APPENDIX H

PRELIMINARY CHARACTERIZATION OF NATURAL ENVIRONMENTAL FEATURES

West Transitway Extension
Bayshore Station to Moodie Drive

Preliminary Characterization of Existing Natural Environmental Conditions

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Prepared by:

ecoplans Limited
100-72 Victoria Street South, Kitchener, ON N2G 4Y9
phone: (519)741-8850 fax: (519)741-8884
email: ecoplans@ecoplans.com

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1.0 Introduction

The City of Ottawa has initiated a planning and design study in order to identify a recommended plan for the extension of the City's bus rapid transit (BRT) network (Transitway) from Bayshore Station to Moodie Drive (referred to as the *West Transitway Extension*). As part of this study, route alternatives are being evaluated, design completed on the recommended route and all necessary permits and approvals required for project implementation are being obtained.

As part of the West Transitway Extension: Bayshore Station to Moodie Drive Project Team, Ecoplans Limited (Ecoplans) has been retained to address the natural environmental component, which includes assessing aquatic and terrestrial features and identifying environmental sensitivities and constraints in relation to the transitway route alternatives. The purpose of this report is to provide a preliminary characterization of existing natural environmental conditions that will be used to support the assessment and evaluation of route alternatives. Once a preferred route has been recommended, the City will proceed with the design of the transitway and supporting facilities and finalize the recommended plan. It should be noted that our understanding of natural environmental existing conditions will be refined through further agency consultation, additional review of background information and possibly, additional field work should data gaps be identified. All natural environmental existing conditions, sensitivities and an assessment of impacts of the recommended route will be documented in the Environmental Project Report (EPR).

1.1 Study Area Overview

Land use within the general area is a mix of agriculture, residential, commercial and recreational. The City of Ottawa Official Plan (Schedule B) indicates that land use designation along the north side of Highway 417 includes *Greenbelt Rural*, corresponding to the Stillwater Creek valley, and *Greenbelt Employment and Institutional Area,* located east of Moodie Drive, abutting the north side of Corkstown Road. South of Highway 417, land use is designated as *Agricultural Resource Area*.

The predominant natural environmental feature within the study area is the portion of the Stillwater Creek valley east of Moodie Drive and north of Highway 417. Graham Creek and tributaries of Stillwater and Graham Creek are also present, though these systems tend to be much more influenced by cultural activity.

1.2 Study Objectives

In this first stage of the project, the objectives of the natural environment component of the study include the following:

- Compile the natural environmental database for the study area based on secondary source information;
- Complete initial field investigations for the broader study area within which route alternatives are being generated;
- Identify key natural environmental issues, sensitivities and constraints;
- Provide input to the generation and evaluation of route alternatives in the context of the natural environment and in consideration of other factors (socio-economic, transportation).

1.3 Secondary Source Information

Secondary source information has been compiled from a variety of sources including Ministry of Natural Resources (MNR) Kemptville District, Rideau Valley Conservation Authority (RVCA), and the City of Ottawa. The following provides a list of information that has been reviewed to date:

- Rideau Valley Conservation Authority (RVCA) *2001 Stream habitat and water quality monitoring reports for Stillwater and Graham Creeks*. Note: Stillwater Creek is being re-sampled in 2009 however, field data are not yet available.
- *City Stream Watch 2005 Annual Report*, RVCA
- *City Stream Watch 2004 Annual Report*, RVCA
- Project information received from MNR Kemptville District (Laura Melvin, Resource Management Planner) in a letter dated June 24, 2009
- Ministry of Natural Resources Natural Heritage Information Centre (NHIC) database - June 2009 query
- *Geotechnical Overview, West Transitway Extension Bayshore Station to West of Moodie Drive*, prepared by Golder Associates (April 2009)
- *Environmental Screening Report Stillwater Creek Remediation and Culvert Installation Activities*, prepared for the National Capital Commission by Jacques Whitford (2000)
- *Fish Habitat Assessment: Stillwater Creek Shoreline Stabilization and Repair Works*, prepared for the National Capital Commission by G.A. Packman and Associates October (2004)
- C*reek Rehabilitation Draft Management Plan*, prepared for the National Capital Commissions by Levac, Robichaud Leclerc Associates(March 2004)
- *Evaluation and Identification of Valued Ecosystems and Natural Habitats: Directory of Valued Ecosystems and Natural Habitats in the Green Belt and on Urban Lands*, prepared for the National Capital Commission by Del Degan, Masse et Associes Inc. (May 2007)
- *Biological Inventories of 23 Areas in the Ottawa Region: Volume 1 Text and Maps*, prepared for the National Capital Commission by H. Loney Dickson and Stephen Darbyshire (July 1980)

- *Biological Inventories of 23 Areas in the Ottawa Region: Volume 2 Plant Species Composition Tables*, prepared for the National Capital Commission by H. Loney Dickson and Stephen Darbyshire (December 1979)
- *Stillwater Creek Management*, prepared for the National Capital Commission Land Resource Management Division by Martha Bradburn (January 1986)
- *Rideau Valley Conservation Authority Stillwater Creek Erosion Control Study, City of Nepean, Hydrology and Hydraulics Report*, Totten Sims Hubicki Associates (May 1988)
- Ontario Breeding Bird Atlas (2001-2005), Region 24, Squares 18VR32 and 18VR3

2.0 Existing Natural Environmental Conditions

The following summary provides an overview of key findings of natural environmental features based on agency consultation, the review of background information and breeding bird, vegetation/habitat and aquatic habitat field surveys conducted to date. These are also depicted on Figures 1A and B and 2 with representative site photographs provided in Appendix A. This overview is intended to support the evaluation of transitway route alternatives and the selection of a recommended alternative.

This overview should be considered *interim* and will be updated through further agency consultation, additional review of background information and possibly, additional field work should data gaps be identified through the study process. As noted above, all existing conditions, sensitivities and an assessment of impacts of the preferred option will be documented as part of a subsequent Environmental Project Report (EPR).

2.1 Designated Natural Environmental Features

The following key points provide an overview of designated natural environmental features within the Study Area:

- The Stillwater Creek valley, north of Highway 417 is designated by MNR as a Life Science Site. This site is recognized for the narrow ravine in deep clay plain dominated by Sugar Maple-Black Maple. Brunton (1982) noted that some individual trees of the regionally uncommon Black Maple are very large (>100 cm DBH) (NHIC).

- No *Provincially Significant Wetlands (*PSWs) are present within or adjacent to the study area. Stoney Swamp is located approximately 5 km upstream (south) of the study area

- No *Environmentally Significant Areas* (ESAs), as designated by MNR/RVCA, are present within the study area.

Key Considerations

The only designated natural feature is the Life Science Site associated with the Stillwater Creek valley, north of Highway 417. With the recognition that any linear transitway route located north of Highway 417 would require the crossing of at least a portion of the Life Science Site, the intent is to generate and evaluate alternatives that avoid key designated features to the extent possible, balancing this objective with social and technical objectives.

2.2 Species of Conservation Concern

The NHIC database, MNR Kemptville District and RVCA were consulted for information on species of conservation concern, which are defined here as species "designated" by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) and/or listed under the Canadian Species at Risk Act; species that are "designated" by COSSARO (Committee on the Status of Species at Risk in Ontario) and/or are listed under the Ontario Endangered Species Act (2007); provincially rare species (S-rank of S1 to S3); and regionally recognized species.

Regional status of plant species was assessed using the City of Ottawa Urban Natural Areas Environmental Evaluation Study Appendix A – Vascular Plants of the City of Ottawa with the Identification of Significant Species (Dan Brunton, 2005).

The following summarizes the key points with respect to species of conservation concern within the study area:

- No flora species "designated" by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) and/or listed under the Canadian Species at Risk Act; species that are "designated" by COSSARO (Committee on the Status of Species at Risk in Ontario) and/or are listed under the Ontario Endangered Species Act (2007); and provincially rare species (S-rank of S1 to S3) have been recorded or observed in the study area.

- A total of 7 plant species with regional rankings according to Brunton (2005) have been confirmed in the vicinity of the route options, as field inventories were focused in these areas. Analysis of field data is ongoing so these results should be considered preliminary in nature. Species identified include 2 regionally significant species (Foxtail Sedge [*Carex alopecoides*], Slender Wild Rye [*Elymus villosus*]), 4 regionally uncommon species (Black Maple [*Acer saccharum ssp nigrum*], Red Elm [*Ulmus rubra*], Red Pine [*Pinus resinosa*], Small-fruit Bullrush [*Scirpus microcarpus*]), and 1 regionally rare species (Stinging Nettle [*Urtica dioica ssp dioica*]).

- No wildlife species "designated" by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) and/or listed under the Canadian Species at Risk Act; species that are "designated" by COSSARO (Committee on the Status of Species at Risk in Ontario) and/or

are listed under the Ontario Endangered Species Act (2007); and provincially rare species (S-rank of S1 to S3) have been recorded or observed in the study area, based on an NHIC query, MNR district records and previously undertaken studies. No wildlife species of conservation concern were observed by Ecoplans within the study area. Members of the Crystal Beach Lakeview Community Association indicated, in a letter dated July 17, 2009, that their members has observed Red-shouldered Hawk (*Buteo lineatus*) within the Stillwater Creek valley. Red-shouldered Hawk is considered *Not at Risk* federally and *Apparently Secure* (uncommon but not rare) provincially. MNR's Natural Heritage Information Centre (NHIC) indicates that this species is considered 'sensitive' in Ontario but has no formal 'at risk' designation. The Community Association also indicated that their members had observed Monarch (*Danaus plexippus*), which is federally and provincially designated as *Special Concern,* with its Ontario status *Generally Secure* (NHIC). It should be noted that the Monarch's Special Concern status is based on ongoing threats to wintering habitat outside of Canada rather than the rarity of is summer habitat and key host plant, Common Milkweed, which are still generally common throughout the province. Notwithstanding the status of these species, their potential presence and use of habitats in the study area is noted by the project team.

Key Considerations

Species of conservation concern recorded within the study area are limited to regionally significant/rare plant species. These species are mainly associated with the Stillwater Creek valley habitat north of Highway 417.

The primary issues to consider are direct mortality of species of conservation concern and direct 'footprint' impacts (removal/encroachment) to their habitats and potential indirect and secondary impacts to these species (e.g. stress, reduced productivity) or their habitats (e.g. salt spray, water quality, erosion and sedimentation and other potential construction-related impacts, invasive species introduction or proliferation, fragmentation of habitat blocks and related effects on habitat quality).

2.3 Terrestrial Ecosystem Features

2.3.1 Vegetation Approach

A review of the secondary source information provided a context from which to assess specific vegetation communities within the study area. Aerial photography was examined to obtain a general understanding of the character of vegetation within the study area prior to undertaking field surveys. More specific characterization of vegetation features using the Ecological Land Classification for Southern Ontario (ELC), where appropriate, and assessment of other vegetation resources was completed during field surveys on May 19-21, 2009 and July 22-23, 2009.

The scope of the field work and terrestrial resource analyses included:

- Preliminary evaluation of the character, sensitivity and significance of vegetation communities, plant species and habitats located within or bordering the route alternatives;
- Classifying vegetation communities, using a modified version of the Ecological Land Classification (ELC) System for Southern Ontario (Lee et. al. 1998) where appropriate;
- Evaluating the significance of vegetation communities, using the Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario (Bakowsky, 1996; Natural Heritage Information Centre [NHIC] website, 2006);
- Preparing a working plant species list;
- Evaluation of plant species status using: Newmaster et al. (1998) and the NHIC website (2006) for provincial and national significance. Nomenclature generally follows Newmaster et al. (1998);
- Regional status was assessed using the City of Ottawa Urban Natural Areas Environmental Evaluation Study Appendix A – Vascular Plants of the City of Ottawa with the Identification of Significant Species (Dan Brunton, 2005); and
- Taking representative site photographs.

Based on previous reports documenting rare flora within the Stillwater Creek valley, a list of 22 regionally ranked flora species with potential to occur in the general vicinity of the proposed alternatives was generated prior to field investigations. Reports reviewed were the *City of Ottawa Urban Natural Areas Environmental Evaluation Study Appendix A – Vascular Plants of the City of Ottawa, With the Identification of Significant Species* (Brunton 2005), and *Biological Inventories of 23 Areas in the Ottawa Region Volume 1: Text and Maps* (Dickson and Darbyshire 1980) (Current status as per Brunton 2005).

Targeted surveys for these 22 species were conducted on July 22 and 23, 2009 by Ecoplans botanists. Surveys focused on appropriate habitat types within and adjacent to the proposed route alternatives in areas potentially impacted by the proposed works. Locations of all regionally ranked species observed were recorded using a Magellan Explorist® 500 handheld GPS device, and voucher specimens and/or digital photographs were obtained where deemed necessary to confirm the identity of the specimen. Specimens were not collected if doing so could pose a threat to the continued existence of the population.

2.3.2 Vegetation Overview

A large portion of the study area consists of culturally influenced and altered landscapes associated with active agriculture, existing transportation facilities (Highway 417 and local roads) and residential and commercial development. Vegetation within these areas is dominated by tolerant old-field species with occasional tree clusters and hedgerows. The area has been modified through a long history of agricultural and residential development and much of the original vegetative cover has been removed. Remnant natural vegetation communities within the study

area are limited to the Stillwater Creek valley north of Highway 417, between Moodie Drive and Holly Acres Road. A portion of this natural area is within the Stillwater Creek Life Science Site. Natural vegetation communities south of Highway 417 are limited to narrow riparian vegetation along watercourses and agricultural swales, surrounded by active agriculture within the NCC Greenbelt.

Other small tributary valleys are characterized by discontinuous and patchy woody riparian vegetation cover, with some areas having relatively little or no woody riparian vegetation (especially across existing and previous agricultural areas).

A summary of key findings from Ecoplans fieldwork is provided:

- A total of 10 vegetation community types have been identified within the study area, including cultural meadow, cultural woodland, deciduous forest and meadow marsh. These are depicted on Figure 1A.

- One community located along the banks of Stillwater Creek is a mosaic which includes elements of Fresh-Moist Sugar Maple – Black Maple Deciduous Forest, a provincially rare vegetation community type with a provincial ranking of S3? (Rare to uncommon in Ontario, usually between 20 and 100 occurrences in the province, may have fewer occurrences, but with some extensive examples remaining) (Bakowsky, 1996). Several very large Black Maple specimens (~100cm dbh) are located within this community. No other provincially rare vegetation communities or flora were observed.

- A total of 78 vascular plant species have been identified within the study area to date. An additional 17 plants were identified only to genus. Of the 78 species identified, 67% are native to Ontario.

- As noted in Section 2.2, no flora species "designated" by COSEWIC and/or listed under the Canadian Species at Risk Act; species that are "designated" by COSSARO and/or are listed under the Ontario Endangered Species Act (2007); and provincially rare species [S-rank of S1 to S3]) have been recorded or observed in the study area.

- As noted in Section 2.2, Ecoplans confirmed a total of 7 plant species with regional rankings according to Brunton (2005) in the vicinity of the route alternatives, as field inventories were focused in these areas. These are depicted on Figure 1B. Analysis of field data is ongoing so these results should be considered preliminary in nature. Species identified include 2 regionally significant species (Foxtail Sedge [*Carex alopecoides*], Slender Wild Rye [*Elymus villosus*]), 4 regionally uncommon species (Black Maple [*Acer saccharum ssp nigrum*], Red Elm [*Ulmus rubra*], Red Pine [*Pinus resinosa*],

Small-fruit Bullrush [*Scirpus microcarpus*]), and 1 regionally rare species (Stinging Nettle [*Urtica dioica ssp dioica*]).

2.3.3 Wildlife Approach

Ecoplans completed avian surveys and a general wildlife habitat assessment for the study area on May 13, 2009. Incidental wildlife observations were recorded during the May 19-21 and July 23-24 field surveys as well. The purpose of the avian surveys was to gather breeding bird data, note migratory use and evaluate natural areas for avian habitat potential. For breeding bird surveys, random transects were walked throughout a variety of vegetation units in the study area by qualified, experienced staff, under appropriate conditions (per Ontario Breeding Bird Atlas [OBBA] protocols) and the level of breeding bird evidence observed was recorded following standard criteria established by the OBBA.

