500 residents) has the only groundwater source for municipal water takings in the Catfish Creek watershed. All other municipalities receive their water from Lake Erie from either primary or secondary water systems from an intake in Lake Erie off Port Stanley. These communities include Aylmer (approximately 2,600 residents), and smaller communities in both Central Elgin and Malahide Townships. Municipal water use totalled 1.3 million cubic metres in 2004 in this region.

5.1.1 Groundwater Use

Groundwater and surface water are vital resources for the livelihood and recreation of constituents and visitors of the Catfish Creek watershed. Area residents use groundwater as the primary source of potable water, which is categorized as un-serviced domestic water use. Un-serviced domestic water use is described as; all water for domestic indoor and outdoor residential applications, not on a municipal water distribution system. Generally, un-serviced domestic water use is established within rural communities and private landowners that take water from private wells.

The rural population in the Catfish Creek watershed is estimated at 22,000 and draws 1.0M cubic metres of groundwater per year. Groundwater is also the source of water for a community in the northern region of the watershed and draws more than 33 000 cubic metres of water per year (Water Use in the Catfish Creek Watershed, September 2005 Draft, Amanda Wong, Samuel Bellamy, Grand River Conservation Authority).

A draft report of the Catfish Creek groundwater (Groundwater Resources of the Catfish Creek Conservation Authority and Kettle Creek Conservation Authority) study has been completed in partnership with Ontario Geological Survey (OGS).

5.1.2 Surface Water

Areas not utilizing un-serviced water systems for domestic water use are linked to a municipal water supply system, which obtains water from Lake Erie through the Elgin Area Primary Water Supply System. Municipal water use is described as; a supply of water that is provided through a central distribution system operated by a municipality and includes; indoor or outdoor urban domestic use, industrial, commercial and institutional and other applications that rely on municipalities for their water supply.

The proximity to Lake Erie provides easy access to municipally serviceable water supplies to the southern regions of the watershed. Municipal water use totals 1.3M cubic metres per year for this region (Water Use in the Catfish Creek Watershed, September 2005 Draft, Amanda Wong, Samuel Bellamy, Grand River Conservation Authority).

5.1.3 Combined

Various water uses for agricultural operations such as livestock watering and irrigation, may use a combination of groundwater or surface water from municipal drainage ditches, ponds, or natural channels. Since inexpensive and reliable water sources are fundamental to an agricultural economy such as exists in the Catfish Creek watershed, the Authorities ground and surface water base flow capacities must be maintained year-round to facilitate the agricultural surface water applications.

5.1.4 Agricultural Water Use

Agricultural water use was divided into two categories livestock/farming operation water use and crop irrigation water use. This division was based on the information available for the two categories, as well as the differing water requirements for each use throughout the year. Water use for livestock and other farming operations are generally year-round takings, as opposed to crop irrigation, which only occurs

during the summer growing season. Other farming operations considered in this water use category include greenhouse operations.

Livestock water demands were estimated using a water use coefficient for daily water requirements and the number of livestock in the watershed. The volume of livestock and other year-round agricultural water requirements, excluding irrigation water, is relatively small, accounting for 0.7 million cubic metres per year.

Crop irrigation is the application of supplemental water onto cropped fields when natural precipitation is insufficient. The estimation of irrigation water requirements were completed using the irrigated area estimation from Census of Agriculture information and a demand model, estimating an average number of irrigation events likely to occur in the watershed per growing season. This demand model (GAWSER), bases the irrigation water requirements on soil moisture content, and averaged four irrigation events per year, for the CCCA watershed. The irrigation demand model only considers irrigation events meant for maintaining soil moisture at adequate levels for plant growth. Irrigating for climate control, such as spring irrigation to protect against frost, was not considered in this exercise. To determine a possible breakdown of the source of irrigation water, the Permit to Take Water database was consulted. It was determined that from the 239 agricultural irrigation sources, 138 were supplied by groundwater and 101 were supplied from surface water, producing a 58 percent, 42 percent split, respectively. Irrigated crops in this watershed may include tobacco, ginseng, potatoes and vegetables, and the water requirements for all irrigation activity accounts for 2.6 million cubic metres per year.

5.1.5 Use of Irrigation

The use of irrigation in the watershed is not extensive, and is generally only applied onto specialty crops such as vegetables, sod, fruit and root crops such as tobacco, potatoes and ginseng. It is rare that other crops are irrigated unless the growing season is particularly dry.

The use of irrigation is concentrated mostly in the Norfolk Sand Plain area in the southeast portion of the watershed where there is a higher percentage of specialty crops grown in well-drained soils. Irrigation for agriculture in the Catfish Creek watershed is concentrated in the summer months of July and August with some exceptions earlier or later in the growing season. The concentration of these large water takings during warmer and often dryer periods and in a limited area poses problems to water quantity in both groundwater and surface water sources.

5.1.6 Un-serviced Domestic Water Use

Un-serviced domestic water use is all water uses for domestic (indoor and outdoor residential water use) use that are not on a municipal distribution system. Generally, these are rural communities and water could be taken from private wells. The estimation of un-serviced domestic water use was based on population estimates and per capita water use rates for rural residents.

Rural domestic per capita water use has traditionally been much lower than urban domestic use. While the actual rate varies depending on a large number of factors, 160 litres per day was assumed to be the rural domestic per capita water use rate (Vandierendonck and Mitchell, 1997). It should be noted that a large percentage of this water is likely returned to the shallow groundwater system via septic systems. This water use is assumed relatively constant throughout the year. The rural population in the Catfish Creek watershed is estimated to be 17,500 and draw 1.0 million cubic metres of water per year.

5.1.7 Other Permitted Water Takings

For water uses in the watershed that did not fall into the three previously mentioned categories (municipal, agricultural and rural un-serviced), the Ministry of the Environment (MOE) Permit to Take Water database was used. The MOE requires any person taking greater than 50,000 litres of water on any day of the year (animal watering, domestic usage and firefighting excluded) to apply for a PTTW. This generally includes many industrial and larger commercial operations, as well as many agricultural water requirements, such as irrigation.

A phone survey of the water takers in the Catfish Creek watershed was completed in the summer of 2005 (June to August), to get better estimates or actual volumes of water use by each user. The survey generated responses from two of the four permits (50 percent response rate) to refine the estimates of their water uses. Where no data could be obtained from the user, adjustments were made based on seasonality of the water takings. For instance, golf course irrigation is likely to occur only during the months of May through October, while commercial water uses are year-round water takings. These adjustments were included where available in the calculation of the water use estimate for large permitted water takings.

The total volume of water takings for all these permits in 2005 was 0.5 million cubic metres, with golf courses taking the bulk of this volume at 0.4 million cubic metres and communal water supplies for just less than 1.0 million cubic metres per year.

5.1.8 Water Control Structures

The CCCA operates one water control structure for flood attenuation and recreation, the Springwater Dam.

6.0 HABITATS AND WILDLIFE

6.1 Forestry and Reforestation

Programs within Catfish Creek Conservation Authority may well be measured and classified in order of significance, however, to administer a watershed effectively all curriculum need to be interconnected and addressed collectively. This involves characterizing terrestrial and aquatic resources sequentially to assist in connecting entire environmental assets, relating to mandated programs within CCCA, and government agencies associated with the CCCA Watershed Management Plan.

As outlined in the Water Management component "Flood control, source water protection, water recharge, wetland area protection, surface and groundwater quality and quantity are all components of the current CCCA Water Management Program." Increased significance and awareness is anticipated on each of these, particularly in water quality and quantity, which links with the forestry management element, *Water Management, CCCA Watershed Management Plan, 2006*.

The Forest Management program of the Catfish Creek Conservation Authority predominantly focuses on Authority owned lands including selected woodlot management consultation services for municipally owned woodlots and private lands within the watershed. Forest cover (Map 2) within Catfish Creek Conservation Authorities administrative boundary is largely located along incised valley slopes, flood plains and wetland areas in the southern section of the watershed and is estimated at 14.4% (17,500

acres, 7, 000 ha). The forested areas are protected to a significant degree by the tree bylaws of Elgin and Oxford Counties.



