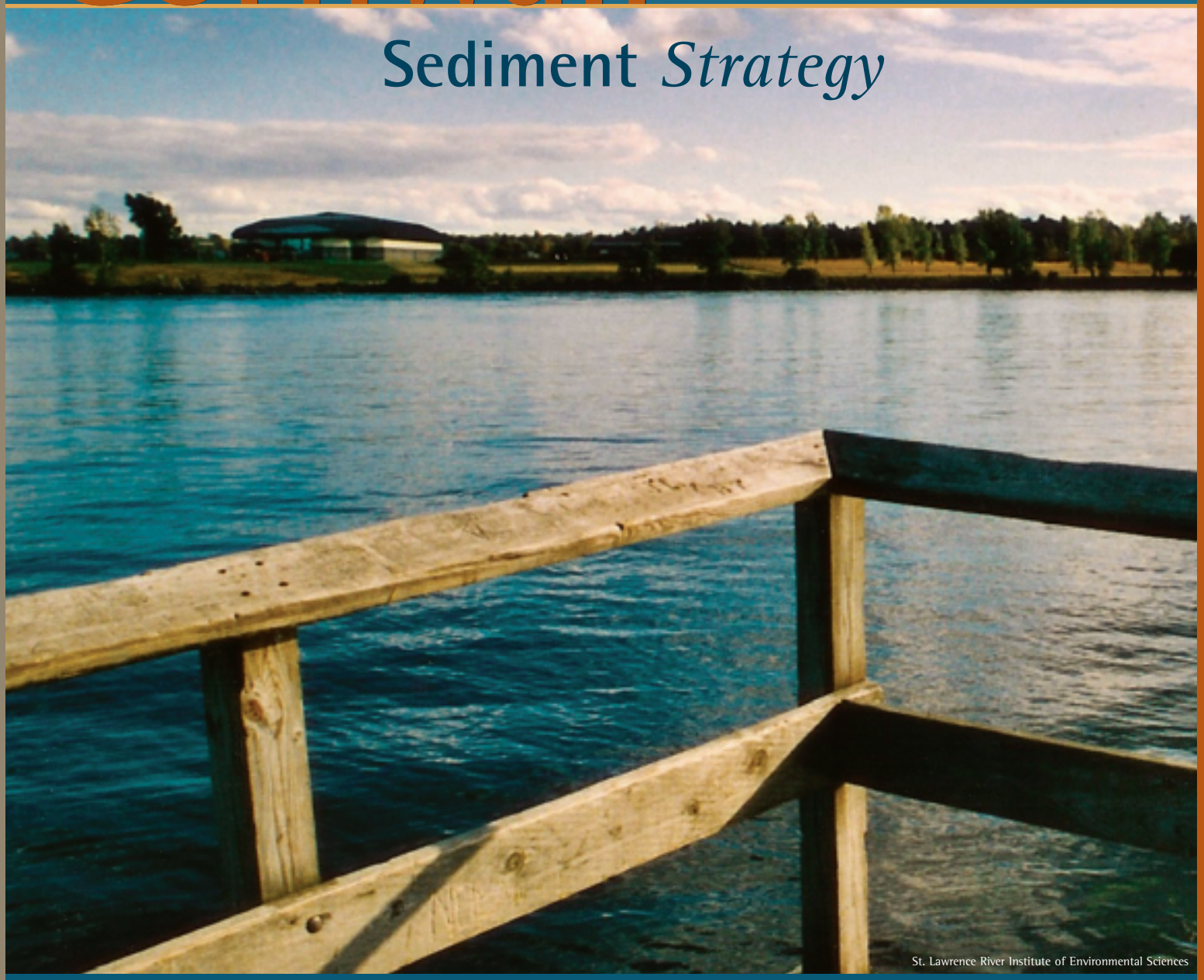
a unique *multi-agency* and community partnership for the *long-term* environmental protection of the *Cornwall* waterfront.