Supplemental wildlife observations were recorded during all field visits. All observations made during the field surveys were recorded, including sightings of species, as well as evidence of use (e.g., browse, tracks / trails, scat, burrows, and vocalizations). Wildlife habitat potential such as potential areas of vernal pooling was also evaluated during field surveys.

2.3.4 Wildlife Overview

The broader landscape mosaic within the study area provides habitat for a range of common, generalist wildlife species that are tolerant of urban and semi-urban and rural/agricultural conditions. Aquatic and riparian areas likely provide some habitat for waterfowl, herons and other water-using species. The forested habitat mosaic associated with the Stillwater Creek valley north of Highway 417 can be expected to support a greater number of wildlife species given the higher habitat quality and diversity. This valley also likely functions for wildlife movement, as discussed further below.

A summary of key findings from Ecoplans fieldwork is provided below:

- Five common mammal species, which are disturbance tolerant and adapted to urban areas, were observed within the study area. These species include White-tailed Deer (*Odocoileus virginianus*), Eastern Cottontail (*Sylvilagus floridanus*), Woodchuck (*Marmota monax*), Grey Squirrel (*Sciurus carolinensis*), and Raccoon (*Procyon lotor*). These species are expected for site conditions and typically abundant within the Ottawa Region generally. Deer tracks and bedding areas were observed throughout the valley indicating frequent and regular use. Other species which likely use the study area but were not observed at the time of the survey include, Coyote (*Canis latrans*), Striped Skunk (*Mephitis mephitis*) and Red Squirrel (*Tamiasciurus hudsonicus*).

- Ecoplans' Avian Biologists identified a total of 21 bird species within the study area. The majority are habitat generalist, disturbance tolerant, urban-adapted species such as American Robin (*Turdus migratorius*), European Starling (*Sturnus vulgaris*), Red-winged Blackbird (*Agelaius phoeniceus*), and Song Sparrow (*Melospiza melodia*). Area sensitive bird species are noted in Section 2.3.4.1, below.

- Two amphibian species, Northern Leopard Frog (*Rana pipiens*) and Spring Peeper (*Pseudacris crucifer*), were observed in the Stillwater Creek valley. Breeding habitat is present in the Stillwater Creek valley floodplain generally however, vernal pools were not observed. These species are common, expected for site conditions and are abundant within the Ottawa Region generally. They are often observed wherever suitable habitat is present including dug ponds, ditches, natural and man-made wetlands, etc. Herpetofauna habitat is present generally, along the watercourses and associated riparian areas within the study area. These areas provide habitat for localized breeding and movement of common amphibian species.

- Typical of landscapes surrounding large urban centres of Southern Ontario, the majority of the study corridor has been heavily modified with much of the south portion in agricultural production and areas immediately north of the Stillwater Creek valley, residential. In general, the suite of wildlife recorded within the study corridor is dominated by common, generalist wildlife species tolerant of urban or semi-urban conditions. The observed species assemblage is consistent with the cultural habitat mosaic, proximity to commercial/residential development, anthropogenic history and moderate to high levels of disturbance within the study corridor. Given the landscape context, the Stillwater Creek valley north of Highway 417 offers the largest remaining natural habitat area within the transitway study area.

2.3.4.1 Area Sensitive Wildlife

Based on the Ecoplans field surveys, three *area sensitive*[1] bird species were observed in the Stillwater Creek valley: Cooper's Hawk (*Accipiter cooperii*) and Pileated Woodpecker (*Dryocopus pileatus*) within the forested portion of the valley and Savannah Sparrow (*Passerculus sandwichensis*) in the surrounding cultural meadow habitat.

2.3.4.2 Significant Wildlife Habitat

Wildlife habitat significance is identified by MNR using the *Significant Wildlife Habitat Wildlife*

[1] Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers. *From: Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Science Section. 151pp. + appendices.*

Habitat Technical Guide (OMNR 2000), in which "significant wildlife habitat" is broadly categorized as:

- Seasonal concentration areas (e.g. conifer forests for deer wintering);
- Rare vegetation communities or specialized habitats for wildlife;
- Habitats of species of conservation concern, excluding the habitats of endangered and threatened species; and
- Animal movement corridors.

No significant wildlife habitat features are identified by MNR within the Study Area. A small apparently abandoned colony (approximately 7-8 nests) of Great-blue Heron (*Ardea herodias*) nests was observed within the study area approximately 25-30m north of the Highway 417 right-of-way. This heronry is not considered to be an active breeding colony due to the lack of significant breeding evidence collected in May of 2009: no adult birds on the nests, no egg shells under the colony, no white-wash (feces) under the colony, and no hatched young in the nests. The status of the colony has been discussed with John Fischer of the Canadian Wildlife Service, Shaun Thompson of Kemptville District MNR and the Ottawa Field Naturalists Club (OFCN) Bird Records Subcommittee. MNR, CWS and the OFNC had no record or knowledge of this heronry and could not comment on how long the heronry might have been abandoned. Consultation with these groups is ongoing.

No additional areas of specialized or sensitive wildlife habitat features such as potential deer wintering habitat, vernal pools, seasonal concentration areas or habitats of rare species etc. have been identified by MNR within or directly adjacent to the study area. There is no forest 'interior' habitat (i.e. core forest areas greater than 100 m from edges) present within the study area.

Although no animal movement corridors were identified by MNR, wildlife movement opportunities were examined by Ecoplans visually at a landscape level by reviewing aerial photography.

As expected, the greatest opportunity for wildlife movement is provided by the Stillwater Creek valley, the largest valley system in the study area. The portion of this system located north of Highway 417 and east of Moodie Drive system is generally less disturbed with much greater natural vegetation cover, habitat diversity and wildlife habitat elements than other watercourses and areas within the study area. While the Stillwater Creek valley is relatively well defined habitat node, linkage quality between this portion of the valley and other large natural areas present in the broader landscape setting (e.g. Stony Swamp) is limited in terms of corridor width, natural vegetation cover, habitat diversity and wildlife habitat elements. Given the surrounding residential development to the north and cleared agricultural lands to the south, potential wildlife movement linkages are mainly associated with discontinuous hedgerows, and the narrow riparian corridors of Stillwater Creek and its tributaries up and downstream of the study area. Movement

opportunities are further limited by the fragmentation by the numerous roads, including Highway 417 which bisects the study area.

The smaller tributary valleys are generally highly disturbed, narrow features with limited natural vegetation cover. As such, they may provide some local wildlife movement opportunities, but are not expected to provide important movement functions. These tributaries are crossed by Highway 417, and the existing culvert crossings may hinder movement by larger animals (e.g. White-tailed Deer) if sufficient vertical clearance at the culvert crossing is not present.

Key Considerations
Within the study area, the Stillwater Creek valley corridor provides the most important wildlife habitat, in terms of habitat size, diversity, level of disturbance, specialized habitat elements, connectivity / movement potential and overall ecological quality. The primary issues to consider are direct removals of vegetation, fragmentation of habitat and linkages, impacts to rare species or habitats, construction-related impacts (e.g. sedimentation) and other indirect impacts (such as salt spray and invasive species proliferation).

The remainder of the landscape is characterized by a mosaic of fragmented and culturally derived vegetation and disturbed narrow riparian systems that provide ecological support roles to varying degrees, including minor movement functions, functional connectivity (via close proximity to larger features), occasional use by forest-associated species (typically for foraging activities) and habitat for common, generalist and tolerant / urban-adapted species.

2.4 Aquatic Ecosystem Features

2.4.1 Aquatic Approach

Field surveys by Ecoplans' fisheries staff were conducted on May 19-21, 2009. Survey sites are shown on Figure 2. The general character of watercourses crossed by proposed route alternatives was recorded and preliminary sensitivities identified based on the combination of secondary source and field reconnaissance information. The collection of fish habitat information during the field survey encompassed the following parameters, updating and building on the existing database:

- flow condition, clarity and general gradient;
- channel dimensions and general character;
- morphology (e.g., riffles, pools);
- cover opportunities (e.g., woody debris, undercut banks, boulders, aquatic vegetation);
- substrate type;
- bank height, character and stability/evidence of erosion;
- riparian vegetation;

- physical barriers to fish movement;
- potential specialized and important habitat areas including potential spawning habitat, good nursery cover, holding habitat (deeper refuge pools); and
- evidence of groundwater discharge.

All observations of fish noted during the survey and their use of particular habitat types were recorded. Existing fish sampling records from RVCA were also utilized. The map of these sampling stations and associated data records are provided in Appendix B. A photographic record documenting aquatic habitat conditions was compiled during the field visits. Representative photos are provided in Appendix A.

2.4.2 Aquatic Habitat Overview

The watercourses present within the study area vary in their degree of anthropogenic influence, amount of riparian woody vegetation cover, permanence of flow (i.e. permanent, intermittent or ephemeral) and overall ecological sensitivity. They range from relatively undisturbed conditions with generally contiguous valley forest cover evident along the Stillwater Creek valley north of Highway 417 to open, channelized reaches with very little associated natural vegetation and associated anthropogenic land uses (e.g. sections of Graham Creek and Graham Creek tributary).

MNR considers Stillwater Creek to be *Type 2 fish habitat*. As defined in MNR's Fish Habitat Protection Guidelines for Developing Areas (1994), Type 2 habitat is important but generally abundant (i.e. not a limiting factor for the species in the area) and include feeding areas, areas of unspecialized spawning habitat such as that used by many minnow species; and pool-riffle-run complexes that occur along a watercourse.

Crossing #1 – Stillwater Creek - west of Moodie Drive *(See Appendix A, Photos 1-3)*
Ecoplans initially surveyed this watercourse in 2001/2002 as part of the *Highway 417 Expansion Class Environmental Assessment and Preliminary Design Study*. The watercourse flows north under Highway 417 through a 5m box culvert and under Corkstown Road through a 4m box culvert. The Corkstown Road culvert is embedded with large substrate present in the culvert. Flow is permanent and no barriers to fish movement observed (no perching). Erosion is present both up and downstream of this crossing with some exposed clay on the banks. The watercourse is confined within relatively steep banks and with little to no active floodplain. The channel and banks are densely vegetated with overhanging grasses and herbaceous vegetation.

No sensitive habitat features (e.g spawning or nursery habitat) are identified in the reach. In 2001, Ecoplans captured warmwater baitfish including Brook Stickleback (*Culaea inconstans*) and Creek Chub (*Semotilus atromaculatus*) downstream of this crossing. In 2001, the RVCA captured warmwater baitfish in sampling stations located approximately 760m downstream of the Highway 417 culvert, and approximately 100m upstream of the Highway 417 culvert. Species captured included: Central Mudminnow (*Umbra limi*), White Sucker *(Catostomus commersonii*),

Northern Redbelly Dace (*Phoxinus eos*), Common Shiner (*Luxilus cornutus*), Blacknose Shiner (*Notropis heterolepis*), Creek Chub and Brook Stickleback. In 2009, Ecoplans observed baitfish in the pools both up and downstream of the Corkstown Road crossing, but species were not identified.

Crossing #2 – Stillwater Creek *(See Appendix A, Photos 4-9)*
This channel forms part of the main branch of Stillwater Creek that flows from west to southeast around the Moodie Drive/ Highway 417 interchange, and along the north side of Highway 417. Flow appears permanent, however, the Corkstown Road culverts are blocked by woody debris and sediment at the upstream end and a collapsed retaining wall at the downstream end, creating barriers to upstream fish movement. A breached beaver dam was observed approximately 10 m downstream of Corkstown Road which may also act as a seasonal barrier to fish movement.

A the time of the field invesgtiations, the Watts Creek Pathway crossing culvert was observed to be collapsed (submerged) with erosion noted on the banks. Despite these issues, the culvert did not appear to present a barrier to fish movement. The downstream portion of the channel is confined within vertical bedrock walls. Stream morphology is dominated by 'flats' with occasional pools present throughout the reach. In many cases the pools contain submergent vegetation and abundant baitfish were observed. A large, wide scour pool is located immediately downstream of the Corkstown Road crossing.

In 2009, Ecoplans observed baitfish throughout the channel between Corkstown Road and the trail system. A minnow trap (not labelled) was found immediately downstream of the breached beaver dam and contained Fathead Minnow (*Pimephales promelas*), Brook Stickleback and Northern Redbelly Dace. In 2001, the RVCA captured warmwater baitfish at sampling sites located approximately 280m upstream of Corkstown Road and 460m upstream of the Highway 417 culvert. Species captured included: Central Mudminnow, Northern Redbelly Dace and Brook Stickleback.

Crossing #3 –Tributary A of Stillwater Creek *(See Appendix A, Photos 10-12)*
This crossing is located on a tributary of Stillwater Creek that joins the main branch approximately 20m downstream of the Highway 417 crossing. Flow appears permanent. The southern bank of the main branch and tributary is lined with rip rap, and the northern bank is characterized by exposed bedrock. Upstream of the confluence, the tributary channel form is relatively straight, with fine substrates and minor bank erosion along the east bank. Downstream of the confluence with the main Stillwater Creek, the channel flows through a bedrock confined straight section of channel with coarse substrates (gravel/cobble) and morphology consisting of riffles and runs. Some submergent vegetation was observed in the scour pool at the outlet of the tributary where Mallards (*Anas platyrhynchos*) were observed feeding. Deer tracks were observed along the edges of the channel and along the fence line of the highway right-of-way

No barriers to upstream fish movement were observed, however, no sensitive habitat features (e.g. spawning or nursery habitat) and no fish were observed in the tributary during the 2009 field visit. In 2001, Ecoplans recorded warmwater baitfish with sculpin species upstream and downstream of the existing Highway 417 ROW. Species included: White Sucker, Brook Stickleback, Creek Chub, Fathead Minnow, Mottled Sculpin (*Cottus bairdii*) (typically a coldwater species), Longnose Dace (*Rhinichthys cataractae*), Blacknose Dace (*Rhinichthys atratulus*) and Central Mudminnow. In 2001, RVCA captured warmwater baitfish at sampling sites located approximately160m downstream of the Highway 417 culvert on Stillwater Creek. Species captured included Creek Chub and Brook Stickleback.

Crossing #4 – Tributary B of Stillwater Creek *(See Appendix A, Photos 13-15)*
This crossing is located on a small swale tributary of Stillwater Creek feeding into the main branch approximately 110m downstream of the Highway 417 right-of-way. Banks of the swale are steep and actively eroding/slumping/undercutting possibly indicating a 'flashy' ephemeral flow regime. Woody debris and fallen trees along the banks and in the channel have created seasonal barriers to upstream movement. Water depths are very shallow and it appears that the tributary flows periodically, draining the agricultural fields south of the highway. The Highway 417 culvert is a 0.8m black plastic corrugated pipe. The channel narrows significantly as it approaches the main branch of Stillwater Creek. Riparian vegetation is a mixed forest with a fairly dense canopy cover, however, groundcover/understory vegetation is limited.

No fish were observed in the tributary, and there was no refuge habitat (deeper pools) or sensitive habitat features noted. The RVCA does not have any sampling stations located on this tributary.

Crossing #5 – Tributary C of Stillwater Creek *(See Appendix A, Photos 16-20)*
This crossing is located on a relatively wide tributary of Stillwater Creek that drains the agricultural fields from the south through the Highway 417 right-of-way. In its open reaches, channel form is meandering as the system transitions from a narrow, confined channel with steep eroding banks, to a wider, flatter channel with low lying stable banks. Flow appears to be permanent.

The creek flows under the highway through a large 2-3m concrete box culvert and then through a small 1.5m culvert under the Watts Creek Pathway, (then into a large grated concrete drop culvert connected to the storm sewer system at the edge of the residential area). All three of the existing culvert crossings on this tributary have rip-rap lined banks for stability, with minimal vegetation around the culvert inlets and outlets. Downstream from the trail culvert, to about 100m upstream of the residential area, the watercourse is confined within a relatively deep channel setting with steep, eroding walls through a mixed forest area with limited understory vegetation.

Sections of the watercourse upstream of the Watts Creek Pathway and the 100m upstream of the residential lands displayed low-lying banks with fine sediment accumulation on the tops both

banks, indicating possible recent high flows. The culvert at the trail was slightly perched, but had a small rocky ramp leading into the culvert outlet and is therefore not considered a barrier to fish movement.

No fish were observed in the watercourse during the 2009 field investigations. In 2001, Ecoplans observed warmwater baitfish (Creek Chub) within the channel downstream of the recreational trail. The RVCA does not have any sampling stations on this watercourse.