Map 2: Forested Areas Within Catfish Creek Watershed

The foundation of the CCCA Forest Management Program focuses on the retention of existing forest cover and reforestation of priority water management areas, with the purpose of benefiting the aquatic and terrestrial environment, watershed resource base, constituents and visitors. Included in these areas are soil and slope regulated highly erodible land, marginal/poor agricultural land, water retention and discharge areas. By recognizing and focusing on these areas, the Authority understands their value in achieving the objectives of accompanying Authority programs by providing erosion control, groundwater recharge/discharge areas, fish and wildlife habitat.

Trees (and other vegetation in the catchment), intercept rainfall and increase infiltration, thus moderating both run-off into the river system and storage of water in the soil. The ability of soils in forest areas to store water and release it through seepage, transpiration and evaporation helps to regulate the water supply in the catchment.

Establishing or conserving forests (and promoting other sustainable land use activities in the watershed) can help to improve water quality. Forests improve water quality by reducing sediment in water bodies and trapping or filtering other water pollutants.

Forests and areas with good vegetation cover can moderate extreme events by reducing the likelihood or frequency of elevated water conditions, landslides and mudflows, which can cause extensive damage to infrastructure and inhabited areas.

Use of riparian buffers to maintain water quality in streams and rivers is a forest and conservation management best practice in many countries and is mandatory in some areas. Riparian buffers are vegetated, often forested, areas ("strips") next to streams, rivers, lakes and other waterways protecting aquatic environments from the impacts of surrounding land use.

The CCCA will incorporate the following strategies and initiatives in an integrated forestry program:

- a) Programs and restoration efforts will be coordinated and focused, consistent with approved, applicable agency plans and studies (e.g. '*Elgin Stewardship Strategy', CCCA Watershed Plans, Source Water Protection Plans);*
- b) Prepare, monitor, review and update forest management plans/activities on Authority owned properties;
- c) Assist private landowners with reforestation and management of forests throughout the watershed (e.g. landowner extension, information transfer, technical assistance);
- d) Assist municipalities to `protect, manage and expand forest cover (e.g. Municipal Woodlot Management, Roadside Tree Planting, County Tree-Cutting By-laws);
- e) Continue the acquisition of prioritized environmentally sensitive areas; and,
- f) Develop partnerships for program delivery and education (volunteers, service clubs, scouting groups, funding sources).

The Authority offers limited woodlot management services to landowners of private woodlots through the preparation of Managed Forest Tax Incentive Plans (MFTIP), renewals and approvals of plans prepared by other accreted individuals. Reforestation assistance is offered by the Authority on a firstcome first-served basis, and is paid for through grants, reserves and fee for service (cost recoverable).

Technical and workforce assistance for reforestation is available from the Authority upon request, for areas requiring a minimum of 500 trees. An additional program initiated by the CCCA, the Municipal Woodlot Management Program is designed to assist with managing municipally-owned lands by providing comprehensive woodlot management and reforestation services for these areas on a fee for service basis.

6.1.1 Riparian Zones

Riparian buffers help to maintain water quality in waterways by protecting streams from non-point source pollution (e.g. surrounding agricultural activities). Riparian vegetation cover provides a barrier between sediments, and pollutants such as nitrates and phosphates, washed from the land and water bodies. Temperature moderation from shading creates an important aquatic habitat, especially for fish and insect life, providing protection from extreme temperatures. During flood events, riparian vegetation slows run-off by absorbing excess water, reducing peak flow and helping to mitigate potential flood damage downstream. Some studies show that riparian buffers can help to reduce the amount of sediment reaching streams by as much as 80 percent.

6.1.2 Wetlands

The definition of wetlands is very broad but normally refers to shallow vegetated water bodies, swamps and marshes or areas that may periodically be dry, varying in size from a few square metres to many square kilometres. The water regulation services provided by wetlands are often cost-competitive and more sustainable than those provided by conventional infrastructure solutions, at the same time providing a wide range of socioeconomic co-benefits. Wetlands contribute to water quality through their natural ability to filter effluents and absorb pollutants. Microorganisms in the sediment and vegetation in the soil help to break down many types of waste, eliminating pathogens and reducing the level of nutrients and pollution in the water. There is a limit to the amount of pollution wetlands can absorb, however. If this tipping-point is reached, their ability to treat pollution may be greatly reduced until they are restored to health, which can be a difficult and lengthy process.

Protecting, restoring or constructing wetlands can help to provide clean water for ecosystems, harvesting biomass, drinking water needs and other uses. The ability of wetlands to store large amounts of water and release it slowly plays a key role in the natural regulation of water quantity during periods of drought and flooding. Wetlands also trap sediments and thus reduce their downstream transport.

Wetlands can 'slow' flood waters, reducing potential flood damage downstream, and increase resilience to storms, thereby avoiding potential damage to grey infrastructure and human lives. In periods of drought, they can function as 'retention basins', providing water through slow release of stored water. The retention capacity of different types of wetlands varies and needs to be evaluated individually.

Constructed wetlands are created artificially with the aim of simulating the hydrological processes of natural wetlands. They function as biological wastewater treatment 'technologies', either supplementing or replacing conventional treatment plants. They are often used for nutrient pollution control (and thus reduction of eutrophication risk) of various wastewater streams (domestic wastewater, grey water, urban wastewater from sewerage).

Constructed wetlands can also be used to reduce flow velocity, remove nutrients and sediments and mitigate surface run-off from agricultural and livestock fields, as well as in urban areas. Their main water management benefits include reduced downstream pollution, improved water quality and flood and drought regulation. (UN Environment-DHI, UN Environment and IUCN 2018)

6.1.3 Tall Grass Prairie

In Ontario, tallgrass prairies were historically found in the southwestern part of the province, particularly in the Elgin County to Windsor Essex Region and along the shores of Lake Erie. However, due to agricultural expansion, urbanization, and other land use changes, the tallgrass prairie ecosystem in Ontario has been severely reduced, and much of what remains is fragmented and degraded.

The tallgrass prairies in Ontario were once home to a diverse array of plant and animal species, including tall grasses like big bluestem and Indian grass, as well as wildflowers such as blazing star and prairie clover. Wildlife such as grassland birds, and small mammals also depend on these habitats for food and shelter. Tallgrass prairies provide important habitat for pollinators such as bees, butterflies, and other insects. Many prairie wildflowers rely on pollinators for reproduction, and healthy pollinator populations are essential for maintaining ecosystem functioning and supporting agricultural productivity.

The deep root systems of tallgrass prairie plants help to store carbon in the soil, contributing to carbon sequestration and helping to mitigate climate change. The dense network of roots in tallgrass prairies helps to improve soil structure, prevent erosion, and increase water infiltration, leading to healthier soils and improved water quality. Tallgrass prairies act as natural water filters, trapping sediment and pollutants and helping to regulate water flow and prevent flooding.

Efforts to conserve and restore tallgrass prairies in Ontario are underway, with organizations like the CCCA and Nature Conservancy of Canada working to protect remaining patches of native prairie habitat and restore degraded areas. These efforts often involve initiatives such as controlled burns, native

grassland plantings, and invasive species removal to help restore the ecological integrity of these important ecosystems.

Despite the challenges of conserving tallgrass prairies in Ontario, there is growing recognition of their ecological significance and efforts to protect and restore them for future generations to enjoy and benefit from. Overall, tallgrass prairies are important ecosystems that provide a wide range of ecological services and support diverse plant and animal communities. Protecting and restoring these habitats is essential for maintaining biodiversity, supporting ecosystem health, and mitigating the impacts of climate change.

6.1.4 Description

Ecosystem integrity may be defined as "the ability to support and maintain a balanced, integrated, and adaptive community of organisms having a species composition, diversity and functional organization comparable to those of natural habitats within a region" (Karr, J. R. and D. R. Dudley. 1981. *Ecological Perspectives On Water Quality Goals*. Environmental Management 5: (55-68).