Cornwall

Sediment *Strategy*



St. Lawrence River Institute of Environmental Sciences

Canada

Ontario

Ministry of the Environment

Environment Canada

Environment Canada

Cornwall Sediment Strategy:
A Long-term Commitment to Environmental Protection

The Cornwall Sediment Strategy is a long-term management plan for historically contaminated sediments in three zones of the St. Lawrence River at Cornwall. Continued natural recovery, administrative controls and long-term environmental monitoring are all part of this strategy, developed through a science-based consensus of community partners, environmental groups, and federal/provincial, municipal, and Mohawk governments.

An *Environmental* Legacy

The City of Cornwall Ontario has been a centre for industrial activity since the turn of the 20th century. A cluster of industries settled on the north shore of the St. Lawrence River, taking advantage of the large volume of fresh water available for industrial processes and transportation.

Three main industries operated plants at the Cornwall waterfront—a pulp and paper mill, Domtar Fine Papers (previously Howard Smith Paper Mill), a chlor-alkali manufacturer, ICI Canada Incorporated, (previously CIL Cornwall Works), and a rayon manufacturer, Courtaulds Fibers Canada.

Over the decades of industrial operations at Cornwall, contaminants such as mercury were directly discharged from these, and other smaller industries, to the St. Lawrence River. The river also received contamination from other sources, such as urban and rural surface runoff, atmospheric deposition, and sources upstream of Cornwall. The result is the contamination of three zones of sediment along the Cornwall waterfront.

What is *Mercury*?

Mercury is a naturally occurring element. It can exist in a gaseous, liquid or solid form. Mercury is commonly used in consumer products to conduct electricity or to measure temperature and pressure.

Mercury's ability to readily change physical states allows it to circulate in air, water, and soil. As an element, mercury cannot be destroyed by combustion or through biological degradation.

Mercury may be deposited into water bodies, either directly from water discharge, air deposition or indirectly in runoff.

Mercury is a persistent toxic substance that has been widely recognized as a threat to the environment and human health. It can build up in living organisms, inflicting increasing levels of harm on higher order species including predatory fish and fish-eating birds and mammals.

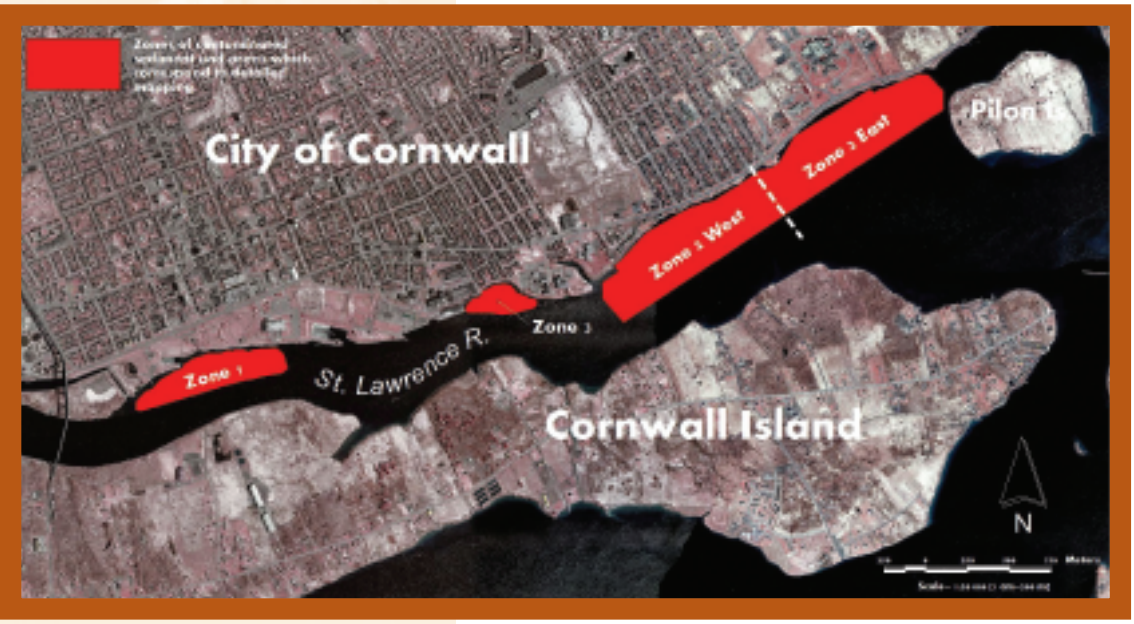
For more information: *http:www.ec.gc.ca/MERCURY/*

Source Control

Environmental regulations and industrial practices have changed significantly over the last 30 years. Government regulations have evolved together with improved scientific understanding of the potential impact of contamination on health and the environment.