Crossing #6 – Main Stillwater Creek at Hydro Corridor *(See Appendix A Photos 21-23)*
In this reach, Stillwater Creek is relatively wide and highly meandering system with low lying banks and evidence of flows of overtopping banks (i.e. good connection to the surrounding floodplain). Flow is permanent and banks appear locally unstable, with erosion and slumping typically found on the outside of meander bends. There is evidence of recent beaver activity and abundant woody debris on banks and across the channel. There is also evidence of deer crossing (tracks) and deer bedding areas.

The downstream section of the channel, located within the residential area, is lined by bedrock fragments and rip-rap bank protection. Potential spawning, rearing or nursery habitat was observed within this reach. Ecoplans observed unidentified baitfish species during their 2009 field investigation. In 2001, the RVCA reported capture of baitfish including sculpin species at their sampling site located approximately 570m downstream of the study area. Other species captured at this location included: Central Mudminnow, White Sucker, Common Carp (*Cyprinus carpio*), Common Shiner (*Luxilus cornutus*), Spottail Shiner (*Notropis hudsonius*), Mimic Shiner (*Notropis volucellus*), Creek Chub, Pearl Dace (*Phoxinus eos x Margariscus margarita*), Brook Stickleback, Bluegill (*Lepomis macrochirus*) , Yellow Perch (*Perca flavescens*) and Johnny Darter (*Etheostoma nigrum*). This species assemblage reflects the proximity of this sampling station to the Ottawa River and use of the lower reaches of Stillwater Creek by Ottawa River fish species.

Crossing #7 – Tributary A of Graham Creek *(See Appendix A, Photos 24-26)*
This tributary of Graham Creek appears to have been historically modified/straightened and channelized. The banks are graded at a 3:1 slope and lined with rip-rap protection. The flow was slow moving and an abundance of algae growing on the rocks lining the channel bed was observed. A rock check dam likely impedes seasonal movement of fish upstream, and has created a stagnant backwater area immediately upstream.

There are some overhanging trees, but for the most part the channel has full sun exposure. Baitfish spawning habitat was noted in this reach; Ecoplans observed small pool areas where baitfish appeared to be forming nests in the large substrate. Ecoplans dip netted the area during the 2009 field season and caught Brook Stickleback that were gravid and in spawning condition

within the reach downstream of the rock check dam. The RVCA does not have any fish sampling stations on this tributary.

Crossing #8–Graham Creek *(See Appendix A, Photos 27-29)*
Graham Creek appears to have been historically straightened/channelized, as the banks are graded to a 3:1 slope, the toe of banks are lined with rip-rap, and the channel is confined within a straight valley. The top of banks are low lying and display minor toe erosion and undercutting around the rip-rap bank materials. There are constructed riffle features that have been created by the placement of fragmented bedrock in a 'straight line' across the channel. These do not appear to hinder fish movement.

Abundant organic debris and leaf litter was observed on the streambed, covering some of the finer substrates, and offering some instream cover for baitfish. Water clarity was poor and flow was turbid during the 2009 field investigation. No sensitive habitat features (e.g. spawning, nursery habitat) were observed during the field visit and no fish were captured. In 2001, the RVCA reported the capture of baitfish at their sampling locations located approximately 670m downstream of the highway ROW, and approximately 750m upstream of the highway. Species captured included: White Sucker, Longnose Dace, Creek Chub, Johnny Darter and sculpin species. American Eel (*Anguilla rostrata*), designated by COSEWIC as *Special Concern*, by MNR as *Endangered* (although Ontario general status is *Secure*) has been captured near the mouth of Graham Creek approximately 670m downstream of the study area. This species has not been recorded within the study area.

Key Considerations
The watercourses and valley systems in the study area vary in their physical characteristics (e.g. morphology, substrate, and sinuosity), amount of natural riparian vegetation, level of anthropogenic disturbance, fish community, flow status (e.g. intermittent/permanent) and overall ecological sensitivity. There are notable differences between reaches or valley sections within a given watercourse (e.g. channelized vs. 'natural' reaches, open disturbed riparian zones vs. wooded, relatively less disturbed areas or narrow vs. wide valley / floodplain areas).

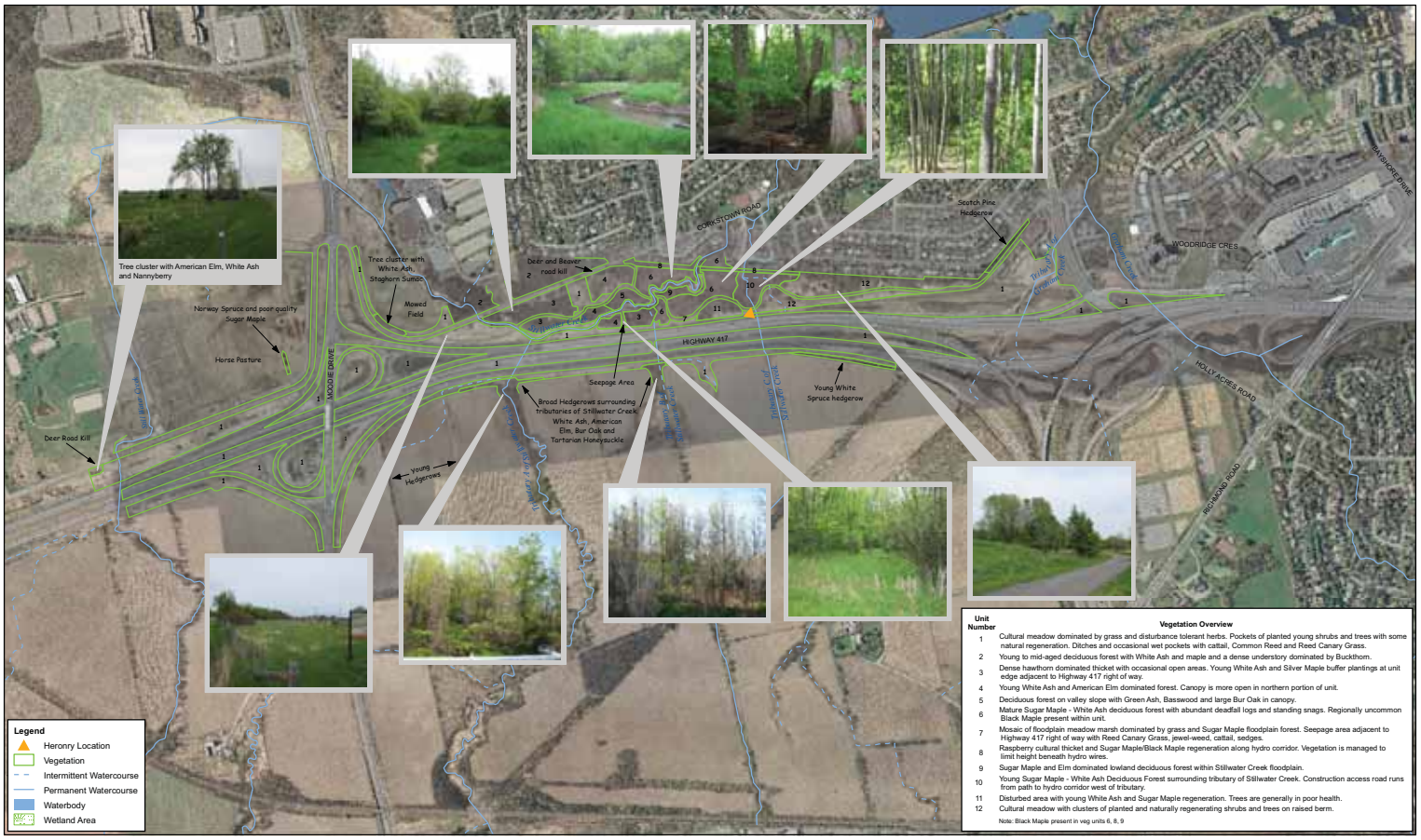
With the recognition that any linear transitway route alternative would require the crossing of some watercourses, the intent of the route alternative generation and evaluation process is to avoid crossing and potential for impacts to the higher quality portions of watercourses and valleys wherever feasible. While design measures can be developed at later stages to avoid or minimize direct impacts, the nature of the potential crossing location is an important consideration during the route evaluation stage. General principles for identifying potential crossings also include avoiding wide valley crossings, highly sinuous crossings, potentially erodible or well forested valley slopes or watercourse confluence zones.

Table 1. Fish Community Summary (RVCA 2001) (Map provided in Appendix B)

Fish Species	Stillwater Creek					Stillwater Creek Tributaries				Graham Creek	
	CK7-01SH	CK7-02SH	CK7-03SH	CK7-04SH	CK7-05SH	CK7-11SH*	CK7-12SH*	CK7-13SH	CK7-14SH	CK8-01SH	CK8-02SH
BLUEGILL	11	2									
YELLOW PERCH	3	53									
COMMON CARP		1									
CREEK CHUB		25	60		414			10	9	6	4
PEARL DACE		4	35								
NORTHERN REDBELLY DACE			45	2							
LONGNOSE DACE			38							252	6
AMERICAN EEL										2	
JOHNNY DARTER	36	3								10	
CENTRAL MUDMINNOW	11	38	143	198	1				16		
BLUNTNOSE MINNOW	2										
SCULPIN FAMILY		2	17							133	92
COMMON SHINER		3			10						
MIMIC SHINER		4									
SPOTTAIL SHINER	6	86									
BROOK STICKLEBACK	3	3	175	65	8			7	3		
WHITE SUCKER	42	28	4		2					3	

* No fish species captured

Figures

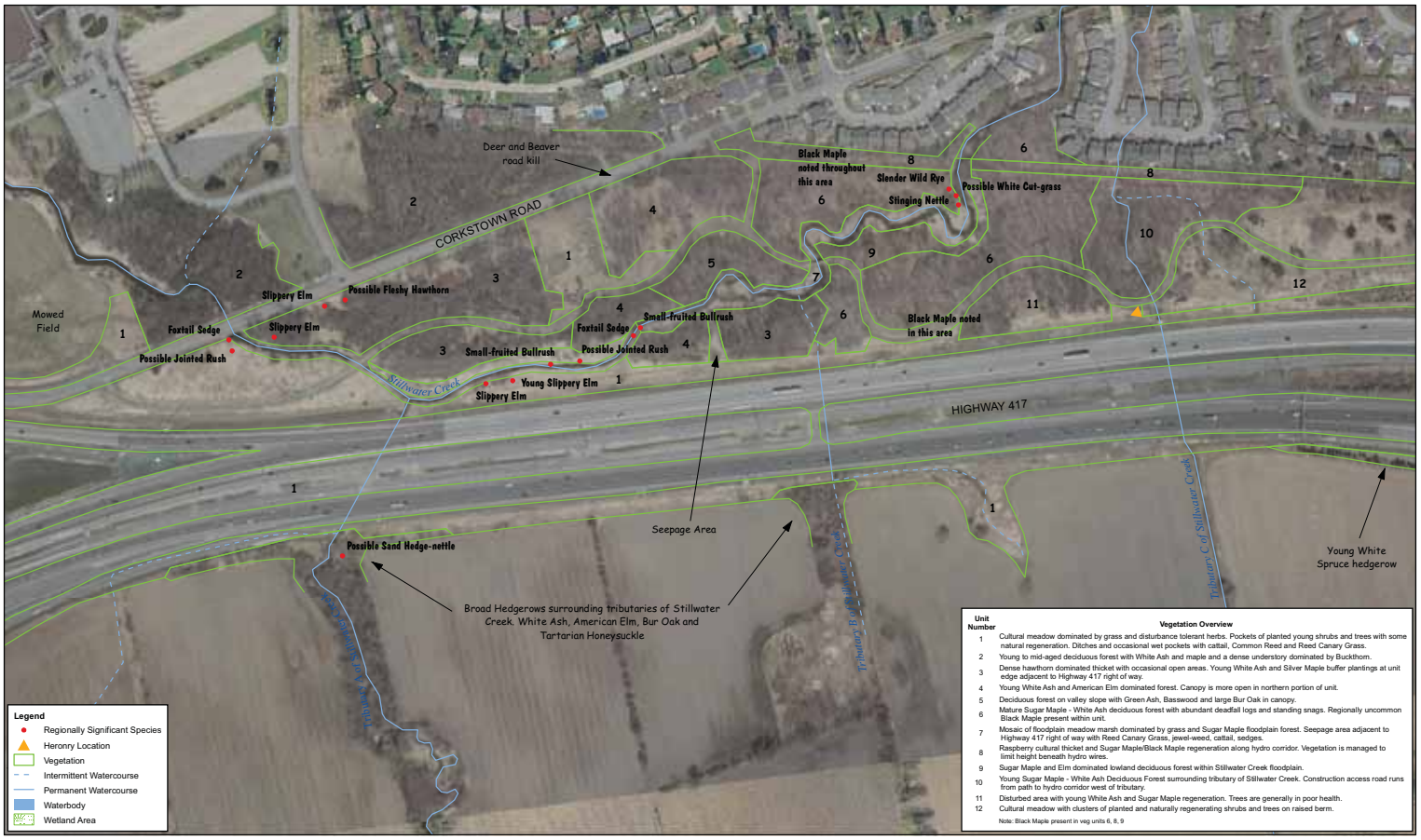


ecoplans limited

West Transitway Facility, Ottawa: Bayshore Station to Moodie Drive
Vegetation Features

0 100 200 Meters
1:10,000
N

Date: September 2009
Project No: 50-3403
Figure No: 1A



ecoplans limited

West Transitway Facility, Ottawa: Bayshore Station to Moodie Drive
Regionally Rare Plant Species

0 50 100 Meters

1:3,000

N

Date: September 2009

Project No: 50-3403

Figure No: 1B

ecoplans limited

West Transitway Facility, Ottawa: Bayshore Station to Moodie Drive
Aquatic Features

0 100 200 Meters

1:10,000

N

Date: September 2009

Project No: 50-3403

Figure No:

Appendix A
Representative Photographs

C#1 – Stillwater Creek west of Moodie Drive

Figure 1. Photograph taken looking upstream at general channel characteristics between Highway 417 ROW and Corkstown Road.

Figure 2. Photograph taken looking downstream at the Corkstown Road culvert and the substrate.

Figure 3. Photograph taken looking downstream from Corkstown Road Culvert at the general channel characteristics downstream.

C#2 – Stillwater Creek at Corkstown Road (east of Moodie Drive)

Figure 4. Photograph taken looking upstream from Corkstown Road at general characteristics of Stillwater Creek upstream of road crossing.

Figure 5. Photograph taken looking downstream at the general location of Corkstown Road crossing, and the debris burying the inlet.

Figure 6. Photograph taken looking upstream at the outlet of the Corkstown Road crossing and failing retaining wall.

Figure 7. Photograph taken looking downstream at scour pool and small beaver dam in Stillwater Creek downstream of Corkstown Road crossing.

Figure 8. Photograph taken looking downstream at general channel characteristics of Stillwater Creek where it is confined within the bedrock walls, between Corkstown Road and the recreational trail.

Figure 9. Photograph taken looking downstream at inlet of culvert at recreational trail.

C#3 – Tributary A of Stillwater Creek at Highway 417, west of Moodie Drive

Figure 10. Photograph taken looking upstream at Highway 417 culvert for Tributary A and the general channel characteristics of this watercourse.

Figure 11. Photograph taken looking downstream at the outlet of the tributary into the main branch of Stillwater Creek.

Figure 12. Photograph taken looking downstream of the tributary outlet on Stillwater Creek at the general channel characteristics.

C#4 – Tributary B of Stillwater Creek – draining agricultural fields through Highway 417 ROW

Figure 13. Photograph taken looking upstream at the culvert under Highway 417 for this tributary.

Figure 14. Photograph taken looking downstream at general channel characteristics within the reach.

Figure 15. Photograph taken looking downstream along the reach at the outfall of the tributary to Stillwater Creek in the background.

C#5 – Tributary C of Stillwater Creek - west of Highway 417/416 Interchange

Figure 16. Photograph taken looking upstream at the box culvert for this tributary under Highway 417.

Figure 17. Photograph looking upstream at the culvert installed at the recreational trail and the rip rap bank protection and rocky ramp.

Figure 18. Photograph taken looking upstream at the confined section of reach in the mixed forest area.

Figure 19. Photograph taken looking downstream at the general channel characteristics in the low lying forested are immediately upstream of the residential lands.