Located in the Carolinian Forest Ecosystem; early descriptions (circa 1837 - 1851) suggest that the forests were mostly hardwoods, combined with a southern species component. The region was mottled with white pine stands on well-drained soils, sugar maple and beech dominated the better-quality soils, while soft maple, elm and oak savannas colonized the sand plains. Mixed stands of white cedar, eastern hemlock, white pine, soft maple and yellow birch established on poorer-quality soils.

Development within Catfish Creek watershed is largely agricultural with small urban pockets speckling the landscape. The importance of agriculture within Catfish Creek to the local economy is clear, but the effect that agriculture has on forest ecosystems requires paramount attention and investigation. Suitability of soils for agriculture led to a rapid decline of the forested lands; by 1860 60% of Elgin County forests were depleted and by 1910, only 10% remained. Today with an aggressive reforestation program 17% of Catfish Creek watershed has a forest component, located along watercourses, valley lands or in areas of poor drainage that are privately, municipal, authority and provincially owned.

7.0 GENERAL LAND USE

7.1 Agricultural Sector Distribution

Agriculture is a large part of the Catfish Creek watershed, as 84 percent of the land area is designated and used for agricultural purposes. Both livestock and agricultural crops are prominent practices, with 70 percent overall in cropped agricultural land. There are a total of 14,400 head of cattle, 40,000 heads of swine and 290,500 heads of poultry across the watershed. The majority of crops grown in the watershed are corn (36.5 percent), soybean (31 percent) and grains (12 percent).



Figure 3: Percent Area of Land used for Agriculture (by crop)

7.1.1 Cropping Characteristics in the Catfish Creek Watershed

Agricultural crops in the Catfish Creek watershed are typical to south western Ontario. Corn and soybean are the highest in land area, with grains and hay as the next largest in land area. Vegetables and root crops, however, make up a large percentage of land relative to the rest of south western Ontario, due to the location of ideal soils of the Norfolk Sand Plain. Vegetables and root crops generally have smaller field sizes and higher water requirements than other row crops. Root crops such as tobacco and potatoes were substantially higher in the southern Catfish area, with 88 percent of all hectares of root crop reported in this area. Overall, root crops comprised 11 percent of the cropped land area in the lower Catfish, while only occupying 1.1 percent of the upper Catfish. All other crops were in similar or greater quantities in the upper Catfish.

7.1.2 Livestock

Livestock farming in the Catfish Creek watershed is fairly high considering the small size of the watershed. The Upper Catfish Creek has the majority of livestock with large intensive farms, which could pose problems to the downstream reaches for nutrient loadings. Swine farms are prominent in number and are found mostly in the Upper Catfish Creek, averaging over 1,100 pigs per farm. Poultry is also much more intensive in the upper Catfish, with double the number of farms and head of poultry found on these farms, averaging 5,600 per farm. Approximately 75 percent of the farms in the upper Catfish reported raising cattle, accounting for 84 percent of the total number of cattle found in the entire watershed. Cattle in the upper Catfish average 102 per farm (Table 3).

Livestock	Total Nu	umbers		Averag Farm	e Numb	er Per	Per Hectare Farmed Land			
Sub-basin	Cattle	Pigs	Poultry	Cattle	Pigs	Poultry	Cattle	Pigs	Poultry	
Lower Catfish	2,260	3,580	57,500	60	390	2,666	0.13	0.20	3.2	
Upper Catfish	12,170	36,420	232,970	102	1186	5,557	0.54	1.61	10.3	
All CCCA	14,430	40,000	290,470	80	790	4,110	0.33	0.91	6.76	

Table 4: Total Head of Livestock (by sub-basin) in Catfish Creek Watershed

The highest nutrient values are found in the lower Catfish due to the greater amount of farmland in crops and in stream cumulative effects. In this area, approximately 25 percent of the total farmland is applied with manure over the year. There was considerably more farmland in root crops on sandy soils in this lower Catfish, which could require more organic material provided by manure applications. Runoff into the creeks and groundwater system could be an issue in lower Catfish area. Livestock can also introduce bacteria, as well as silt from the banks, directly into the waterways if proper fencing is not in place.

7.1.3 Agricultural Management Practices

Management practices include such activities as conservation tillage and grassed waterways, and are preventative actions against erosion into the waterways or chemical runoff. Across the watershed, to reduce the amount of sediment loading in the waterways, 34.7 percent of farms reported using grassed waterways, 5.7 percent use contour cultivation and 8.3 percent use strip cropping. The use of winter cover crops (42.5 percent) and the use of windbreaks or shelter belts (24 percent) has helped to prevent the removal of topsoil by wind. Crop rotation is the most widely used conservation practice at 61.2 percent of farms reporting. This increases the longevity, productivity and environmental quality of farmland by replacing nutrients into the soil.

7.1.4 Soils and Vegetated Land

Maintaining good soil structure and vegetation cover has benefits for farming on every scale, from large scale irrigation to rain-fed smallholder systems. Causes of soil degradation include deforestation, extensive cultivation on marginal land and improper cultivation practices such as poor manuring management, misuse of fertilizers, excessive irrigation, overgrazing and water erosion. As agriculture uses about 70 per cent of global water withdrawals and a large proportion of surface water pollution originates from agriculture, the potential benefits of improved water management in agriculture are enormous.

Low or zero-till systems, mulching, crop rotation and maintenance of vegetation cover (conservation agriculture) all contribute to good soil structure, improve water retention and drainage and reduce erosion and pollution of surface waters. Along with other structural and management interventions, these measures can help improve agricultural productivity, while also improving resilience to drought and flooding.

7.1.5 Mining and Aggregate Extraction

There are no open pit/mining operations currently licensed within the Catfish Creek watershed.

Currently, there are five areas licensed by the Ministry of Natural Resources and Forestry (MNRF) pursuant to the Aggregate Resources Act, relative to aggregate extraction within the watershed. All of the licensed operations are located in a small cluster along County Road 45 (John Wise Line) and Pleasant Valley Line in the Municipality of Central Elgin. The situation of these licenses is due to the localized surficial geology (sand and gravel deposits).

Two of the licenses are located on one property (Pleasant Valley Aggregates/Trout Farm) and have almost exhausted the material within the 55 hectare licensed area. Extraction did occur below the water table to a level of 178 metres above sea level (pit floor elevation). Extensive rehabilitation has occurred on this site to permit land uses which include passive recreation, aquaculture and a put-and-take/public fishing area.

The third license has been issued to a property immediately to the east of the above operation, on Lot: 26; Concession: 5; geographic Township of Yarmouth. The licensed area is 29 hectares with a proposed tonnage of 45,350 tonnes annually. Terms of the license will allow for extraction to proceed to a level of 180.3 metres above sea level, which is below the water table, however, no active extraction has been initiated to date.

On the north side of Pleasant Valley Line is the fourth license issued to North Shore Farming Company. The licensed area encompasses 19 hectares (annual tonnage of 150,000 tonnes) with a final pit floor elevation of 206 metres above sea level being above the water table.

The final active pit is 65 hectares in size and is licensed to Alisar Aggregates Inc. on John Wise Line. Extraction will be above the water table (pit floor elevation 198 metres above sea level) with an annual maximum tonnage of 300,000 tonnes.

Also of note, is the issuance of a 'way-side-permit' to The Township of Malahide to allow the use of sand material (total tonnage of 33,080 tonnes) for specific road projects within the municipality. Located on Lot: 7; Concession: 3 in the Township of Malahide, this authorization will permit the removal of a small "sand knoll" (well above the water table) with the final rehabilitation back to agricultural production.

8.0 WATERSHED CHALLENGES

The CCCA identified a number of challenges that may influence program priorities and services over the next several years. Challenges may include, but are not limited to:

8.1 Capacity Levels

Increases to conservation authority roles and responsibilities disproportionately impact smaller conservation authorities such as the Catfish Creek Conservation Authority with a very limited tax base within our area of jurisdiction to support mandatory program and service delivery. Variances in capacity affect the extent to which the CCCA can support hazard management policy objectives. Conservation Ontario and municipalities have repeatedly requested increases to provincial funding levels to conservation authorities, which have not been increased in well over 20 years.