As regulations evolved, environmental control measures were implemented at Cornwall, in the late 1960s. The Ontario Ministry of the Environment initiated an industrial effluent regulatory program and spills reporting legislation in the 1980s. Today, there are no industrial releases of mercury to the St. Lawrence River at Cornwall.

ICI ceased operation of its mercury cell chlor-alkali plant in 1995 and completed decommissioning this facility in 1996. In 1992 Courtaulds closed its facility and ceased operations at its Cornwall site. Domtar has not used mercury-based products at its facility since the early 1960s and in the early 1990s installed secondary wastewater treatment as an added environmental protection. The once major direct sources of local industrial contamination to the river have been controlled.



Environment Canada

St. Lawrence Remedial *Action Plan*

In 1985, the Cornwall-Massena section of the St. Lawrence River was designated a Great Lakes-St. Lawrence Area of Concern (AOC) by the International Joint Commission. The AOC stretches from the Moses-Saunders Power Dam in the west, at Cornwall and downstream through Lake St. Francis to Valleyfield, Quebec.

Separate Remedial Action Plans (RAPs) were developed for Canadian and U.S. Areas of Concern in this section of the St. Lawrence River. Each RAP was developed through an in-depth process of public, inter-agency and international consultation.

Recommendations of the St. Lawrence River (Cornwall) RAP were documented in the Stage 2 Report, released in 1997. Two of the recommendations concern contaminated sediment in the Canadian section of the St. Lawrence River, and called for controls on sources of contamination and development of an appropriate sediment management strategy.

Working Together for the Environment

In response to the RAP recommendations for contaminated sediment, Environment Canada and the Ontario Ministry of the Environment invited a community of partners to join them in developing the Cornwall Sediment Strategy. The result is a strong collaboration between community partners, environmental groups, and federal/provincial, municipal, and Mohawk governments. A dedicated group of about 50 people, representing 14 different groups, met through a series of facilitated workshops to review and discuss environmental science and options.

The strategy represents a science-based consensus on the most appropriate course of action for dealing with contaminated sediments along the Cornwall waterfront and harmonizes the regulatory responsibilities of several partner agencies. Through their participation these agencies have reinforced their long-term commitment to environmental protection.

Community Partners

Representatives from these organizations met from 2000 to 2005 to discuss and debate environmental science and options for dealing with Cornwall's contaminated sediments. They were joined by nationally and internationally recognized scientific experts.

- City of Cornwall
- Mohawk Council of Akwesasne – Department of Environment
- Environment Canada
- Ontario Ministry of the Environment
- Ontario Ministry of Natural Resources
- Biology Department, University of Ottawa
- St. Lawrence River Restoration Council
- Cornwall District Environment Committee
- St. Lawrence River Institute of Environmental Sciences
- Raisin Region Conservation Authority
- Zone d'intervention prioritaire Haute-Saint-Laurent
- AKZO Nobel (owners of the former Courtauld's Fibres Inc.)
- Domtar Papers
- ICI Engineering