Figure 20. Photograph taken looking downstream at the culvert leading into the storm sewers and the woody debris accumulation on banks and in front of the grated culvert.

C#6 – Main Stillwater Creek at Hydro Corridor

Figure 21. Photograph taken looking upstream from the Hydro Corridor on Stillwater Creek, upstream of the residential lands.

Figure 22. Photograph taken looking upstream at potential ROW (yellow corridor) at island formation and valley wall embankment.

Figure 23. Photograph taken looking downstream from the potential ROW (yellow corridor) at general channel characteristics.

C#7 – Tributary A of Graham Creek

Figure 24. Photograph taken looking upstream at the culvert under Highway 417 for this tributary.

Figure 25. Photograph taken looking upstream through potential ROW (all corridors) at rock check dam and general bank vegetation.

Figure 26. Photograph taken looking downstream at the general channel characteristics downstream of the potential ROW.

C#8–Graham Creek – East of Holly Acres Road

Figure 27. Photograph taken looking upstream at the bridge over Graham Creek for Highway 417.

Figure 28. Photograph taken looking across channel from western bank at the manmade riffle features and turbid (grey-water) observed during the 2009 field investigation.

Figure 29. Photograph taken looking downstream of the pedestrian bridge over Graham creek at the general channel characteristics through the residential and commercial lands.

Appendix B
Rideau Valley Conservation Authority
Stream Habitat and Fish Community Sampling Station Locations


CARLING
CK7-01SH
CK8-01SH
CK9-04SH
CK7-02SH
HIGHWAY 417
CK7-04SH
CK8-02SH
BASELINE
CK7-05SH
CK7-03SH
CK7-13SH
CK7-11SH
HWY416-IC75
CK8-03SH
HIGHWAY 417
CK7-14SH
CK7-06SH
CK7-12SH
RAMP 26
CK8-04SH
CK7-07SH
CK7-08SH
CK7-09SH
CK8-05
ST HUNT CLUB
CK7-10SH
ROBERTSON
WEST HUNT CLUB
HIGHWAY 416
GREENBANK
EAGLESON
RICHMOND
MOODIE
CK8-08SH
CEDARVIEW

Site Identification Summary

Date Report Printed: 2009-06-09

Stream Name: Graham Creek **Stream Code:** CK8 **Site Code:** CK8-01SH **Year:** 2001 **Sample:** 1

	Grid	Easting	Northing	GIS Source		Deg.	Min.	Sec.
Uncorrected UTM's	9	358423.1	5023583.7		**Latitude**	45	21	1
Corrected UTM's	18	436106	5022172	other	**Longitud**	75	48	56

Source of Coordinates: Corrected with City **Datum:** NAD 83

Township City of Ottawa **Lot:** **Concession:**

MNR District: Kemptville **Watershed**

Site Descriptio Site begins 19.30 m upstream of the culvert crossing Carling, 12.5 m from wooden fence. Site bottom is mostly large flat and round rocks - depth from 10 cm in riffles to 80 cm in pool.

First Year Site Surveyed 2001

Sample is included in the following projects:

Project Code	Project Title	Lead Agency
GRAHAM CK	Graham Creek Stream Habitat Assessment 2001	City of Ottawa (formerly RMOC)

Water Quality Summary Report:
Thermal Stability Rating and Hilsenhoff Index

Date Report Printed: 2009-06-09

Stream Name: Graham Creek Stream Code: CK8 Site Code: CK8-01SH Year: 2001 Sample: 1

Thermal Stability Rating

The water temperature was 23.41°C at 16:00 on 2001-06-27.

The maximum air temperature was 33.14°C on 2001-06-27.

Thermal Stability Rating: Unavailable: Date is outside of allowable window of July 1 - September 10.

Site Features Affecting Water Quality

Springs and Seeps Active in Site: No

Chemical Discharges Present in Site: Yes

Chemical discharges will adversely affect water quality and will impair the accuracy of the Hilsenhoff Index.

Hilsenhoff Index

Each taxon of invertebrate is assigned a weighting based on its tolerance of organic pollution. The sum of the weighted scores gives an indication of the degree of organic pollution in the stream.

Survey Type (Invertebrate Sampling Technique) :

Invertebrate Taxon	Percent of Sample	Hilsenhoff Index Weighting	Score
Acarina (Water Mites)	0.00%	6	0.00
Oligochaeta (Segmented Worms	24.10%	8	1.93
Hirudinea (Leeches)	0.00%	8	0.00
Amphipoda (Scuds)	0.00%	6	0.00
Isopoda (Aquatic Sowbugs)	49.00%	8	3.92
Chironomidae (Blood Worms	22.49%	7	1.57
Simuliidae (Black Flies	0.40%	6	0.02
Tipulidae (Crane Flies	0.00%	3	0.00
Dipteran Sub-Groups / Lepidoptera *	0.00%	5	0.00
Ephemeroptera (Mayflies)	0.00%	5	0.00
Plecoptera (Stoneflies)	0.00%	1	0.00
Hemiptera (True Bugs)	0.00%	5	0.00
Coleoptera (Beetles)	1.20%	4	0.05
Megaloptera (Helgrammites	0.00%	4	0.00
Anisoptera (Dragonflies)	0.00%	5	0.00
Zygoptera (Damselflies)	0.00%	7	0.00
Trichoptera (Caddisflies)	0.80%	4	0.03
Gastropoda (Snails)	0.00%	8	0.00
Pelecypoda (Clams)	0.00%	6	0.00
Ostracoda (Seed Shrimp)	0.00%	7	0.00
Decapoda (Crayfish)	0.00%	6	0.00
Hydra	0.00%	5	0.00
Flatworms (Platyhelminthes)	2.01%	6	0.12
Misc. Diptera	0.00%	5	0.00
		Hilsenhoff Index	7.65

* Includes Ceratopogonidae, Culicidae, Tabanidae and Lepidoptera

Interpretation of Hilsenhoff Scores

Hilsenhoff Index	Water Quality	Degree of Organic Pollutio
0.00-3.75	Excellent	Organic Pollution Unlikely
3.76-4.25	Very Good	Possible Slight Organic Pollution
4.26-5.00	Good	Some Organic Pollution Probable
5.01-5.75	Fair	Fairly Substantial Organic Pollution Likely
5.76-6.50	Fairly Poor	Substantial Organic Pollution Likely
6.51-7.25	Poor	Very Substantial Organic Pollution Likely
7.26-10	Very Poor	Severe Organic Pollution Likely

A Hilsenhoff score of 7.65 indicates that there is likely severe organic pollution present.

Fish Community Summary

Date Report Printed: 2009-06-09

Stream Name: Graham Creek Stream Code: CK8 Site Code: CK8-01SH Year: 2001 Sample: 1

Date of Assessment: 2001-06-27

Survey Type: Single Pass:

- ☐ Screening (# of runs = 1; effort<6 sec/m^2)
- ☑ Standard (# of runs = 1; effort>6 sec/m^2)
- ☐ Unknown (# of runs = 1; effort = unknown)

OR ☐ Multiple Pass (# of runs > 1)

Run 1 of 1	Start Time: 7:30:00 AM	Shocker Seconds: 5861	Effort (Seconds/m²): 31.74
	Stop Time: 10:11:00 AM	Area (m²): 184.66	

Summary of fish captured for which weight data was available, allowing estimation of biomass.

Species Code	Common Name	Scientific Name	Size Class (<100mm. T.L. = 1 >=100mm.T.L.=2) (Non-salmonids are all class 1)	Number Caught	Number Caught / 100 m²	Weight Caught (gm.)	Weight (gm.)/ 100m²	Estimated Biomass (g/100m²) (Only calculated for salmonids.)
163	White Sucker	*Catostomus commersoni*	1	3	1.62	262.00	141.88	NA
211	Longnose Dace	*Rhinichthys cataractae*	1	252	136.47	449.00	243.15	NA
212	Creek Chub	*Semotilus atromaculatus*	1	6	3.25	302.00	163.54	NA
251	American Eel	*Anguilla rostrata*	1	2	1.08			NA
341	Johnny Darter	*Etheostoma nigrum*	1	10	5.42	22.00	11.91	NA
380	Sculpin Family		1	133	72.02	816.00	441.89	NA
			Total All Species:	406	219.86	1851.00	1002.38	

Channel Structure Summary

(Point Transect Data)

Stream Name: Graham Creek Stream Code: CK8 Site Code: CK8-01SH Year: 2001 Sample: 1

Site Dimensions

Site Length (m.): 42.2
Average Width (m.): 4.45
Area (m²): 188
Usable Area (m²): 184.7

Usable area is defined as the wetted surface area, calculated as: (Average Width * Site Length) * (Number of Points with Water Depths >0 / Total Number of Points Measured)

Maximum Depth (mm.): 675
Number of Transects: 12
Total Number of Points: 60

Number of Points with Water Depths > 0: 59
Number of Points on Islands: 1

Habitat Type Summary

Summary of habitat types by depth category expressed as a percentage of the number of points measured. Totals may not add to 100% due to points on land and missing data.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	20.00%	5.00%	1.67%	1.67%	28.33%
101 - 600	25.00%	16.67%	16.67%	10.00%	68.33%
601 - 1000		1.67%			1.67%
> 1000					0.00%
Totals	45.00%	23.33%	18.33%	11.67%	98.33%
			Percentage of Islands:		1.67%

Instream Cover Summary

Unembedded Cover

Summary of unembedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	15.25%		1.69%	1.69%	18.64%
101 - 600	20.34%	15.25%	15.25%	8.47%	59.32%
601 - 1000		1.69%			1.69%
> 1000					0.00%
Totals	35.59%	16.95%	16.95%	10.17%	79.66%

Distribution of Unembedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	47.46%	30.51%		

Channel Structure Summary

(Point Transect Data)

Stream Name: Graham Creek Stream Code: CK8 Site Code: CK8-01SH Year: 2001 Sample: 1

Embedded Cover

Summary of embedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	3.39%	3.39%			6.78%
101 - 600	3.39%		1.69%	1.69%	6.78%
601 - 1000					0.00%
> 1000					0.00%
Totals	6.78%	3.39%	1.69%	1.69%	13.56%

Distribution of Embedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	11.86%	1.69%		

Vegetation Summary

Instream Vegetation

Percent of usable area with each instream vegetation type.

Filamentous Algae:	Non-Filamentous:	Moss:	Macrophytes:	Watercress:	Grass:	Terrestrial Plants:
0.00%	3.39%	86.44%	0.00%	0.00%	0.00%	0.00%

Riparian Vegetation

Dominant vegetation type found along each bank. Riparian zones are defined by distance from the water's edge.

Riparian Zone	Dominant Vegetation Type:									
	Left Bank					Right Bank				
	None	Cultivated	Meadow	Scrub	Forest	None	Cultivated	Meadow	Scrub	Forest
0 - 2m.	☐	☐	☐	☑	☐	☐	☐	☑	☐	☐
2 - 10m.	☐	☐	☐	☑	☐	☐	☐	☑	☐	☐
10 - 30m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐
30-100m.	☑	☐	☐	☐	☐	☑	☐	☐	☐	☐

Site Identification Summary

Date Report Printed: 2009-06-09

Stream Name: Graham Creek **Stream Code:** CK8 **Site Code:** CK8-02SH **Year:** 2001 **Sample:** 1

	Grid	Easting	Northing	GIS Source		Deg.	Min.	Sec.
Uncorrected UTM's	9	359264.9	5022731.9		**Latitude**	45	20	33
Corrected UTM's	18	436932	5021305	other	**Longitud**	75	48	18

Source of Coordinates: Corrected with City **Datum:** NAD 83

Township City of Ottawa **Lot:** **Concession:**

MNR District: Kemptville **Watershed**

Site Descriptio Behind houses on left side, first site is just beyond first bend in creek and before second bend. Bottom station is approximately 85 metres downstream from Nanaimo Drive crossing.

First Year Site Surveyed 2001

Sample is included in the following projects:

Project Code	Project Title	Lead Agency
GRAHAM CK	Graham Creek Stream Habitat Assessment 2001	City of Ottawa (formerly RMOC)

Water Quality Summary Report:
Thermal Stability Rating and Hilsenhoff Index

Date Report Printed: 2009-06-09

Stream Name: Graham Creek Stream Code: CK8 Site Code: CK8-02SH Year: 2001 Sample: 1

Thermal Stability Rating

The water temperature was 22.46°C at 16:00 on 2001-06-27.

The maximum air temperature was 33.14°C on 2001-06-27.

Thermal Stability Rating: Unavailable: Date is outside of allowable window of July 1 - September 10.

Site Features Affecting Water Quality

Springs and Seeps Active in Site: No

Chemical Discharges Present in Site: Yes

Chemical discharges will adversely affect water quality and will impair the accuracy of the Hilsenhoff Index.

Hilsenhoff Index

Each taxon of invertebrate is assigned a weighting based on its tolerance of organic pollution. The sum of the weighted scores gives an indication of the degree of organic pollution in the stream.

Survey Type (Invertebrate Sampling Technique) :

Invertebrate Taxon	Percent of Sample	Hilsenhoff Index Weighting	Score
Acarina (Water Mites)	1.90%	6	0.11
Oligochaeta (Segmented Worms	31.90%	8	2.55
Hirudinea (Leeches)	0.00%	8	0.00
Amphipoda (Scuds)	1.43%	6	0.09
Isopoda (Aquatic Sowbugs)	41.90%	8	3.35
Chironomidae (Blood Worms	7.14%	7	0.50
Simuliidae (Black Flies	0.00%	6	0.00
Tipulidae (Crane Flies	0.48%	3	0.01
Dipteran Sub-Groups / Lepidoptera *	0.00%	5	0.00
Ephemeroptera (Mayflies)	0.00%	5	0.00
Plecoptera (Stoneflies)	1.43%	1	0.01
Hemiptera (True Bugs)	0.00%	5	0.00
Coleoptera (Beetles)	0.95%	4	0.04
Megaloptera (Helgrammites	0.00%	4	0.00
Anisoptera (Dragonflies)	0.00%	5	0.00
Zygoptera (Damselflies)	0.00%	7	0.00
Trichoptera (Caddisflies)	11.43%	4	0.46
Gastropoda (Snails)	0.00%	8	0.00
Pelecypoda (Clams)	0.00%	6	0.00
Ostracoda (Seed Shrimp)	0.00%	7	0.00
Decapoda (Crayfish)	1.43%	6	0.09
Hydra	0.00%	5	0.00
Flatworms (Platyhelminthes)	0.00%	6	0.00
Misc. Diptera	0.00%	5	0.00
		Hilsenhoff Index	7.21

* Includes Ceratopogonidae, Culicidae, Tabanidae and Lepidoptera

Interpretation of Hilsenhoff Scores

Hilsenhoff Index	Water Quality	Degree of Organic Pollutio
0.00-3.75	Excellent	Organic Pollution Unlikely
3.76-4.25	Very Good	Possible Slight Organic Pollution
4.26-5.00	Good	Some Organic Pollution Probable
5.01-5.75	Fair	Fairly Substantial Organic Pollution Likely
5.76-6.50	Fairly Poor	Substantial Organic Pollution Likely
6.51-7.25	Poor	Very Substantial Organic Pollution Likely
7.26-10	Very Poor	Severe Organic Pollution Likely

A Hilsenhoff score of 7.21 indicates that there is likely very substantial organic pollution present.

Fish Community Summary

Date Report Printed: 2009-06-09

Stream Name: Graham Creek | Stream Code: CK8 | Site Code: CK8-02SH | Year: 2001 | Sample: 1

Date of Assessment: 2001-06-25

Survey Type: Single Pass:

- ☐ Screening (# of runs = 1; effort<6 sec/m^2)
- ☑ Standard (# of runs = 1; effort>6 sec/m^2)
- ☐ Unknown (# of runs = 1; effort = unknown)

OR

- ☐ Multiple Pass (# of runs > 1)

Run 1 of 1	Start Time: 9:00:00 AM	Shocker Seconds: 5443	Effort (Seconds/m²): 39.48
	Stop Time: 10:45:00 AM	Area (m²): 137.88	

Summary of fish captured for which weight data was available, allowing estimation of biomass.