8.1.1 Increased Development Pressure

If development continues at prevailing densities in the watershed, land will be consumed at an even faster rate than population grows, particularly in rural and suburban areas. This expanding footprint will put additional pressure on diminishing wildlife resources and their habitats, and has the potential to drive more plants and animals toward extinction.

8.1.2 Invasive Species

Invasive species are the second most significant threat to biodiversity, after habitat loss. In their new ecosystems, invasive species become predators, competitors, parasites, hybridizers, and diseases of our native and domesticated plants and animals.

8.1.3 Climate Change

Watersheds are affected by climate changes that are altering the quantity, quality, timing and distribution of water. The cumulative impacts of past land-uses, water withdrawals, and disturbances in a watershed are all exacerbated by climate changes.

8.1.4 Species at Risk

Ontario has the most species at risk in Canada, a number which has jumped by 22 per cent since 2009 (although no new species have been added to the Species at Risk in Ontario List since 2018) while approvals to impact species at risk have increased by 6,262 per cent in that same time frame.

8.1.5 Agricultural Runoff

When plant nutrients from synthetic fertilizers or organic fertilizers, decomposed crop residues, and agricultural waste products, such as wastewater from dairies, run off into fresh water, they speed up the eutrophication of water bodies.

8.1.6 Habitat and Biodiversity Loss

Biodiversity loss can have significant direct human health impacts if ecosystem services are no longer adequate to meet social needs. Indirectly, changes in ecosystem services affect livelihoods, income, local migration and, on occasion, may even cause or exacerbate political conflict.

8.1.7 Water Quality

Water quality degradation affects both aquatic life and human uses of water. For example, higher concentrations of nutrients may result in uncontrolled plant growth and reduce the amount of dissolved oxygen available for fish and other aquatic animals. They can also foster the growth of algae, some of which can cause health effects in humans and animals. Degraded water quality can also undermine economic activities such as fisheries, tourism and agriculture.

8.1.8 Floodplain Mapping

Mapping of floodplains and flood damage centres is critical to flood preparedness. With changing precipitation patterns, the return period for events of a given magnitude (e.g., 1:25 year or 1:100 year flood) is changing. Floodplain mapping needs to be updated accordingly, or in the case of some sub watersheds, needs to be assessed for the first time.

8.1.9 Erosion

In areas with expanding population, agricultural production, construction and urbanization as well as human activities soil erosion is a major problem. Soil erosion adversely hinders the growth of plants, agricultural yields, quality of water, and recreation. It is a key cause of degradation of soils as it occurs naturally on all lands.

8.1.10 Flooding

Flooding is considered the most significant natural hazard in Ontario in terms of death, damage and civil disruption and is the costliest type of natural disaster in Canada in terms of property damage.

8.1.11 Drought

Historically, periods of dry weather and low water levels, or drought, were relatively uncommon in Ontario occurring once every 10-15 years. However, in recent years, periods of drought are becoming more common, as the demand for water steadily increases and climate change impacts weather patterns and water availability.

8.1.12 Urbanization and Development

Rapid urbanization leads to increased impervious surfaces, such as roads and buildings, which can disrupt natural hydrological processes and increase runoff, leading to erosion, flooding, and water quality degradation.

8.1.13 Water Pollution

Pollution from various sources such as agricultural runoff, industrial discharge, and urban runoff can degrade water quality, impacting aquatic ecosystems and human health.

8.1.14 Resource Management Conflicts

Conflicts over the allocation and use of water resources among various stakeholders, including municipalities, industries, agriculture, and environmental conservation interests, can complicate watershed management efforts.

8.1.15 Data Deficiency and Monitoring

Limited availability of data on water quantity, quality, and ecosystem health, as well as challenges in monitoring and assessing watershed conditions, hinders effective decision-making and management.

8.1.16 Community Engagement and Education

Engaging and empowering local communities in watershed management efforts, as well as raising awareness about the importance of conservation and sustainable water use practices, are ongoing challenges.

8.1.17 Financial and Human Resources

Limited funding and capacity constraints within conservation authorities can restrict our ability to implement comprehensive watershed management programs and initiatives effectively.

Addressing these challenges requires integrated approaches that incorporate ecosystem-based management principles, stakeholder collaboration, adaptive management strategies, and innovative technologies to safeguard the health and resilience of watersheds for current and future generations.

9.0 OVERVIEW OF CCCA PROGRAMS AND SERVICES

A new categorization of CA programs and services was initialized through amendments to the Conservation Authorities act by the Province of Ontario. A Programs and Services Guide was created and within it Category 1, Mandatory, Category 2, Municipally Advised, and Category 3, Non-mandatory; advisable by CCCA. Category 1 Programs and Services are to be included in the WBRMS and Category 2, and Category 3 Programs and Services can also be included if agreements have been reached between the CA and its member municipalities. The CCCA supports Category 1 Mandatory Programs and Services and Category 3 Programs and Services. All Category 3: Other Programs and Services are all compensated via grants, reserves or fee for service work (cost recoverable).

Ca	Itegory 1: Mandatory Programs and Services Overview								
	Category 3: Other Programs and Services Overview								
Program Area	Program Area General Description								
Natural Hazard Management: Category 1 Mandatory Programs and Services Budget 2024 - \$322,049.35									
Section 28 Permit	Reviewing and processing permit applications, technical reports, natural								
Administration and	hazards studies, mapping and updates to regulation limits mapping. Site								
Compliance Activities/	visits/ inspections, communication with applicants, agents, and consultants.								
Enforcing and Administering the Act	Property enquires and legal expenses for regulations and compliance.								
Mandatory in	Administering and enforcing sections 28,								
accordance to CA Act;	28.0.1, and 30.1 of the act as required.								
Reg. 686/21 s.8									
Review Under Other	Input and review on a variety of different Acts including, The Aggregate								
Legislation	Resources Act, Drainage Act, Environmental Assessment Act and The								
Mandatory in	Ontario Planning Act. Subdivisions, consents and minor variances.								
accordance to CA Act;									
Reg. 686/21 s.6									
Municipal Plan Input	Provide technical information, advice, and policy support to municipalities								
and Review	on matters relating to Natural Hazards Policies (Section 3.1 under the PPS)								
Mandatory in	with a focus on Official Plan and Official Plan Amendments. This includes,								
accordance to CA Act;	broad policy interpretation, transfer of data, information and science to								
Reg. 686/21 s.7	hazards policy to Ministry of Municipal Affairs and Housing								

Flood Forecasting and Warning	Daily data collection and monitoring of local weather forecasts hydrometric stations, local water level forecasts and watershed conditions. Flood event
Mandatory in accordance to CA Act; Reg.686/21 s.2, Reg. 686/21 s.3	forecasting, provincial watershed condition statements and inter agency communications in the event of a flood. Maintenance of flood forecasting equipment and annual meeting with applicable inter agency flood emergency coordinators.
Flood and Erosion Control Infrastructure Operation and Management	Flood and erosion control infrastructure and low flow augmentation includes 1 dam.
Mandatory in accordance to CA Act; Reg. 686/21 s.5	
Ice Management Services Mandatory in accordance to CA Act; Reg. 686/21 s. 4	Providing advice for ice jam prevention and mitigation through-out the winter season. Suggest equipment for ice mitigation and create/ update an Ice Management Plan.
Catfish Creek Channel Monitoring Mandatory in accordance to CA Act; Reg. 686/21 s. 2, s.3, s.4	Monitoring the Catfish Creek channel morphology changes at Port Bruce due to seasonal loading and/or scour by bathometric sounding the lower reaches of the Catfish Creek through Port Bruce.
Drought and Low Water Response Mandatory in accordance to CA Act; Reg. 686/21 s.3	Monitoring of surface and groundwater conditions and analysis of low water data for dissemination to irrigators, landowners and applicable government agencies. Technical and administrative support to regional advisors, and the CCCA's Irrigation Committee.
Natural Hazards Technical Studies and Information Management	Data collection and study of technical report designs to mitigate natural hazard. Development and use of systems to collect and store data and to provide spatial geographical representations of data.
Mandatory in accordance to CA Act; Reg. 686/21 s.1(1)	