Species Code	Common Name	Scientific Name	Size Class (<100mm. T.L. = 1 >=100mm.T.L.=2) (Non-salmonids are all class 1)	Number Caught	Number Caught / 100 m²	Weight Caught (gm.)	Weight (gm.)/ 100m²	Estimated Biomass (g/100m²) (Only calculated for salmonids.)
211	Longnose Dace	*Rhinichthys cataractae*	1	6	4.35	25.50	18.49	NA
212	Creek Chub	*Semotilus atromaculatus*	1	4	2.90	126.90	92.04	NA
380	Sculpin Family		1	92	66.73	465.50	337.62	NA
			Total All Species:	102	73.98	617.90	448.15	

Channel Structure Summary

(Point Transect Data)

Stream Name: Graham Creek Stream Code: CK8 Site Code: CK8-02SH Year: 2001 Sample: 1

Site Dimensions

Site Length (m.): 45.4
Average Width (m.): 3.142
Area (m^2): 143
Usable Area (m^2): 137.9

Usable area is defined as the wetted surface area, calculated as: (Average Width * Site Length) * (Number of Points with Water Depths >0 / Total Number of Points Measured)

Maximum Depth (mm.): 415
Number of Transects: 12
Total Number of Points: 60

Number of Points with Water Depths > 0: 58
Number of Points on Islands: 2

Habitat Type Summary

Summary of habitat types by depth category expressed as a percentage of the number of points measured. Totals may not add to 100% due to points on land and missing data.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	20.00%	1.67%	1.67%		23.33%
101 - 600	36.67%	28.33%	8.33%		73.33%
601 - 1000					0.00%
> 1000					0.00%
Totals	56.67%	30.00%	10.00%	0.00%	96.67%
			Percentage of Islands:		3.33%

Instream Cover Summary

Unembedded Cover

Summary of unembedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	6.90%				6.90%
101 - 600	20.69%	15.52%	1.72%		37.93%
601 - 1000					0.00%
> 1000					0.00%
Totals	27.59%	15.52%	1.72%	0.00%	44.83%

Distribution of Unembedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	12.07%	32.76%		

Channel Structure Summary

(Point Transect Data)

Stream Name: Graham Creek Stream Code: CK8 Site Code: CK8-02SH Year: 2001 Sample: 1

Embedded Cover

Summary of embedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	3.45%				3.45%
101 - 600	1.72%	5.17%	1.72%		8.62%
601 - 1000					0.00%
> 1000					0.00%
Totals	5.17%	5.17%	1.72%	0.00%	12.07%

Distribution of Embedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	8.62%	3.45%		

Vegetation Summary

Instream Vegetation

Percent of usable area with each instream vegetation type.

Filamentous Algae:	Non-Filamentous:	Moss:	Macrophytes:	Watercress:	Grass:	Terrestrial Plants:
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Riparian Vegetation

Dominant vegetation type found along each bank. Riparian zones are defined by distance from the water's edge.

Riparian Zone	Dominant Vegetation Type:									
	Left Bank					Right Bank				
	None	Cultivated	Meadow	Scrub	Forest	None	Cultivated	Meadow	Scrub	Forest
0 - 2m.	☑	☐	☐	☐	☐	☑	☐	☐	☐	☐
2 - 10m.	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑
10 - 30m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐
30-100m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐

Site Identification Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck **Stream Code:** CK7 **Site Code:** CK7-12SH **Year:** 2001 **Sample:** 1

	Grid	Easting	Northing	GIS Source		Deg.	Min.	Sec.
Uncorrected UTM's	9	357688.3	5021694.4		**Latitude**	45	19	58
Corrected UTM's	18	435337	5020298	other	**Longitud**	75	49	34

Source of Coordinates: Corrected with City **Datum:** NAD 83

Township City of Ottawa **Lot:** **Concession:**

MNR District: Kemptville **Watershed**

Site Descriptio The creek has been straightened and runs beteewn two soy fields. The banks are fairly steep and lined with occasssional patches of trees. The creek is very narrow at this site and the small dogwood and other grasses spotted along the banks are providing shade.

First Year Site Surveyed 2001

Sample is included in the following projects:

Project Code	Project Title	Lead Agency
STILLWATER C	Stillwater Creek Stream Habitat Assessment 2001	City of Ottawa (formerly RMOC)

Water Quality Summary Report:
Thermal Stability Rating and Hilsenhoff Index

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck Stream Code: CK7 Site Code: CK7-12SH Year: 2001 Sample: 1

Thermal Stability Rating

No water temperature data is available.

The maximum air temperature was 33.14°C on 2001-06-27.

Thermal Stability Rating: Unavailable: Water temperature is missing.

Site Features Affecting Water Quality

Springs and Seeps Active in Site: No

Chemical Discharges Present in Site: Yes

Chemical discharges will adversely affect water quality and will impair the accuracy of the Hilsenhoff Index.

Hilsenhoff Index

Each taxon of invertebrate is assigned a weighting based on its tolerance of organic pollution. The sum of the weighted scores gives an indication of the degree of organic pollution in the stream.

Survey Type (Invertebrate Sampling Technique) :

Invertebrate Taxon	Percent of Sample	Hilsenhoff Index Weighting	Score
Acarina (Water Mites)	0.00%	6	0.00
Oligochaeta (Segmented Worms	0.32%	8	0.03
Hirudinea (Leeches)	0.00%	8	0.00
Amphipoda (Scuds)	0.00%	6	0.00
Isopoda (Aquatic Sowbugs)	80.19%	8	6.42
Chironomidae (Blood Worms	8.44%	7	0.59
Simuliidae (Black Flies	6.17%	6	0.37
Tipulidae (Crane Flies	0.65%	3	0.02
Dipteran Sub-Groups / Lepidoptera *	0.65%	5	0.03
Ephemeroptera (Mayflies)	0.00%	5	0.00
Plecoptera (Stoneflies)	0.00%	1	0.00
Hemiptera (True Bugs)	0.00%	5	0.00
Coleoptera (Beetles)	3.25%	4	0.13
Megaloptera (Helgrammites	0.00%	4	0.00
Anisoptera (Dragonflies)	0.00%	5	0.00
Zygoptera (Damselflies)	0.00%	7	0.00
Trichoptera (Caddisflies)	0.00%	4	0.00
Gastropoda (Snails)	0.32%	8	0.03
Pelecypoda (Clams)	0.00%	6	0.00
Ostracoda (Seed Shrimp)	0.00%	7	0.00
Decapoda (Crayfish)	0.00%	6	0.00
Hydra	0.00%	5	0.00
Flatworms (Platyhelminthes)	0.00%	6	0.00
Misc. Diptera	0.00%	5	0.00
		Hilsenhoff Index	7.61

* Includes Ceratopogonidae, Culicidae, Tabanidae and Lepidoptera

Interpretation of Hilsenhoff Scores

Hilsenhoff Index	Water Quality	Degree of Organic Pollutio
0.00-3.75	Excellent	Organic Pollution Unlikely
3.76-4.25	Very Good	Possible Slight Organic Pollution
4.26-5.00	Good	Some Organic Pollution Probable
5.01-5.75	Fair	Fairly Substantial Organic Pollution Likely
5.76-6.50	Fairly Poor	Substantial Organic Pollution Likely
6.51-7.25	Poor	Very Substantial Organic Pollution Likely
7.26-10	Very Poor	Severe Organic Pollution Likely

A Hilsenhoff score of 7.61 indicates that there is likely severe organic pollution present.

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-12SH | Year: 2001 | Sample: 1

Site Dimensions

Site Length (m.):	55.3	Average Width (m.):	0.784	Area (m^2):	43.4	Usable Area (m^2):	43.36

Usable area is defined as the wetted surface area, calculated as: (Average Width * Site Length) * (Number of Points with Water Depths >0 / Total Number of Points Measured)

Maximum Depth (mm.):	240	Number of Transects:	20	Total Number of Points:	40

Number of Points with Water Depths > 0:	40	Number of Points on Islands:	0

Habitat Type Summary

Summary of habitat types by depth category expressed as a percentage of the number of points measured. Totals may not add to 100% due to points on land and missing data.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	75.00%	5.00%			80.00%
101 - 600	20.00%				20.00%
601 - 1000					0.00%
> 1000					0.00%
Totals	95.00%	5.00%	0.00%	0.00%	100.00%
			Percentage of Islands:		0.00%

Instream Cover Summary

Unembedded Cover

Summary of unembedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	2.50%				2.50%
101 - 600					0.00%
601 - 1000					0.00%
> 1000					0.00%
Totals	2.50%	0.00%	0.00%	0.00%	2.50%

Distribution of Unembedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	2.50%			

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-12SH | Year: 2001 | Sample: 1

Embedded Cover

Summary of embedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	5.00%				5.00%
101 - 600					0.00%
601 - 1000					0.00%
> 1000					0.00%
Totals	5.00%	0.00%	0.00%	0.00%	5.00%

Distribution of Embedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	2.50%	2.50%		

Vegetation Summary

Instream Vegetation

Percent of usable area with each instream vegetation type.

Filamentous Algae:	Non-Filamentous:	Moss:	Macrophytes:	Watercress:	Grass:	Terrestrial Plants:
32.50%	0.00%	0.00%	0.00%	0.00%	0.00%	2.50%

Riparian Vegetation

Dominant vegetation type found along each bank. Riparian zones are defined by distance from the water's edge.

Riparian Zone	Dominant Vegetation Type:									
	Left Bank					Right Bank				
	None	Cultivated	Meadow	Scrub	Forest	None	Cultivated	Meadow	Scrub	Forest
0 - 2m.	☐	☐	☑	☐	☐	☐	☐	☐	☑	☐
2 - 10m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐
10 - 30m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐
30-100m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐

Site Identification Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck **Stream Code:** CK7 **Site Code:** CK7-11SH **Year:** 2001 **Sample:** 1

	Grid	Easting	Northing	GIS Source		Deg.	Min.	Sec.
Uncorrected UTM's	9	357744.9	5022325.9		**Latitude**	45	20	20
Corrected UTM's	18	435405	5020928	other	**Longitud**	75	49	28

Source of Coordinates: Corrected with City **Datum:** NAD 83

Township City of Ottawa **Lot:** **Concession:**

MNR District: Kemptville **Watershed**

Site Descriptio Site is located in the middle of agriculture area within tree clusters lining the banks. Creek substrate and banks are clay with active erosion on left bank. Active channel width was usually less than 1m.

First Year Site Surveyed 2001

Sample is included in the following projects:

Project Code	Project Title	Lead Agency
STILLWATER C	Stillwater Creek Stream Habitat Assessment 2001	City of Ottawa (formerly RMOC)

Water Quality Summary Report:
Thermal Stability Rating and Hilsenhoff Index

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck Stream Code: CK7 Site Code: CK7-11SH Year: 2001 Sample: 1

Thermal Stability Rating

No water temperature data is available.
The maximum air temperature was 33.14°C on 2001-06-27.
Thermal Stability Rating: Unavailable: Water temperature is missing.

Site Features Affecting Water Quality

Springs and Seeps Active in Site: No

Chemical Discharges Present in Site: Yes

Chemical discharges will adversely affect water quality and will impair the accuracy of the Hilsenhoff Index.

Hilsenhoff Index

Each taxon of invertebrate is assigned a weighting based on its tolerance of organic pollution. The sum of the weighted scores gives an indication of the degree of organic pollution in the stream.

Survey Type (Invertebrate Sampling Technique) :

Invertebrate Taxon	Percent of Sample	Hilsenhoff Index Weighting	Score
Acarina (Water Mites)	0.00%	6	0.00
Oligochaeta (Segmented Worms	0.00%	8	0.00
Hirudinea (Leeches)	0.00%	8	0.00
Amphipoda (Scuds)	0.00%	6	0.00
Isopoda (Aquatic Sowbugs)	76.64%	8	6.13
Chironomidae (Blood Worms	12.15%	7	0.85
Simuliidae (Black Flies	1.40%	6	0.08
Tipulidae (Crane Flies	0.47%	3	0.01
Dipteran Sub-Groups / Lepidoptera *	0.93%	5	0.05
Ephemeroptera (Mayflies)	0.00%	5	0.00
Plecoptera (Stoneflies)	0.00%	1	0.00
Hemiptera (True Bugs)	0.00%	5	0.00
Coleoptera (Beetles)	2.80%	4	0.11
Megaloptera (Helgrammites	0.00%	4	0.00
Anisoptera (Dragonflies)	0.00%	5	0.00
Zygoptera (Damselflies)	0.00%	7	0.00
Trichoptera (Caddisflies)	3.27%	4	0.13
Gastropoda (Snails)	2.34%	8	0.19
Pelecypoda (Clams)	0.00%	6	0.00
Ostracoda (Seed Shrimp)	0.00%	7	0.00
Decapoda (Crayfish)	0.00%	6	0.00
Hydra	0.00%	5	0.00
Flatworms (Platyhelminthes)	0.00%	6	0.00
Misc. Diptera	0.00%	5	0.00
		Hilsenhoff Index	7.56

* Includes Ceratopogonidae, Culicidae, Tabanidae and Lepidoptera

Interpretation of Hilsenhoff Scores

Hilsenhoff Index	Water Quality	Degree of Organic Pollutio
0.00-3.75	Excellent	Organic Pollution Unlikely
3.76-4.25	Very Good	Possible Slight Organic Pollution
4.26-5.00	Good	Some Organic Pollution Probable
5.01-5.75	Fair	Fairly Substantial Organic Pollution Likely
5.76-6.50	Fairly Poor	Substantial Organic Pollution Likely
6.51-7.25	Poor	Very Substantial Organic Pollution Likely
7.26-10	Very Poor	Severe Organic Pollution Likely

A Hilsenhoff score of 7.56 indicates that there is likely severe organic pollution present.

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck Stream Code: CK7 Site Code: CK7-11SH Year: 2001 Sample: 1

Site Dimensions

Site Length (m.): 48.3
Average Width (m.): 0.825
Area (m²): 39.8
Usable Area (m²): 36.86

Usable area is defined as the wetted surface area, calculated as: (Average Width * Site Length) * (Number of Points with Water Depths >0 / Total Number of Points Measured)

Maximum Depth (mm.): 195
Number of Transects: 20
Total Number of Points: 40

Number of Points with Water Depths > 0: 37
Number of Points on Islands: 3

Habitat Type Summary

Summary of habitat types by depth category expressed as a percentage of the number of points measured. Totals may not add to 100% due to points on land and missing data.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	67.50%	7.50%	2.50%	2.50%	80.00%
101 - 600	12.50%				12.50%
601 - 1000					0.00%
> 1000					0.00%
Totals	80.00%	7.50%	2.50%	2.50%	92.50%
			Percentage of Islands:		7.50%

Instream Cover Summary

Unembedded Cover

Summary of unembedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Distribution of Unembedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank

Embedded Cover

Summary of embedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck Stream Code: CK7 Site Code: CK7-11SH Year: 2001 Sample: 1

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	5.41%	2.70%			8.11%
101 - 600					0.00%
601 - 1000					0.00%
> 1000					0.00%
Totals	5.41%	2.70%	0.00%	0.00%	8.11%

Distribution of Embedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
8.11%				

Vegetation Summary

Instream Vegetation

Percent of usable area with each instream vegetation type.

Filamentous Algae:	Non-Filamentous:	Moss:	Macrophytes:	Watercress:	Grass:	Terrestrial Plants:
0.00%	0.00%	0.00%	16.22%	0.00%	0.00%	0.00%

Riparian Vegetation

Dominant vegetation type found along each bank. Riparian zones are defined by distance from the water's edge.

Riparian Zone	Dominant Vegetation Type:									
	Left Bank					Right Bank				
	None	Cultivated	Meadow	Scrub	Forest	None	Cultivated	Meadow	Scrub	Forest
0 - 2m.	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑
2 - 10m.	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑
10 - 30m.	☐	☐	☐	☐	☑	☐	☑	☐	☐	☐
30-100m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐

Site Identification Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck **Stream Code:** CK7 **Site Code:** CK7-13SH **Year:** 2001 **Sample:** 1

	Grid	Easting	Northing	GIS Source		Deg.	Min.	Sec.
Uncorrected UTM's	9	356910.6	5022411.2		**Latitude**	45	20	23
Corrected UTM's	18	434573	5021029	other	**Longitud**	75	50	7

Source of Coordinates: Corrected with City **Datum:** NAD 83

Township City of Ottawa **Lot:** **Concession:**

MNR District: Kemptville **Watershed**

Site Descriptio Bottom of site begins 74 m upstream of cement out outfall. Site has bedrock bottom with lots of bolders and is completely shaded by riparian vegetation on both banks.