Natural Hazards	Promoting public awareness of natural hazards including flooding, drought,							
Communications,	and erosion. Social media services. Media relations. Natural hazards							
Outreach and	studies, mapping and updates to Regulation Limits mapping and data							
Education	Education transfer to public, through web based map(s) showing Regulation Limits .							
Mandatory in accordance to CA Act; Reg. 686/21 s.2, s.3, s.4, s.5								
Core Watershed -	Collate/compile existing resource management plans, watershed plans,							
based Resource	studies, and data. Strategy development, implementation, and annual							
Management Strategy	reporting. This project builds on previous Watershed Management							
Mandatory in	Strategies.							
accordance to CA Act.								
21.1(1) 0. Reg. 686/21								
12 (1) 3								
ISSUES AND RISKS								
Natural Hazard Managen	nent:							
1. CCCA does not current	ly provide stormwater management review, due to the changes under the							
CA Act. Should direction	change or clarification be provided by the Province, the Board might decide							
to reassess this decision	to ensure that stormwater management is reviewed consistently across the							
watershed.								
2 Conservation authoriti	es are restricted by the Province from commenting on planning applications							
regarding natural heritag	e, as has been done under agreement with municipalities for several years.							
The health of natural her	itage systems and features within the watershed could be negatively							
impacted without this re	gional, watershed based review.							
3. Climate change could i	result in more frequent flooding and low water events resulting in the need							
more staff time and reco								
more statt time and resources.								
4. Major maintenance fo	r Flood and Erosion Control works could be required when no provincial							
funding is available; most of the flood and erosion control structures at LTC are not eligible for								
provincial funding due to the nature of the scoring matrix for funding.								
5. Plans and Technical St	5. Plans and Technical Studies require considerable staff time and/or outside expertise.							
Municipal/provincial/federal funds and municipal agreements are needed to support completion of								
technical studies or mapping projects.								

6. Natural hazards can be highly complex and uncertain in terms of their occurrence, intensity, and impacts. This uncertainty makes it difficult to predict and prepare for events effectively.

7. An increase in natural hazards enforcement and complaints results in an increased demand for staff time. The ability to hire new staff is paramount but limited by funding shortfalls.

8. Rapid population growth and urbanization in hazard-prone areas increase the vulnerability of communities to natural hazards. Urbanization often leads to the development of infrastructure in high-risk areas, exacerbating the potential for damage and loss of life.

9. Effective coordination and cooperation among various stakeholders, including government agencies, NGOs, and the private sector. Political and institutional challenges, such as bureaucratic hurdles and conflicting interests, can hinder effective collaboration and decision-making.

10. Reliance on technology for hazard monitoring, early warning systems, and communication can introduce risks such as system failures, malfunctions, or cyber-attacks, which may compromise the effectiveness of response and recovery efforts.

Provincial Water Quality and Quantity Monitoring: Category 1 Mandatory Programs and Services

Budget 2024 – \$9,366.44							
Provincial Water	Through a partnership with the MECP, CCCA undertakes stream water						
Quality Monitoring	quality monitoring at four sites. The Conservation Authority collects the						
Network (PWQMN)	water samples at the four sites, ten times per year and MECP is responsible						
and Provincial	for the laboratory analysis and data management. The results are made						
Groundwater	available to CCCA. The data is used to prepare watershed report cards and						
Monitoring Network	report on watershed health. It also helps prioritize the need for watershed						
(PGMN)	restoration projects. CCCA has a long-standing partnership with the MCEP						
Mandatory in	for groundwater level and water quality monitoring at 5 stations (2 sites)						
accordance to CA Act.	across the watershed. CCCA costs include data collection, shipping, minor						
	equipment repairs/purchases, data management, and reporting. The						
Neg. 000/21 3.12	Province funded the installation of the network and continues to fund						
	equipment replacements. Information collected is helping to build a						
	database on groundwater levels and groundwater quality and is used in the						
	preparation of watershed report cards.						
Integrated Water and	CCCA uses four MECP hydrometric stations to monitor flows and						
Climate Station	precipitation within the Catfish Creek Watershed						
Mandatory in							
accordance to CA Act:							
Reg. 686/21 s.12 (2)							
-0 , - (,							
Water Quality	and Quantity Monitoring Category 3: Other Programs and Services						
	Budget 2024 – Funded by Self-Generated Revenue						
Surface Water Quality	In addition to PWQMN, CCCA maintains nine benthic monitoring sites						
Monitoring Program	across the watershed. CCCA responds to local spills events at the request of						
	MECP. Costs include sampling, analysis and reporting.						

Watershed Report Card	Conservation Authorities report on local watershed conditions every five	
	years. Measuring environmental indicator changes within the watershed,	
	with a focus on Authority managed projects to evaluate efforts and track	
	progress.	

ISSUES AND RISKS

Provincial Water Quality & Quantity Monitoring:

1. Agencies often face constraints in terms of funding, personnel, and equipment for monitoring water quality and quantity. Limited resources can lead to gaps in monitoring coverage and frequency, hindering the ability to identify emerging issues and trends.

2. Ensuring the accuracy, reliability, and consistency of water quality and quantity data across different monitoring sites and time periods can be challenging. Factors such as sensor calibration, sampling techniques, and data interpretation practices can vary, affecting the comparability and usefulness of the data for decision-making.

3. Interpretation and usefulness of PGMN data to support CCCA programs (e.g. low water program, watershed report card).

4. Climate change is altering precipitation patterns, temperature regimes, and hydrological cycles, leading to shifts in water availability, quality, and distribution. Provincial monitoring programs must account for these climate change impacts and incorporate adaptive strategies to assess and mitigate associated risks effectively.

5. Maintaining and upgrading monitoring infrastructure, such as gauges, sensors, and laboratory facilities, is necessary to ensure the reliability and continuity of water monitoring efforts. However, funding constraints and technological obsolescence may hinder efforts to modernize and optimize monitoring systems.

6. Ensuring the sustainability of groundwater resources requires long-term monitoring efforts to track changes in groundwater levels, quality, and usage over time. However, maintaining continuity and consistency in monitoring activities over extended periods can be challenging due to funding uncertainties, institutional changes, and competing priorities.

7. Groundwater contamination from sources such as industrial activities, agriculture, and urban development poses significant risks to human health and environmental integrity. Provincial groundwater monitoring programs must prioritize the detection and assessment of contamination threats and implement mitigation measures to protect groundwater resources.

8. Adequate funding, personnel, and equipment are essential for conducting groundwater monitoring (PGMN) activities effectively. However, CAs may face resource constraints, which can limit the frequency of monitoring, the number of monitoring wells, and the analytical capacity of laboratories.

9. Groundwater systems are complex, heterogeneous, and dynamic, with interactions between geological, hydrological, and environmental factors influencing groundwater flow and quality.

Understanding and monitoring these dynamics require interdisciplinary approaches and advanced modeling techniques, which may pose challenges to the CCCA.

10. Ensuring the quality and consistency of groundwater monitoring data is essential for making informed decisions about groundwater management. However, challenges such as sensor calibration, sampling protocols, and data validation procedures can affect the reliability and usability of monitoring data.

Drinking Water Source Protection: Category 1 Mandatory Programs and Services 2024 Budget - \$6,267.78

Drinking Water Source	Locally, CCCA disseminates information and provides advice to local	
Protection (DWSP)	municipalities to facilitate implementation of the Source Protection Plan	
Mandatory in accordance to CA Act; Reg. 686/21 s.13 (1)1	and to identify local priorities for future updates to the Assessment Report and Source Protection Plan. CCCA is responsible for administering the Catfish Creek Source Protection Authority – governance, administration, meetings, reports and the delivery of other activities required by the Clean Water Act and its regulations.	

ISSUES AND RISKS

Drinking Water Source Protection (DWSP): Regional and Local:

1. Insufficient funding, personnel, and technical expertise can hamper drinking water source protection initiatives. Limited resources may result in inadequate monitoring, enforcement, and implementation of best management practices, leaving drinking water sources vulnerable to contamination and degradation.

2. Keeping the science current (updated technical studies needed including issues identification, water budgets, wellhead protection areas, intake protection zones and vulnerability).

3. Protection of non-municipal systems (communal and private).

4. Challenges with implementation of the Source Protection Plan.

5. Delivery of an effective education and outreach program.

6. Program Coordinator has no supervisory role over local Source Protection Authority staff within regional staffing structure.

7. Urbanization, agricultural expansion, and industrial development can lead to land use changes that compromise drinking water sources. Increased impervious surfaces, deforestation, and soil erosion can impact water quality through sedimentation, nutrient runoff, and contamination from pollutants.

8. Climate change exacerbates existing risks to drinking water sources by altering precipitation patterns, temperature regimes, and hydrological cycles. Extreme weather events, such as floods, droughts, and storms, can impact water availability, quality, and infrastructure resilience, posing challenges for drinking water source protection efforts.

9. Invasive species and habitat loss can degrade ecosystem functions and impair water quality in drinking water sources. Invasive plants, algae, and aquatic species can disrupt natural ecosystems, alter nutrient cycling, and increase the risk of harmful algal blooms and waterborne diseases.

10. Drinking water sources can be contaminated by various pollutants from point sources (such as industrial discharge pipes) and non-point sources (such as agricultural runoff and urban stormwater). Contaminants may include pathogens, chemicals, heavy metals, and nutrients, posing risks to human health and the environment.

2024 Budget - \$86,900.35		
Section 29 Minister's Regulation Rules of Conduct in Conservation Areas Mandatory in accordance to CA Act; Reg. 688/21	Conservation areas regulations enforcement/compliance. Incurred legal expenses for regulation and compliance.	
Conservation Areas Mandatory in accordance to CA Act; Reg. 686/21 s.9(1)	Management and maintenance of three passive day use conservation areas (Yarmouth Natural Heritage Area, Archie Coulter and Springwater Forest, not the Campground) with recreational trails. Includes passive recreation, risk management program, hazard tree management, gates, fencing, signage, brochures, communications, pedestrian bridges, trails, parking lots, pavilions, roadways, stewardship, restoration, ecological monitoring, carrying costs such as taxes and insurance. Ivan Steen & Ward McKenna; existing agreements with The Corporation of the Town of Aylmer, for use of the Ivan Steen Conservation Area and Ward McKenna Conservation Area for public park space and recreational amenities which is maintained by The Corporation of the Town of Aylmer .	
Conservation Area Major Maintenance Mandatory in accordance to CA Act; Reg. 686/21 s.9 (2)	Major maintenance and capital improvements to support public access, safety and environmental protection such as pedestrian bridges, boardwalks, trails.	
Inventory of Conservation Authority Lands Mandatory in accordance to CA Act;	The land inventory includes the following information: location as well as date, method and purpose of acquisition, land use. One -time project with updates as properties are acquired or disposed of.	

Conservation Lands: Category 1 Mandatory Programs and Services

CA Act 21.1(1) 0. Reg.		
686/21 9 (3)		
Conservation Areas Strategy Mandatory in accordance to CA Act; 21.1(1) 0. OReg. 686/21 9 (1)	A strategy to guide the management and use of CA-owned or controlled properties including guiding principles, objectives, land use, natural heritage, classifications of lands, mapping, identification of programs and services on the lands, public consultation, publish on website. Updates of existing conservation area management plans.	
Land Acquisition and Disposition Strategy Mandatory in accordance to CA Act; Reg. 686/21 s.9 (2) (5)	A policy to guide the acquisition and disposition of land in order to fulfill the objects of the authority is to be created before the end of the Transition Period.	
Springwater Conservation Area	CCCA operates one campground and its associated facilities, generates our main revenue stream and offsets costs of mandated programs.	
CCCA forests and management areas (not Conservation Areas)	Management and maintenance of CA owned lands (will all be listed in the Land Inventory) Includes forest management, signage, gates, passive recreation, stewardship, restoration, ecological monitoring, carrying costs such as taxes and insurance.	
Conservation Lands Category 3: Other Programs and Services Budget 2024 - Funded by Self-Generated Revenue		
Land acquisition	Strategic acquisition of environmentally significant properties.	
	Follow guidance from our land acquisition and disposal policy.	
Private Land Stewardship Program/ Integrated	Work with property owners to implement Best Management Practices to mitigate flood and erosion hazards, improve and protect water quality, restore floodplains and river valleys, reduce nutrient contamination, restore and enhance wetlands to reduce flooding peaks and	
	augment low flow, management of terrestrial non-native invasive species, protect groundwater, and improve aquatic species at risk habitat. Apply for and manage external funding, promote private land stewardship such as tree planting, wetlands and tall grass prairie plantings, outreach, provide technical advice and design assistance.	
Tree Planting and Forestry Services	Site preparation, tree and shrub planting, and survival assessments, technical assistance, hazard tree abatement, link to funding programs to maintain form and function of watershed forest cover. CCCA Tree Planting	

	Program allows property owners to purchase bare root native tree and	
	shrub seedlings at a minimal cost. CCCA also provides full service tree	
	planting to landowners. Administration of Malahide Roadside Tree Planting	
	Program. Agreement with Town of Aylmer to manage Aylmer Woodlot.	
Education	An annual Memorandum of Understanding is signed with Thames Valley	
Programming in	District Schoolboard leasing a part of Springwater Forest to the Jaffa	
Conjunction with	Outdoor Education Center for an outdoor classroom. The Maple Program,	
Thames Valley	Marsh Quest and Forest Festival are all ran in conjunction with Thames	
Schoolboard	Valley District Schoolboard staff.	

ISSUES AND RISKS

Conservation Lands Program:

1. Complete Ecological Lands Classification (ELC) mapping and identify habitat of species at risk.

- 2. Funding for major trail improvements.
- 3. Aging infrastructure.

4. Signage updates required to address legislative and social needs.

5. Invasive species can outcompete native flora and fauna, disrupt ecosystem functions, and alter habitat structure and composition on conservation lands. Invasive plants, animals, and pathogens may spread rapidly, outpacing management efforts and threatening the integrity of native ecosystems.

6. Ecosystem enhancement and regeneration.

7. Engagement of volunteers to assist with Conservation Lands management.

8. Conservation lands often intersect with competing interests, such as agriculture, forestry, energy development, and indigenous rights. Conflicting land uses, resource extraction, and development pressures can lead to conflicts among stakeholders and challenges in achieving conservation goals while balancing socio-economic needs.

9. Wildlife diseases, such as pathogens, parasites, and emerging infectious diseases, can spread rapidly among populations on conservation lands, causing mortality, population declines, and ecosystem disruption. Disease outbreaks may be exacerbated by factors such as habitat degradation, climate change, and wildlife-human interactions.

10. Recreational activities, tourism, and infrastructure development on conservation lands can lead to human disturbance, habitat degradation, and wildlife displacement. Overuse of trails, off-road vehicles, and camping sites can degrade sensitive habitats, disturb nesting sites, and stress wildlife populations.