First Year Site Surveyed 2001

Sample is included in the following projects:

Project Code	Project Title	Lead Agency
STILLWATER C	Stillwater Creek Stream Habitat Assessment 2001	City of Ottawa (formerly RMOC)

Water Quality Summary Report:
Thermal Stability Rating and Hilsenhoff Index

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-13SH | Year: 2001 | Sample: 1

Thermal Stability Rating

The water temperature was 28.82°C at 16:00 on 2001-07-24.
The maximum air temperature was 32.17°C on 2001-07-24.
Thermal Stability Rating: Unstable

Site Features Affecting Water Quality

Springs and Seeps Active in Site: No

Chemical Discharges Present in Site: Yes

Chemical discharges will adversely affect water quality and will impair the accuracy of the Hilsenhoff Index.

Hilsenhoff Index

Each taxon of invertebrate is assigned a weighting based on its tolerance of organic pollution. The sum of the weighted scores gives an indication of the degree of organic pollution in the stream.

Survey Type (Invertebrate Sampling Technique) :

Invertebrate Taxon	Percent of Sample	Hilsenhoff Index Weighting	Score
Acarina (Water Mites)	0.50%	6	0.03
Oligochaeta (Segmented Worms	0.99%	8	0.08
Hirudinea (Leeches)	0.50%	8	0.04
Amphipoda (Scuds)	5.94%	6	0.36
Isopoda (Aquatic Sowbugs)	49.50%	8	3.96
Chironomidae (Blood Worms	4.95%	7	0.35
Simuliidae (Black Flies	0.50%	6	0.03
Tipulidae (Crane Flies	0.00%	3	0.00
Dipteran Sub-Groups / Lepidoptera *	1.98%	5	0.10
Ephemeroptera (Mayflies)	0.00%	5	0.00
Plecoptera (Stoneflies)	0.00%	1	0.00
Hemiptera (True Bugs)	0.00%	5	0.00
Coleoptera (Beetles)	16.83%	4	0.67
Megaloptera (Helgrammites	0.00%	4	0.00
Anisoptera (Dragonflies)	0.00%	5	0.00
Zygoptera (Damselflies)	0.00%	7	0.00
Trichoptera (Caddisflies)	14.85%	4	0.59
Gastropoda (Snails)	0.00%	8	0.00
Pelecypoda (Clams)	0.00%	6	0.00
Ostracoda (Seed Shrimp)	0.00%	7	0.00
Decapoda (Crayfish)	0.99%	6	0.06
Hydra	0.00%	5	0.00
Flatworms (Platyhelminthes)	2.48%	6	0.15
Misc. Diptera	0.00%	5	0.00
		Hilsenhoff Index	6.42

* Includes Ceratopogonidae, Culicidae, Tabanidae and Lepidoptera

Interpretation of Hilsenhoff Scores

Hilsenhoff Index	Water Quality	Degree of Organic Pollutio
0.00-3.75	Excellent	Organic Pollution Unlikely
3.76-4.25	Very Good	Possible Slight Organic Pollution
4.26-5.00	Good	Some Organic Pollution Probable
5.01-5.75	Fair	Fairly Substantial Organic Pollution Likely
5.76-6.50	Fairly Poor	Substantial Organic Pollution Likely
6.51-7.25	Poor	Very Substantial Organic Pollution Likely
7.26-10	Very Poor	Severe Organic Pollution Likely

A Hilsenhoff score of 6.42 indicates that there is likely substantial organic pollution present.

Fish Community Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-13SH | Year: 2001 | Sample: 1

Date of Assessment: 2001-08-13

Survey Type: Single Pass:

- ☐ Screening (# of runs = 1; effort<6 sec/m^2)
- ☑ Standard (# of runs = 1; effort>6 sec/m^2)
- ☐ Unknown (# of runs = 1; effort = unknown)

OR ☐ Multiple Pass (# of runs > 1)

Run 1 of 1	Start Time: 10:30:00 AM	Shocker Seconds: 2471	Effort (Seconds/m²): 26.56
	Stop Time: 11:00:00 AM	Area (m²): 93.03	

Summary of fish captured for which weight data was available, allowing estimation of biomass.

Species Code	Common Name	Scientific Name	Size Class (<100mm. T.L. = 1 >=100mm.T.L.=2) (Non-salmonids are all class 1)	Number Caught	Number Caught / 100 m²	Weight Caught (gm.)	Weight (gm.)/ 100m²	Estimated Biomass (g/100m²) (Only calculated for salmonids.)
212	Creek Chub	*Semotilus atromaculatus*	1	10	10.75	141.90	152.53	NA
281	Brook Stickleback	*Culaea inconstans*	1	7	7.52	6.50	6.99	NA
			Total All Species:	17	18.27	148.40	159.51	

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-13SH | Year: 2001 | Sample: 1

Site Dimensions

Site Length (m.):	Average Width (m.):	Area (m²):	Usable Area (m²):
40	2.379	95.1	93.03

Usable area is defined as the wetted surface area, calculated as: (Average Width * Site Length) * (Number of Points with Water Depths >0 / Total Number of Points Measured)

Maximum Depth (mm.):	Number of Transects:	Total Number of Points:
835	15	45

Number of Points with Water Depths > 0:	Number of Points on Islands:
44	1

Habitat Type Summary

Summary of habitat types by depth category expressed as a percentage of the number of points measured. Totals may not add to 100% due to points on land and missing data.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	42.22%	4.44%			46.67%
101 - 600	48.89%				48.89%
601 - 1000	2.22%				2.22%
> 1000					0.00%
Totals	93.33%	4.44%	0.00%	0.00%	97.78%
			Percentage of Islands:		2.22%

Instream Cover Summary

Unembedded Cover

Summary of unembedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	20.45%	2.27%			22.73%
101 - 600	18.18%				18.18%
601 - 1000	2.27%				2.27%
> 1000					0.00%
Totals	40.91%	2.27%	0.00%	0.00%	43.18%

Distribution of Unembedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
2.27%	15.91%	25.00%		

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-13SH | Year: 2001 | Sample: 1

Embedded Cover

Summary of embedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	15.91%	2.27%			18.18%
101 - 600	11.36%				11.36%
601 - 1000					0.00%
> 1000					0.00%
Totals	27.27%	2.27%	0.00%	0.00%	29.55%

Distribution of Embedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	15.91%	13.64%		

Vegetation Summary

Instream Vegetation

Percent of usable area with each instream vegetation type.

Filamentous Algae:	Non-Filamentous:	Moss:	Macrophytes:	Watercress:	Grass:	Terrestrial Plants:
11.36%	2.27%	15.91%	0.00%	0.00%	0.00%	0.00%

Riparian Vegetation

Dominant vegetation type found along each bank. Riparian zones are defined by distance from the water's edge.

Riparian Zone	Dominant Vegetation Type:									
	Left Bank					Right Bank				
	None	Cultivated	Meadow	Scrub	Forest	None	Cultivated	Meadow	Scrub	Forest
0 - 2m.	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑
2 - 10m.	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑
10 - 30m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐
30-100m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐

Site Identification Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck **Stream Code:** CK7 **Site Code:** CK7-14SH **Year:** 2001 **Sample:** 1

	Grid	Easting	Northing	GIS Source		Deg.	Min.	Sec.
Uncorrected UTM's	9	357206.4	5021989		**Latitude**	45	20	9
Corrected UTM's	18	434860	5020601	other	**Longitud**	75	49	53

Source of Coordinates: Corrected with City **Datum:** NAD 83

Township City of Ottawa **Lot:** **Concession:**

MNR District: Kemptville **Watershed**

Site Descriptio Site is located in the middle of the agricultural fields.

First Year Site Surveyed 2001

Sample is included in the following projects:

Project Code	Project Title	Lead Agency
STILLWATER C	Stillwater Creek Stream Habitat Assessment 2001	City of Ottawa (formerly RMOC)

Water Quality Summary Report:
Thermal Stability Rating and Hilsenhoff Index

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-14SH | Year: 2001 | Sample: 1

Thermal Stability Rating

The water temperature was 28.82°C at 16:00 on 2001-07-24.
The maximum air temperature was 32.17°C on 2001-07-24.
Thermal Stability Rating: Unstable

Site Features Affecting Water Quality

Springs and Seeps Active in Site: No

Chemical Discharges Present in Site: Yes

Chemical discharges will adversely affect water quality and will impair the accuracy of the Hilsenhoff Index.

Hilsenhoff Index

Each taxon of invertebrate is assigned a weighting based on its tolerance of organic pollution. The sum of the weighted scores gives an indication of the degree of organic pollution in the stream.

Survey Type (Invertebrate Sampling Technique) :

Invertebrate Taxon	Percent of Sample	Hilsenhoff Index Weighting	Score
Acarina (Water Mites)	0.00%	6	0.00
Oligochaeta (Segmented Worms	0.00%	8	0.00
Hirudinea (Leeches)	0.68%	8	0.05
Amphipoda (Scuds)	27.80%	6	1.67
Isopoda (Aquatic Sowbugs)	64.75%	8	5.18
Chironomidae (Blood Worms	0.68%	7	0.05
Simuliidae (Black Flies	0.00%	6	0.00
Tipulidae (Crane Flies	0.00%	3	0.00
Dipteran Sub-Groups / Lepidoptera *	0.34%	5	0.02
Ephemeroptera (Mayflies)	0.00%	5	0.00
Plecoptera (Stoneflies)	0.00%	1	0.00
Hemiptera (True Bugs)	0.00%	5	0.00
Coleoptera (Beetles)	2.37%	4	0.09
Megaloptera (Helgrammites	0.00%	4	0.00
Anisoptera (Dragonflies)	0.00%	5	0.00
Zygoptera (Damselflies)	0.00%	7	0.00
Trichoptera (Caddisflies)	2.71%	4	0.11
Gastropoda (Snails)	0.00%	8	0.00
Pelecypoda (Clams)	0.00%	6	0.00
Ostracoda (Seed Shrimp)	0.00%	7	0.00
Decapoda (Crayfish)	0.68%	6	0.04
Hydra	0.00%	5	0.00
Flatworms (Platyhelminthes)	0.00%	6	0.00
Misc. Diptera	0.00%	5	0.00
		Hilsenhoff Index	7.21

* Includes Ceratopogonidae, Culicidae, Tabanidae and Lepidoptera

Interpretation of Hilsenhoff Scores

Hilsenhoff Index	Water Quality	Degree of Organic Pollutio
0.00-3.75	Excellent	Organic Pollution Unlikely
3.76-4.25	Very Good	Possible Slight Organic Pollution
4.26-5.00	Good	Some Organic Pollution Probable
5.01-5.75	Fair	Fairly Substantial Organic Pollution Likely
5.76-6.50	Fairly Poor	Substantial Organic Pollution Likely
6.51-7.25	Poor	Very Substantial Organic Pollution Likely
7.26-10	Very Poor	Severe Organic Pollution Likely

A Hilsenhoff score of 7.21 indicates that there is likely very substantial organic pollution present.

Fish Community Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-14SH | Year: 2001 | Sample: 1

Date of Assessment: 2001-07-26

Survey Type: Single Pass:

- ☐ Screening (# of runs = 1; effort<6 sec/m^2)
- ☑ Standard (# of runs = 1; effort>6 sec/m^2)
- ☐ Unknown (# of runs = 1; effort = unknown)

OR ☐ Multiple Pass (# of runs > 1)

Run 1 of 1	Start Time: 8:00:00 AM	Shocker Seconds: 1957	Effort (Seconds/m²): 23.22
	Stop Time: 9:00:00 AM	Area (m²): 84.29	

Summary of fish captured for which weight data was available, allowing estimation of biomass.

Species Code	Common Name	Scientific Name	Size Class (<100mm. T.L. = 1 >=100mm.T.L.=2) (Non-salmonids are all class 1)	Number Caught	Number Caught / 100 m²	Weight Caught (gm.)	Weight (gm.)/ 100m²	Estimated Biomass (g/100m²) (Only calculated for salmonids.)
141	Central Mudminnow	*Umbra limi*	1	16	18.98	66.50	78.89	NA
212	Creek Chub	*Semotilus atromaculatus*	1	9	10.68	7.50	8.90	NA
281	Brook Stickleback	*Culaea inconstans*	1	3	3.56	2.50	2.97	NA
			Total All Species:	28	33.22	76.50	90.75	

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-14SH | Year: 2001 | Sample: 1

Site Dimensions

Site Length (m.): 44.6
Average Width (m.): 1.89
Area (m^2): 84.3
Usable Area (m^2): 84.29

Usable area is defined as the wetted surface area, calculated as: (Average Width * Site Length) * (Number of Points with Water Depths >0 / Total Number of Points Measured)

Maximum Depth (mm.): 210
Number of Transects: 20
Total Number of Points: 40

Number of Points with Water Depths > 0: 40
Number of Points on Islands: 0

Habitat Type Summary

Summary of habitat types by depth category expressed as a percentage of the number of points measured. Totals may not add to 100% due to points on land and missing data.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	77.50%				77.50%
101 - 600	22.50%				22.50%
601 - 1000					0.00%
> 1000					0.00%
Totals	100.00%	0.00%	0.00%	0.00%	100.00%
			Percentage of Islands:		0.00%

Instream Cover Summary

Unembedded Cover

Summary of unembedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	17.50%				17.50%
101 - 600	2.50%				2.50%
601 - 1000					0.00%
> 1000					0.00%
Totals	20.00%	0.00%	0.00%	0.00%	20.00%

Distribution of Unembedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	10.00%	10.00%		

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-14SH | Year: 2001 | Sample: 1

Embedded Cover

Summary of embedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	7.50%				7.50%
101 - 600	7.50%				7.50%
601 - 1000					0.00%
> 1000					0.00%
Totals	15.00%	0.00%	0.00%	0.00%	15.00%

Distribution of Embedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	7.50%	7.50%		

Vegetation Summary

Instream Vegetation

Percent of usable area with each instream vegetation type.

Filamentous Algae:	Non-Filamentous:	Moss:	Macrophytes:	Watercress:	Grass:	Terrestrial Plants:
57.50%	37.50%	12.50%	0.00%	0.00%	0.00%	0.00%

Riparian Vegetation

Dominant vegetation type found along each bank. Riparian zones are defined by distance from the water's edge.

Riparian Zone	Dominant Vegetation Type:									
	Left Bank					Right Bank				
	None	Cultivated	Meadow	Scrub	Forest	None	Cultivated	Meadow	Scrub	Forest
0 - 2m.	☐	☐	☑	☐	☐	☐	☐	☐	☑	☐
2 - 10m.	☑	☐	☑	☑	☐	☑	☐	☑	☑	☐
10 - 30m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐
30-100m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐

Site Identification Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck **Stream Code:** CK7 **Site Code:** CK7-01SH **Year:** 2001 **Sample:** 1

	Grid	Easting	Northing	GIS Source		Deg.	Min.	Sec.
Uncorrected UTM's	9	357711	5023463.7		**Latitude**	45	20	57
Corrected UTM's	18	435392	5022065	other	**Longitud**	75	49	29

Source of Coordinates: Corrected with City **Datum:** NAD 83

Township City of Ottawa **Lot:** **Concession:**

MNR District: Kemptville **Watershed**

Site Descriptio Bottom of site begins 25.4 m upstream of cement box culvert crossing under Carling Ave. Creek is very slow moving, bottom is boot sucking clay & sand.

First Year Site Surveyed 2001

Sample is included in the following projects:

Project Code	Project Title	Lead Agency
STILLWATER C	Stillwater Creek Stream Habitat Assessment 2001	City of Ottawa (formerly RMOC)

Water Quality Summary Report:
Thermal Stability Rating and Hilsenhoff Index

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-01SH | Year: 2001 | Sample: 1

Thermal Stability Rating

The water temperature was 26.11°C at 16:00 on 2001-06-27.

The maximum air temperature was 33.14°C on 2001-06-27.

Thermal Stability Rating: Unavailable: Date is outside of allowable window of July 1 - September 10.

Site Features Affecting Water Quality

Springs and Seeps Active in Site: No

Chemical Discharges Present in Site: Yes

Chemical discharges will adversely affect water quality and will impair the accuracy of the Hilsenhoff Index.