Enabling Services: Category 1 Mandatory Programs and Services Budget 2024 – \$143,635.60

Enabling Services Mandatory in accordance with CA Act, 21.1 (1) para 1. (iv)	Corporate Services are key services provided to all departments of the Conservation Authority, Board of Directors, member municipalities and the general public to enable LTC to operate in an accountable, transparent, efficient and effective manner. These general operating expenses and capital costs, permitted as Mandatory Program and Services under Part IV and Section 21.1 of the CA Act, are not directly related to the provision of a specific program or service that an authority provides (Ontario Regulation 402/22: Budget and Apportionment). Funding for these services are both municipally funded and self-generated. Administrative, human resources, operating and capital costs which are not directly related to the delivery of any specific program or service, but are the overhead and support costs of a conservation authority. Includes health and safety program, overseeing
Financial Services Mandatory in accordance to CA Act, 21.1(1) para 1. (iv)	Financial services ensures the wise use of funds and fiscal accountability. Ongoing vigilance is needed to ensure that the funding received from member municipalities, the provincial and federal governments, other partners, agencies and donors is used wisely for the betterment of the watershed region. It includes development of the annual budget, accounts payable and receivable, payroll, financial analysis, financial audit, administration of reserves and investments, asset management, financial reports for funding agencies, preparing and submitting reports to the Canada Revenue Agency, and administration of the benefits program. Also included under Financial Service is fundraising. As a non-profit registered charity, CCCA undertakes fundraising to support its conservation efforts. This includes: grant writing, direct requests to businesses and private donors, and fundraising campaigns. Annual budget, accounts payable and receivable, payroll, financial analysis, financial audit, administration of reserves and investments, financial audit, administration of reserves and investments, financial reports for funding agencies, preparing and submitting reports to CRA, benefits program administration.
Legal Expenses Mandatory in accordance to CA Act, 21.1 (1) para 1. (iv)	Costs related to agreements/ contracts , administrative by-law updates.
Governance Mandatory in accordance to CA Act, 21.1 (1) para 1. (iv)	Governance is the overall framework for managing and decision making of the organization. Governance costs cover those required for operation and support of the Board of Directors, any associated Boards or Advisory Committees, and for the Office of Chief Administrative Officer/Secretary- Treasurer Supporting CA Boards, Advisory Committees, GM and Senior Management.

Communications and	Informing public of CCCA programs and projects through media, open	
Outreach	houses, public meetings, website administration, responding to inquiries	
Mandatory in	from the public, crisis communications .	
accordance to CA Act,		
21.1 (1) para 1. (iv)		
Administration Building	Office buildings and workshop used to support CCCA staff, programs and	
Mandatory in	services. Includes utilities, routine and major maintenance, property taxes.	
accordance to CA Act,		
21.1 (1) para 1. (iv)		
Information	Data management, records retention. Development and use of systems to	
Technology	collect and store data and to provide spatial geographical representations	
Management/ GIS	of data.	
Mandatory in		
accordance to CA Act,		
21.1 (1) para 1. (iv)		
Vehicle and Equipment	A fleet of vehicles and equipment to support the work of the CCCA,	
Mandatory in	including capital purchases, fuel, licenses, repairs and maintenance.	
accordance to CA Act,	Programs and projects are charged for the use of the vehicles and	
21.1	equipment.	
(1) para 1. (iv)		
ISSUES AND RISKS		
Enabling Services:		
1. Municipal funding req	uired for capital costs.	
2. Funding support for operational costs.		
3. Self-generated funding	g is unpredictable.	
4. Legal expenses are not consistent annually.		
5. Future major maintenance or alterations to buildings and other equipment could result in		
increased costs.		
6. Staff turnover, knowledge transfer.		
7. Keeping current and acquiring technology to sustain program functions and to meet expectations.		
8. E-Commerce/improved online customer service processes and tracking required.		
9. Cyber security.		

10. Public expectations for Open Data.

11. Enhanced mapping, data, and analytical tools to facilitate faster, sound decision making.

12. Funds for purchase of necessary data products (i.e. Orthophotography).

To review our complete inventory of Programs and Services please see <u>https://www.catfishcreek.ca/wp-content/uploads/2022/02/CCCA-Programs-Services-Inventory.pdf</u>.

10.0 RISK ASSESSMENT AND MITIGATION EFFORTS

The issues and risks documented in this strategy have been identified and mitigation measures are as described. In most cases, the amount of funding required to mitigate the risks is "To be Determined (TBD)" as the issue may not arise or be able to be addressed in the foreseeable future, and may be outside of the review period for this document.

Mandated Programs and Services			
Issues and Risk	Mitigation	Cost	
	Natural Hazard Management		
CCCA does not currently provide stormwater management review for water quality, due to the changes under the CA Act. Should direction change or clarification be provided by the Province, the Board may decide to reassess this decision to ensure that stormwater management is reviewed consistently across the watershed.	Monitor requirements. If stormwater Management review re-introduced for water quality, requirement to hire engineer or retain engineering consultant.	TBD	
Conservation authorities are restricted by the Province. Monitor requirements. The costs could be from commenting on planning applications regarding natural heritage, as has been done under agreement with municipalities for several years. The health of natural heritage systems and features within the	Monitor requirements.	TBD	

watershed could be negatively impacted without this regional, watershed based review. Climate change could result in more frequent flooding and low water events resulting in the need for more rain gauges and stream gauges, computer models for flood forecasting, and demand for more staff time	Ensure staff efficiencies, budget for increased staffing. Equipment is covered under the Capital Asset Management Plan. Apply for grants for climate change resiliency when available	TBD	
and resources.	Continuo to regulato		
and Erosion Control works could be required when no provincial funding is available.	continue to regulate development to lessen need for control works. Continue regular maintenance of existing projects to identify upcoming maintenance requirements. Municipal support for future maintenance requirements.	IBD	
Plans and Technical Studies require considerable staff time and/or outside expertise. Municipal/provincial/federal funds and municipal agreements are needed to support completion of technical studies or mapping projects.	Contribute to Special Projects Reserve when funds are available. Costs for Project Management should be built into the project when available.	TBD	
An increase in natural hazards enforcement and complaints results in an increased demand for staff time. The ability to hire new staff is paramount but limited by funding shortfalls.	Ensure staff efficiencies.	TBD	
Provincial Water Quality and Quantity Monitoring			
Long-term access to wells on private lands (landowner turnover).	Maintain communications. Ensure agreements are in place. Move or close wells if required.	TBD	

Interpretation and usefulness of PGMN data to support CCCA programs (e.g. low water program, watershed report	Seek assistance from Province with interpretation. Move or close wells if required.	TBD
card).		
	Drinking Water Source Protection	
Discontinuation or diminished provincial funding.	Lobby for continued provincial funding. The Province has an alternate funding mechanism proposed through regulation that could download the financial responsibility to the municipalities.	TBD
Keeping the science current (updated technical studies needed including issues identification, water budgets, wellhead protection areas, intake protection zones and vulnerability).	Lobby for provincial support for updated technical studies and the associated funding.	TBD
Protection of non-municipal systems (communal and private).	Lobby for provincial support and funding.	TBD
Challenges with implementation of the Source Protection Plan.	Encourage Source Protection Committee to review policy effectiveness. Increase focus for Education and Outreach.	TBD
Delivery of an effective education and outreach program.	Seek additional funding/staffing for new tools and increased outreach. Track effectiveness/of education campaigns through surveys, etc.	TBD
Program Coordinator has no supervisory role over local Source Protection Authority staff within regional staffing structure.	Program Coordinator involvement in the development of local work plan targets with local Source Protection Authority managers.	TBD

Increased development	Increase education for	TBD
impacting vulnerable areas and	municipal leaders and staff to	
the number of potential threats.	understand the significance of	
	unsafe development. Update	
	vulnerability studies.	
	Conservation Lands	
Complete Ecological Lands	Budget staffing to undertake	TBD
Classification (ELC) mapping and	work.	
identify habitat of species at		
risk.		
Funding for major trail	Capital Asset Management Plan	TBD
improvements.	in place to anticipate and cover	
	capital costs.	
Aging Infrastructure.	Capital Asset Management Plan	TBD
	in place to anticipate and cover	
	capital costs.	
Signage updates required to	Budget for work.	TBD
address legislative and social		
needs.		
Invasive species inventory and	Budget staffing to undertake	TBD
management.	work. Grant proposals.	
Ecosystem enhancement and	Partnerships with municipalities	TBD
regeneration.	Grant proposals Budget staff	
	time.	
Engagement of volunteers to	Implement an organized	TBD
assist with Conservation Lands	approach to a volunteer	
management.	program.	
Population growth and	Budget for increased	TBD
increased outdoor activity	maintenance/repairs (Asset	
resulting in increased stresses	Management Plan). Increased	
on the Conservation Area and	staff presence on CA Lands.	
potential for visitor conflicts.		
Enabling Services		
Municipal funding required for	Capital Asset Management Plan	TBD
canital costs	required to anticipate and cover	
	capital costs.	