Hilsenhoff Index

Each taxon of invertebrate is assigned a weighting based on its tolerance of organic pollution. The sum of the weighted scores gives an indication of the degree of organic pollution in the stream.

Survey Type (Invertebrate Sampling Technique) :

Invertebrate Taxon	Percent of Sample	Hilsenhoff Index Weighting	Score
Acarina (Water Mites)	1.49%	6	0.09
Oligochaeta (Segmented Worms	15.67%	8	1.25
Hirudinea (Leeches)	0.00%	8	0.00
Amphipoda (Scuds)	7.46%	6	0.45
Isopoda (Aquatic Sowbugs)	0.75%	8	0.06
Chironomidae (Blood Worms	52.24%	7	3.66
Simuliidae (Black Flies	0.00%	6	0.00
Tipulidae (Crane Flies	0.00%	3	0.00
Dipteran Sub-Groups / Lepidoptera *	0.00%	5	0.00
Ephemeroptera (Mayflies)	0.00%	5	0.00
Plecoptera (Stoneflies)	0.00%	1	0.00
Hemiptera (True Bugs)	0.00%	5	0.00
Coleoptera (Beetles)	10.45%	4	0.42
Megaloptera (Helgrammites	0.00%	4	0.00
Anisoptera (Dragonflies)	0.00%	5	0.00
Zygoptera (Damselflies)	0.00%	7	0.00
Trichoptera (Caddisflies)	2.24%	4	0.09
Gastropoda (Snails)	2.99%	8	0.24
Pelecypoda (Clams)	0.75%	6	0.04
Ostracoda (Seed Shrimp)	0.75%	7	0.05
Decapoda (Crayfish)	0.00%	6	0.00
Hydra	0.00%	5	0.00
Flatworms (Platyhelminthes)	0.00%	6	0.00
Misc. Diptera	0.00%	5	0.00
		Hilsenhoff Index	6.35

* Includes Ceratopogonidae, Culicidae, Tabanidae and Lepidoptera

Interpretation of Hilsenhoff Scores

Hilsenhoff Index	Water Quality	Degree of Organic Pollutio
0.00-3.75	Excellent	Organic Pollution Unlikely
3.76-4.25	Very Good	Possible Slight Organic Pollution
4.26-5.00	Good	Some Organic Pollution Probable
5.01-5.75	Fair	Fairly Substantial Organic Pollution Likely
5.76-6.50	Fairly Poor	Substantial Organic Pollution Likely
6.51-7.25	Poor	Very Substantial Organic Pollution Likely
7.26-10	Very Poor	Severe Organic Pollution Likely

A Hilsenhoff score of 6.35 indicates that there is likely substantial organic pollution present.

Fish Community Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-01SH | Year: 2001 | Sample: 1

Date of Assessment: 2001-06-28

Survey Type: Single Pass:

- ☐ Screening (# of runs = 1; effort<6 sec/m^2)
- ☑ Standard (# of runs = 1; effort>6 sec/m^2)
- ☐ Unknown (# of runs = 1; effort = unknown)

OR ☐ Multiple Pass (# of runs > 1)

Run 1 of 1	Start Time: 7:45:00 AM	Shocker Seconds: 7100	Effort (Seconds/m²): 28.03
	Stop Time: 10:15:00 AM	Area (m²): 253.29	

Summary of fish captured for which weight data was available, allowing estimation of biomass.

Species Code	Common Name	Scientific Name	Size Class (<100mm. T.L. = 1 >=100mm.T.L.=2) (Non-salmonids are all class 1)	Number Caught	Number Caught / 100 m²	Weight Caught (gm.)	Weight (gm.)/ 100m²	Estimated Biomass (g/100m²) (Only calculated for salmonids.)
141	Central Mudminnow	*Umbra limi*	1	11	4.34	39.00	15.40	NA
163	White Sucker	*Catostomus commersoni*	1	42	16.58	111.20	43.90	NA
201	Spottail Shiner	*Notropis hudsonius*	1	6	2.37	6.10	2.41	NA
208	Bluntnose Minnow	*Pimephales notatus*	1	2	0.79	9.40	3.71	NA
281	Brook Stickleback	*Culaea inconstans*	1	3	1.18	2.40	0.95	NA
314	Bluegill	*Lepomis macrochirus*	1	11	4.34	25.00	9.87	NA
331	Yellow Perch	*Perca flavescens*	1	3	1.18	30.50	12.04	NA
341	Johnny Darter	*Etheostoma nigrum*	1	36	14.21	53.40	21.08	NA
			Total All Species:	114	45.01	277.00	109.36	

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-01SH | Year: 2001 | Sample: 1

Site Dimensions

Site Length (m.):	53.1	Average Width (m.):	4.77	Area (m^2):	253	Usable Area (m^2):	253.3

Usable area is defined as the wetted surface area, calculated as: (Average Width * Site Length) * (Number of Points with Water Depths >0 / Total Number of Points Measured)

Maximum Depth (mm.):	640	Number of Transects:	10	Total Number of Points:	60

Number of Points with Water Depths > 0:	60	Number of Points on Islands:	0

Habitat Type Summary

Summary of habitat types by depth category expressed as a percentage of the number of points measured. Totals may not add to 100% due to points on land and missing data.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	21.67%				21.67%
101 - 600	76.67%				76.67%
601 - 1000	1.67%				1.67%
> 1000					0.00%
Totals	100.00%	0.00%	0.00%	0.00%	100.00%
			Percentage of Islands:		0.00%

Instream Cover Summary

Unembedded Cover

Summary of unembedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100					0.00%
101 - 600	3.33%				3.33%
601 - 1000					0.00%
> 1000					0.00%
Totals	3.33%	0.00%	0.00%	0.00%	3.33%

Distribution of Unembedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	1.67%		1.67%	

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck Stream Code: CK7 Site Code: CK7-01SH Year: 2001 Sample: 1

Embedded Cover

Summary of embedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
	Pools	Glides	Riffles		Totals
			Slow	Fast	
0 - 100					0.00%
101 - 600	8.33%				8.33%
601 - 1000					0.00%
> 1000					0.00%
Totals	8.33%	0.00%	0.00%	0.00%	8.33%

Distribution of Embedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	5.00%	3.33%		

Vegetation Summary

Instream Vegetation

Percent of usable area with each instream vegetation type.

Filamentous Algae:	Non-Filamentous:	Moss:	Macrophytes:	Watercress:	Grass:	Terrestrial Plants:
0.00%	0.00%	0.00%	20.00%	0.00%	0.00%	0.00%

Riparian Vegetation

Dominant vegetation type found along each bank. Riparian zones are defined by distance from the water's edge.

Riparian Zone	Dominant Vegetation Type:									
	Left Bank					Right Bank				
	None	Cultivated	Meadow	Scrub	Forest	None	Cultivated	Meadow	Scrub	Forest
0 - 2m.	☐	☐	☐	☑	☐	☐	☐	☐	☑	☐
2 - 10m.	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑
10 - 30m.	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑
30-100m.	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑

Site Identification Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck **Stream Code:** CK7 **Site Code:** CK7-02SH **Year:** 2001 **Sample:** 1

	Grid	Easting	Northing	GIS Source		Deg.	Min.	Sec.
Uncorrected UTM's	9	357580.9	5023203.3		**Latitude**	45	20	48
Corrected UTM's	18	435257	5021808	other	**Longitud**	75	49	37

Source of Coordinates: Corrected with City **Datum:** NAD 83

Township City of Ottawa **Lot:** **Concession:**

MNR District: Kemptville **Watershed**

Site Descriptio Right bank is armoured with large boulders on outside bend of creek for erosion control. Large treed buffer zone on right bank before residential area. Left bank is lower in elevation and consists of meadow vegetation.

First Year Site Surveyed 2001

Sample is included in the following projects:

Project Code	Project Title	Lead Agency
STILLWATER C	Stillwater Creek Stream Habitat Assessment 2001	City of Ottawa (formerly RMOC)

Water Quality Summary Report:
Thermal Stability Rating and Hilsenhoff Index

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-02SH | Year: 2001 | Sample: 1

Thermal Stability Rating

The water temperature was 26.11°C at 16:00 on 2001-06-27.

The maximum air temperature was 33.14°C on 2001-06-27.

Thermal Stability Rating: Unavailable: Date is outside of allowable window of July 1 - September 10.

Site Features Affecting Water Quality

Springs and Seeps Active in Site: No

Chemical Discharges Present in Site: Yes

Chemical discharges will adversely affect water quality and will impair the accuracy of the Hilsenhoff Index.

Hilsenhoff Index

Each taxon of invertebrate is assigned a weighting based on its tolerance of organic pollution. The sum of the weighted scores gives an indication of the degree of organic pollution in the stream.

Survey Type (Invertebrate Sampling Technique) :

Invertebrate Taxon	Percent of Sample	Hilsenhoff Index Weighting	Score
Acarina (Water Mites)	0.00%	6	0.00
Oligochaeta (Segmented Worms	7.61%	8	0.61
Hirudinea (Leeches)	0.00%	8	0.00
Amphipoda (Scuds)	64.21%	6	3.85
Isopoda (Aquatic Sowbugs)	6.60%	8	0.53
Chironomidae (Blood Worms	4.31%	7	0.30
Simuliidae (Black Flies	0.00%	6	0.00
Tipulidae (Crane Flies	0.00%	3	0.00
Dipteran Sub-Groups / Lepidoptera *	0.76%	5	0.04
Ephemeroptera (Mayflies)	0.00%	5	0.00
Plecoptera (Stoneflies)	0.00%	1	0.00
Hemiptera (True Bugs)	0.00%	5	0.00
Coleoptera (Beetles)	1.52%	4	0.06
Megaloptera (Helgrammites	0.00%	4	0.00
Anisoptera (Dragonflies)	0.00%	5	0.00
Zygoptera (Damselflies)	0.00%	7	0.00
Trichoptera (Caddisflies)	5.33%	4	0.21
Gastropoda (Snails)	0.00%	8	0.00
Pelecypoda (Clams)	0.76%	6	0.05
Ostracoda (Seed Shrimp)	0.00%	7	0.00
Decapoda (Crayfish)	0.25%	6	0.02
Hydra	0.00%	5	0.00
Flatworms (Platyhelminthes)	8.63%	6	0.52
Misc. Diptera	0.00%	5	0.00
		Hilsenhoff Index	6.18

* Includes Ceratopogonidae, Culicidae, Tabanidae and Lepidoptera

Interpretation of Hilsenhoff Scores

Hilsenhoff Index	Water Quality	Degree of Organic Pollutio
0.00-3.75	Excellent	Organic Pollution Unlikely
3.76-4.25	Very Good	Possible Slight Organic Pollution
4.26-5.00	Good	Some Organic Pollution Probable
5.01-5.75	Fair	Fairly Substantial Organic Pollution Likely
5.76-6.50	Fairly Poor	Substantial Organic Pollution Likely
6.51-7.25	Poor	Very Substantial Organic Pollution Likely
7.26-10	Very Poor	Severe Organic Pollution Likely

A Hilsenhoff score of 6.18 indicates that there is likely substantial organic pollution present.

Fish Community Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck Stream Code: CK7 Site Code: CK7-02SH Year: 2001 Sample: 1

Date of Assessment: 2001-07-25

Survey Type: Single Pass:

- ☐ Screening (# of runs = 1; effort<6 sec/m^2)
- ☑ Standard (# of runs = 1; effort>6 sec/m^2)
- ☐ Unknown (# of runs = 1; effort = unknown)

OR

- ■ Multiple Pass (# of runs > 1)

Run 1 of 1	Start Time: 8:30:00 AM	Shocker Seconds: 3691	Effort (Seconds/m²): 23.75
	Stop Time: 10:30:00 AM	Area (m²): 155.40	

Summary of fish captured for which weight data was available, allowing estimation of biomass.

Species Code	Common Name	Scientific Name	Size Class (<100mm. T.L. = 1 >=100mm.T.L.=2) (Non-salmonids are all class 1)	Number Caught	Number Caught / 100 m²	Weight Caught (gm.)	Weight (gm.)/ 100m²	Estimated Biomass (g/100m²) (Only calculated for salmonids.)
141	Central Mudminnow	*Umbra limi*	1	38	24.45	137.20	88.29	NA
163	White Sucker	*Catostomus commersoni*	1	28	18.02	360.70	232.11	NA
186	Common Carp	*Cyprinus carpio*	1	1	0.64			NA
198	Common Shiner	*Luxilus cornutus*	1	3	1.93	26.70	17.18	NA
201	Spottail Shiner	*Notropis hudsonius*	1	86	55.34	157.00	101.03	NA
206	Mimic Shiner	*Notropis volucellus*	1	4	2.57	28.10	18.08	NA
212	Creek Chub	*Semotilus atromaculatus*	1	25	16.09	298.10	191.83	NA
214	Pearl Dace	*Margariscus margarita*	1	4	2.57	15.10	9.72	NA
281	Brook Stickleback	*Culaea inconstans*	1	3	1.93	2.70	1.74	NA
314	Bluegill	*Lepomis macrochirus*	1	2	1.29	11.50	7.40	NA
331	Yellow Perch	*Perca flavescens*	1	53	34.11	231.80	149.16	NA
341	Johnny Darter	*Etheostoma nigrum*	1	3	1.93	4.10	2.64	NA
380	Sculpin Family		1	2	1.29	0.60	0.39	NA
			Total All Species:	252	162.16	1273.60	819.56	

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-02SH | Year: 2001 | Sample: 1

Site Dimensions

Site Length (m.): 50.4
Average Width (m.): 3.083
Area (m²): 155
Usable Area (m²): 155.4

Usable area is defined as the wetted surface area, calculated as: (Average Width * Site Length) * (Number of Points with Water Depths >0 / Total Number of Points Measured)

Maximum Depth (mm.): 555
Number of Transects: 12
Total Number of Points: 60

Number of Points with Water Depths > 0: 60
Number of Points on Islands: 0

Habitat Type Summary

Summary of habitat types by depth category expressed as a percentage of the number of points measured. Totals may not add to 100% due to points on land and missing data.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	33.33%				33.33%
101 - 600	66.67%				66.67%
601 - 1000					0.00%
> 1000					0.00%
Totals	100.00%	0.00%	0.00%	0.00%	100.00%
			Percentage of Islands:		0.00%

Instream Cover Summary

Unembedded Cover

Summary of unembedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	6.67%				6.67%
101 - 600	8.33%				8.33%
601 - 1000					0.00%
> 1000					0.00%
Totals	15.00%	0.00%	0.00%	0.00%	15.00%

Distribution of Unembedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
		15.00%		

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-02SH | Year: 2001 | Sample: 1

Embedded Cover

Summary of embedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	8.33%				8.33%
101 - 600	30.00%				30.00%
601 - 1000					0.00%
> 1000					0.00%
Totals	38.33%	0.00%	0.00%	0.00%	38.33%

Distribution of Embedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	11.67%	20.00%	8.33%	

Vegetation Summary

Instream Vegetation

Percent of usable area with each instream vegetation type.

Filamentous Algae:	Non-Filamentous:	Moss:	Macrophytes:	Watercress:	Grass:	Terrestrial Plants:
30.00%	15.00%	16.67%	31.67%	0.00%	1.67%	0.00%

Riparian Vegetation

Dominant vegetation type found along each bank. Riparian zones are defined by distance from the water's edge.

Riparian Zone	Dominant Vegetation Type:									
	Left Bank					Right Bank				
	None	Cultivated	Meadow	Scrub	Forest	None	Cultivated	Meadow	Scrub	Forest
0 - 2m.	☐	☐	☐	☑	☐	☐	☐	☐	☑	☐
2 - 10m.	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑
10 - 30m.	☐	☐	☑	☐	☑	☑	☐	☐	☐	☐
30-100m.	☐	☐	☑	☐	☐	☑	☐	☐	☐	☐

Site Identification Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck **Stream Code:** CK7 **Site Code:** CK7-03SH **Year:** 2001 **Sample:** 1

	Grid	Easting	Northing	GIS Source		Deg.	Min.	Sec.
Uncorrected UTM's	9	357030.4	5022626.1		Latitude	45	20	30
Corrected UTM's	18	434696	5021241	other	Longitud	75	50	1

Source of Coordinates: Corrected with City **Datum:** NAD 83

Township City of Ottawa **Lot:** **Concession:**

MNR District: Kemptville **Watershed**

Site Descriptio Site begins downstream of tributary crossing under Queensway. Right bank is meadow with tall grasses, left bank is meadow wit the odd tree. The bottom and left bank consists maily of bedrock and large rock in this site with an abundance of moss and algae.