Funding support for operational costs.	Regular budgeting process and implementation of a Board member budget sub- committee.	TBD
Self-generated funding is unpredictable.	Plan and budget on more reliable funding sources.	TBD
Legal expenses are not consistent annually.	The legal reserve fund increased to cover increasing legal action. Allocated when surplus funds are available.	TBD
Future major maintenance or alterations to buildings and other equipment could result in increased costs.	Capital Asset Management Plan in place to anticipate and cover capital costs, to be reviewed every 5 years.	TBD
Staff turnover, knowledge transfer.	Offer competitive salaries and benefits in a positive work environment. Maintain good records. Develop/maintain policies and procedures/ documents.	TBD
Keeping current and acquiring technology to sustain program functions and to meet expectations.	Ensure sufficient annual budget. Information Technology and Operations (IT and Ops) Review recommendations to assist in prioritizing technology upgrades and apply to budget cycle.	TBD
E-Commerce/improved online customer service processes and tracking required.	Include in future Business Plan/Budget.	TBD
Cyber security. Public expectations for Open	Cyber insurance. Budget for external Information Technology provider and staff training, as recommended in the IT and Ops Review.	TBD
Data.	platform.	

Enhanced mapping, data, and analytical tools to facilitate faster, sound decision making.	T and Ops Review recommendations for dedicated GIS position.	TBD
Funds for purchase of necessary data products (i.e. orthophotography).	Capital Asset Management Plan in place to anticipate and cover costs.	TBD

11.0 REVIEW AND ASSESSMENT OF CCCA PROGRAMS AND SERVICES

The Strategy must be prepared on or before December 31, 2024. The Strategy is made available to the public on the Authority's website, or by other means the CA considers advisable, by December 31, 2024.

As a best practice, CCCA will post this on the established CA Governance Webpage (where certain other documents are required to be posted pursuant to <u>O. Reg. 400/22</u>). Once the Strategy is complete, the CCCA will notify the organizations and individuals who were engaged in the consultation process of the availability of the final Strategy. There is no legislative requirement to submit to the Province a confirmation of completion of the Strategy.

The Strategy will be reviewed every five (5) years or as required to enter into new Category 1,2, and 3 Programs and Services or to re-evaluate Category 1,2, or 3 Programs and Services the CCCA offers to its member municipalities.

12.0 INFORMATION SUPPORTING CCCA PROGRAMS

Ontario Regulation 686/21 requires this Strategy include a summary of existing technical studies, monitoring programs, and other information about the natural resources the Conservation Authority relies on within its area of jurisdiction or in specific watersheds that directly informs and supports the delivery of programs and services under section 21.1 of the CA Act.

CCCA's monitoring programs are described elsewhere in this document. Water level monitoring is accomplished through the flood forecasting and warning, low water response, and base flow monitoring programs and the Provincial Groundwater Monitoring Network. Water quality is monitored through the Provincial Water Quality Monitoring Network and local programs (benthic macroinvertebrate monitoring and local surface water quality monitoring programs).

In addition to its monitoring programs, CCCA relies on a range of technical resources to inform decision making. Some of these have been completed in-house and others have been contracted to consultants. The documents, computer models and mapping products need updated from time to time to address and respond to changes in land use, watershed conditions, the regulatory framework, and emerging issues. These resources are described in Appendix 2.

13.0 FUTURE INITIATIVES

Opportunities for growth, new programs, services and projects that benefit the watershed and its municipal partners can materialize at any time; these could be long-term or short-term initiatives. These

special projects may update existing studies and mapping, help address current and emerging issues, and/or assist with delivery of programs. Not only are there benefits to the health of the watershed, but the Conservation Authority benefits from heightened expertise, new resources, enhanced partnerships and use of the completed products. The program, services and projects could fall into any of the three categories permitted under the CA Act: mandatory, municipal or other (Category 1, 2 or 3, respectively). In addition, the projects could fall under any of the programs and services described in this Strategy, or be new initiatives

13.1 Watershed and Sub-Watershed Plans

Watershed and watershed plans take a holistic view of the entire hydrological system, considering the interconnectedness of land, water, and ecosystems within a defined geographic area. This integrated approach allows for more comprehensive and effective management of natural resources. By assessing the characteristics and vulnerabilities of watersheds and sub-watersheds, these plans can identify areas at risk of erosion, flooding, habitat degradation, pollution, and other environmental hazards. Understanding these vulnerabilities is essential for implementing targeted mitigation and adaptation measures. Watershed and sub-watershed plans help to reduce risks associated with natural hazards such as floods, droughts, and wildfires. By implementing measures such as green infrastructure, land use planning, and erosion control, these plans can enhance the resilience of communities and ecosystems to extreme events. They play a critical role in protecting water quality by identifying sources of pollution, implementing best management practices, and promoting sustainable land use practices. These efforts are essential for safeguarding drinking water supplies, supporting aquatic habitats, and preserving recreational opportunities. Watershed and sub-watershed plans provide a framework for long-term planning and management of natural resources. By setting goals, objectives, and action plans, these plans guide decision-making and resource allocation over multiple years and across different jurisdictional boundaries. Healthy watersheds and sub-watersheds provide a wide range of economic benefits, including clean water supplies, recreational opportunities, tourism revenue, and ecosystem services such as flood control and carbon sequestration. By investing in watershed planning and management, communities can protect these valuable resources and support sustainable economic development.

13.1.2 Updates to Mapping and Technical Projects

Accurate floodplain maps allow communities to assess the extent and severity of flood risks in a given area. By identifying flood-prone zones and vulnerable infrastructure, updated mapping enables better-informed decision-making for land use planning, emergency preparedness, and infrastructure development. Access to up-to-date flood hazard data helps residents, businesses, and local authorities understand areas at risk of flooding. This information allows communities to take proactive measures to protect lives and property, such as implementing building codes, evacuation plans, and floodplain zoning regulations.

Insurance companies rely on floodplain maps to assess flood risks and determine insurance premiums. Accurate mapping ensures that insurance rates reflect the actual level of risk, which can incentivize property owners to invest in flood mitigation measures and reduce financial losses from flooding events. Engineers and urban planners use floodplain maps to design and locate infrastructure such as roads, bridges, utilities, and drainage systems. Updated mapping allows for more precise engineering designs that consider flood risks, minimize exposure to hazards, and enhance the resilience of critical infrastructure. Floodplain mapping helps identify environmentally sensitive areas, such as wetlands and riparian zones, which provide important habitat for wildlife and contribute to ecosystem health. Incorporating environmental considerations into floodplain management supports conservation efforts and promotes sustainable land use practices.

Up-to-date floodplain mapping is essential for risk assessment, community safety, insurance, infrastructure planning, environmental protection, regulatory compliance, climate change adaptation, and public awareness. Investing in accurate and reliable mapping data is critical for building resilient and sustainable communities that are better equipped to withstand and recover from flood disasters.

13.1.3 Public Engagement/ Consultation

As outlined in the regulation, all CAs are required to ensure stakeholders and the public are consulted during the preparation of the WBRMS in "a manner that the authority considers advisable". Further, CAs must ensure stakeholders and the public are consulted during the periodic review and update process for the strategy. The CCCA released the Strategy for our member municipalities, public and First Nations from June 17, 2024 to July 26, 2024. Letters will be provided to our participating municipalities, Indigenous Communities, and the public advising them of the consultation period.

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