First Year Site Surveyed 2001

Sample is included in the following projects:

Project Code	Project Title	Lead Agency
STILLWATER C	Stillwater Creek Stream Habitat Assessment 2001	City of Ottawa (formerly RMOC)

Water Quality Summary Report:
Thermal Stability Rating and Hilsenhoff Index

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck Stream Code: CK7 Site Code: CK7-03SH Year: 2001 Sample: 1

Thermal Stability Rating

The water temperature was 29.77°C at 16:00 on 2001-06-27.

The maximum air temperature was 33.14°C on 2001-06-27.

Thermal Stability Rating: Unavailable: Date is outside of allowable window of July 1 - September 10.

Site Features Affecting Water Quality

Springs and Seeps Active in Site: No

Chemical Discharges Present in Site: Yes

Chemical discharges will adversely affect water quality and will impair the accuracy of the Hilsenhoff Index.

Hilsenhoff Index

Each taxon of invertebrate is assigned a weighting based on its tolerance of organic pollution. The sum of the weighted scores gives an indication of the degree of organic pollution in the stream.

Survey Type (Invertebrate Sampling Technique) :

Invertebrate Taxon	Percent of Sample	Hilsenhoff Index Weighting	Score
Acarina (Water Mites)	0.00%	6	0.00
Oligochaeta (Segmented Worms	3.24%	8	0.26
Hirudinea (Leeches)	0.00%	8	0.00
Amphipoda (Scuds)	10.03%	6	0.60
Isopoda (Aquatic Sowbugs)	35.99%	8	2.88
Chironomidae (Blood Worms	19.17%	7	1.34
Simuliidae (Black Flies	3.83%	6	0.23
Tipulidae (Crane Flies	1.18%	3	0.04
Dipteran Sub-Groups / Lepidoptera *	0.00%	5	0.00
Ephemeroptera (Mayflies)	0.00%	5	0.00
Plecoptera (Stoneflies)	1.47%	1	0.01
Hemiptera (True Bugs)	0.00%	5	0.00
Coleoptera (Beetles)	11.80%	4	0.47
Megaloptera (Helgrammites	0.00%	4	0.00
Anisoptera (Dragonflies)	0.00%	5	0.00
Zygoptera (Damselflies)	0.00%	7	0.00
Trichoptera (Caddisflies)	11.80%	4	0.47
Gastropoda (Snails)	0.29%	8	0.02
Pelecypoda (Clams)	0.00%	6	0.00
Ostracoda (Seed Shrimp)	0.00%	7	0.00
Decapoda (Crayfish)	0.29%	6	0.02
Hydra	0.00%	5	0.00
Flatworms (Platyhelminthes)	0.88%	6	0.05
Misc. Diptera	0.00%	5	0.00
		Hilsenhoff Index	6.40

* Includes Ceratopogonidae, Culicidae, Tabanidae and Lepidoptera

Interpretation of Hilsenhoff Scores

Hilsenhoff Index	Water Quality	Degree of Organic Pollutio
0.00-3.75	Excellent	Organic Pollution Unlikely
3.76-4.25	Very Good	Possible Slight Organic Pollution
4.26-5.00	Good	Some Organic Pollution Probable
5.01-5.75	Fair	Fairly Substantial Organic Pollution Likely
5.76-6.50	Fairly Poor	Substantial Organic Pollution Likely
6.51-7.25	Poor	Very Substantial Organic Pollution Likely
7.26-10	Very Poor	Severe Organic Pollution Likely

A Hilsenhoff score of 6.40 indicates that there is likely substantial organic pollution present.

Fish Community Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-03SH | Year: 2001 | Sample: 1

Date of Assessment: 2001-07-03

Survey Type: Single Pass:

- ☐ Screening (# of runs = 1; effort<6 sec/m^2)
- ☑ Standard (# of runs = 1; effort>6 sec/m^2)
- ☐ Unknown (# of runs = 1; effort = unknown)

OR ☐ Multiple Pass (# of runs > 1)

Run 1 of 1	Start Time: 8:10:00 AM	Shocker Seconds: 7947	Effort (Seconds/m²): 51.05
	Stop Time: 10:45:00 AM	Area (m²): 155.67	

Summary of fish captured for which weight data was available, allowing estimation of biomass.

Species Code	Common Name	Scientific Name	Size Class (<100mm. T.L. = 1 >=100mm.T.L.=2) (Non-salmonids are all class 1)	Number Caught	Number Caught / 100 m²	Weight Caught (gm.)	Weight (gm.)/ 100m²	Estimated Biomass (g/100m²) (Only calculated for salmonids.)
141	Central Mudminnow	*Umbra limi*	1	143	91.86	412.50	264.98	NA
163	White Sucker	*Catostomus commersoni*	1	4	2.57	43.50	27.94	NA
182	Northern Redbelly Dace	*Phoxinus eos*	1	45	28.91	121.00	77.73	NA
211	Longnose Dace	*Rhinichthys cataractae*	1	38	24.41	168.00	107.92	NA
212	Creek Chub	*Semotilus atromaculatus*	1	60	38.54	204.00	131.05	NA
214	Pearl Dace	*Margariscus margarita*	1	35	22.48	153.00	98.28	NA
281	Brook Stickleback	*Culaea inconstans*	1	175	112.42	165.50	106.31	NA
380	Sculpin Family		1	17	10.92	49.50	31.80	NA
			Total All Species:	517	332.11	1317.00	846.02	

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-03SH | Year: 2001 | Sample: 1

Site Dimensions

Site Length (m.): 54.2
Average Width (m.): 2.921
Area (m²): 158
Usable Area (m²): 155.7

Usable area is defined as the wetted surface area, calculated as: (Average Width * Site Length) * (Number of Points with Water Depths >0 / Total Number of Points Measured)

Maximum Depth (mm.): 330
Number of Transects: 12
Total Number of Points: 60

Number of Points with Water Depths > 0: 59
Number of Points on Islands: 1

Habitat Type Summary

Summary of habitat types by depth category expressed as a percentage of the number of points measured. Totals may not add to 100% due to points on land and missing data.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	26.67%	8.33%	1.67%	1.67%	38.33%
101 - 600	50.00%	8.33%	1.67%		60.00%
601 - 1000					0.00%
> 1000					0.00%
Totals	76.67%	16.67%	3.33%	1.67%	98.33%
			Percentage of Islands:		1.67%

Instream Cover Summary

Unembedded Cover

Summary of unembedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	16.95%	8.47%	1.69%	1.69%	28.81%
101 - 600	38.98%	8.47%	1.69%		49.15%
601 - 1000					0.00%
> 1000					0.00%
Totals	55.93%	16.95%	3.39%	1.69%	77.97%

Distribution of Unembedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	40.68%	11.86%	27.12%	

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck	Stream Code: CK7	Site Code: CK7-03SH	Year: 2001	Sample: 1

Embedded Cover

Summary of embedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100					0.00%
101 - 600	3.39%				3.39%
601 - 1000					0.00%
> 1000					0.00%
Totals	3.39%	0.00%	0.00%	0.00%	3.39%

Distribution of Embedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	3.39%			

Vegetation Summary

Instream Vegetation

Percent of usable area with each instream vegetation type.

Filamentous Algae:	Non-Filamentous:	Moss:	Macrophytes:	Watercress:	Grass:	Terrestrial Plants:
28.81%	38.98%	33.90%	64.41%	0.00%	0.00%	0.00%

Riparian Vegetation

Dominant vegetation type found along each bank. Riparian zones are defined by distance from the water's edge.

Riparian Zone	Dominant Vegetation Type:									
	Left Bank					Right Bank				
	None	Cultivated	Meadow	Scrub	Forest	None	Cultivated	Meadow	Scrub	Forest
0 - 2m.	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐
2 - 10m.	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐
10 - 30m.	☑	☐	☐	☐	☐	☐	☐	☐	☐	☑
30-100m.	☑	☐	☐	☐	☐	☑	☐	☐	☐	☐

Site Identification Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck **Stream Code:** CK7 **Site Code:** CK7-04SH **Year:** 2001 **Sample:** 1

	Grid	Easting	Northing	GIS Source		Deg.	Min.	Sec.
Uncorrected UTM's	9	356629.2	5022689		**Latitude**	45	20	33
Corrected UTM's	18	434297	5021311	other	**Longitud**	75	50	21

Source of Coordinates: Corrected with City **Datum:** NAD 83

Township City of Ottawa **Lot:** **Concession:**

MNR District: Kemptville **Watershed**

Site Descriptio Site is just downstream of a bridge and weir. There is very low flow with low, meadowed banks and a weedy creek bed. Depth of creek varies from 10 cm to 40cm.

First Year Site Surveyed 2001

Sample is included in the following projects:

Project Code	Project Title	Lead Agency
STILLWATER C	Stillwater Creek Stream Habitat Assessment 2001	City of Ottawa (formerly RMOC)

Water Quality Summary Report:
Thermal Stability Rating and Hilsenhoff Index

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-04SH | Year: 2001 | Sample: 1

Thermal Stability Rating

The water temperature was 29.77°C at 16:00 on 2001-06-27.

The maximum air temperature was 33.14°C on 2001-06-27.

Thermal Stability Rating: Unavailable: Date is outside of allowable window of July 1 - September 10.

Site Features Affecting Water Quality

Springs and Seeps Active in Site: No

Chemical Discharges Present in Site: Yes

Chemical discharges will adversely affect water quality and will impair the accuracy of the Hilsenhoff Index.

Hilsenhoff Index

Each taxon of invertebrate is assigned a weighting based on its tolerance of organic pollution. The sum of the weighted scores gives an indication of the degree of organic pollution in the stream.

Survey Type (Invertebrate Sampling Technique) :

Invertebrate Taxon	Percent of Sample	Hilsenhoff Index Weighting	Score
Acarina (Water Mites)	0.42%	6	0.03
Oligochaeta (Segmented Worms	0.42%	8	0.03
Hirudinea (Leeches)	2.54%	8	0.20
Amphipoda (Scuds)	11.44%	6	0.69
Isopoda (Aquatic Sowbugs)	25.85%	8	2.07
Chironomidae (Blood Worms	40.25%	7	2.82
Simuliidae (Black Flies	0.00%	6	0.00
Tipulidae (Crane Flies	0.00%	3	0.00
Dipteran Sub-Groups / Lepidoptera *	0.00%	5	0.00
Ephemeroptera (Mayflies)	4.24%	5	0.21
Plecoptera (Stoneflies)	0.00%	1	0.00
Hemiptera (True Bugs)	0.00%	5	0.00
Coleoptera (Beetles)	11.86%	4	0.47
Megaloptera (Helgrammites	0.00%	4	0.00
Anisoptera (Dragonflies)	0.85%	5	0.04
Zygoptera (Damselflies)	0.00%	7	0.00
Trichoptera (Caddisflies)	0.00%	4	0.00
Gastropoda (Snails)	2.12%	8	0.17
Pelecypoda (Clams)	0.00%	6	0.00
Ostracoda (Seed Shrimp)	0.00%	7	0.00
Decapoda (Crayfish)	0.00%	6	0.00
Hydra	0.00%	5	0.00
Flatworms (Platyhelminthes)	0.00%	6	0.00
Misc. Diptera	0.00%	5	0.00
		Hilsenhoff Index	6.73

* Includes Ceratopogonidae, Culicidae, Tabanidae and Lepidoptera

Interpretation of Hilsenhoff Scores

Hilsenhoff Index	Water Quality	Degree of Organic Pollutio
0.00-3.75	Excellent	Organic Pollution Unlikely
3.76-4.25	Very Good	Possible Slight Organic Pollution
4.26-5.00	Good	Some Organic Pollution Probable
5.01-5.75	Fair	Fairly Substantial Organic Pollution Likely
5.76-6.50	Fairly Poor	Substantial Organic Pollution Likely
6.51-7.25	Poor	Very Substantial Organic Pollution Likely
7.26-10	Very Poor	Severe Organic Pollution Likely

A Hilsenhoff score of 6.73 indicates that there is likely very substantial organic pollution present.

Fish Community Summary

Date Report Printed: 2009-06-09

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-04SH | Year: 2001 | Sample: 1

Date of Assessment: 2001-07-04

Survey Type: Single Pass:

- ☐ Screening (# of runs = 1; effort<6 sec/m^2)
- ☑ Standard (# of runs = 1; effort>6 sec/m^2)
- ☐ Unknown (# of runs = 1; effort = unknown)

OR ☐ Multiple Pass (# of runs > 1)

Run 1 of 1	Start Time: 8:20:00 AM	Shocker Seconds: 5834	Effort (Seconds/m²): 41.51
	Stop Time: 10:15:00 AM	Area (m²): 140.53	

Summary of fish captured for which weight data was available, allowing estimation of biomass.

Species Code	Common Name	Scientific Name	Size Class (<100mm. T.L. = 1 >=100mm.T.L.=2) (Non-salmonids are all class 1)	Number Caught	Number Caught / 100 m²	Weight Caught (gm.)	Weight (gm.)/ 100m²	Estimated Biomass (g/100m²) (Only calculated for salmonids.)
141	Central Mudminnow	*Umbra limi*	1	198	140.89	497.00	353.66	NA
182	Northern Redbelly Dace	*Phoxinus eos*	1	2	1.42	1.30	0.93	NA
281	Brook Stickleback	*Culaea inconstans*	1	65	46.25	27.00	19.21	NA
			Total All Species:	265	188.57	525.30	373.79	

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-04SH | Year: 2001 | Sample: 1

Site Dimensions

Site Length (m.):	Average Width (m.):	Area (m^2):	Usable Area (m^2):
54.1	2.642	143	140.5

Usable area is defined as the wetted surface area, calculated as: (Average Width * Site Length) * (Number of Points with Water Depths >0 / Total Number of Points Measured)

Maximum Depth (mm.):	Number of Transects:	Total Number of Points:
240	12	60

Number of Points with Water Depths > 0:	Number of Points on Islands:
59	1

Habitat Type Summary

Summary of habitat types by depth category expressed as a percentage of the number of points measured. Totals may not add to 100% due to points on land and missing data.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	41.67%				41.67%
101 - 600	56.67%				56.67%
601 - 1000					0.00%
> 1000					0.00%
Totals	98.33%	0.00%	0.00%	0.00%	98.33%
			Percentage of Islands:		1.67%

Instream Cover Summary

Unembedded Cover

Summary of unembedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	15.25%				15.25%
101 - 600	38.98%				38.98%
601 - 1000					0.00%
> 1000					0.00%
Totals	54.24%	0.00%	0.00%	0.00%	54.24%

Distribution of Unembedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	3.39%	6.78%	50.85%	

Channel Structure Summary

(Point Transect Data)

Stream Name: Stillwater Ck | Stream Code: CK7 | Site Code: CK7-04SH | Year: 2001 | Sample: 1

Embedded Cover

Summary of embedded, instream cover reported as the percentage of the usable area by habitat type and depth category.

Depth Categories (mm.)	Habitat Categories				
			Riffles		
	Pools	Glides	Slow	Fast	Totals
0 - 100	6.78%				6.78%
101 - 600	11.86%				11.86%
601 - 1000					0.00%
> 1000					0.00%
Totals	18.64%	0.00%	0.00%	0.00%	18.64%

Distribution of Embedded Instream Cover: Percentage of usable points with each type of cover.

Wood	Flat Rock	Round Rock	Macrophyte	Bank
	11.86%	5.08%	1.69%	

Vegetation Summary

Instream Vegetation

Percent of usable area with each instream vegetation type.

Filamentous Algae:	Non-Filamentous:	Moss:	Macrophytes:	Watercress:	Grass:	Terrestrial Plants:
64.41%	67.80%	30.51%	72.88%	0.00%	1.69%	1.69%

Riparian Vegetation

Dominant vegetation type found along each bank. Riparian zones are defined by distance from the water's edge.

Riparian Zone	Dominant Vegetation Type:									
	Left Bank					Right Bank				
	None	Cultivated	Meadow	Scrub	Forest	None	Cultivated	Meadow	Scrub	Forest
0 - 2m.	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐
2 - 10m.	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐
10 - 30m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐
30-100m.	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