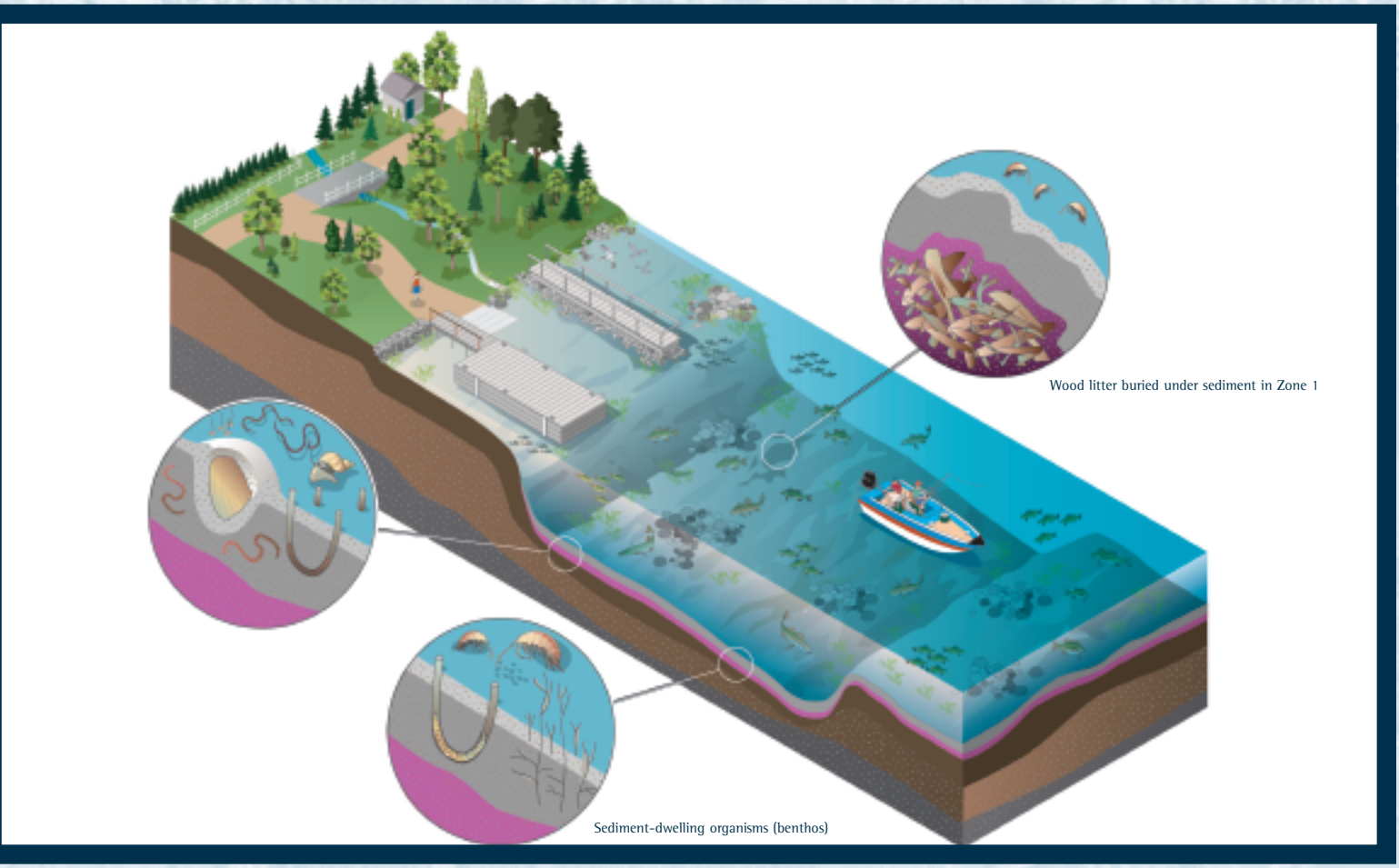
The Underwater World of the St. Lawrence River at *Cornwall*

The Cornwall Sediment Strategy is based on five years of consultation, collaboration and scientific review which included:

- a thorough review of 30 years of environmental data, including water, and sediment quality and information on sport fish and other organisms living in the water and sediment along the St. Lawrence River at Cornwall;
- a biomagnification study to assess the potential for mercury in sediment along the Cornwall waterfront to accumulate and magnify in the food chain;
- a study of sediment stability in the area; and
- a comprehensive assessment of sediment management options.

Scientific assessment has provided a great deal of information about the state of the ecosystem in the underwater world of the St. Lawrence River at Cornwall. A snapshot of the area:

- **Underwater contours (bathymetry)**
  The river bottom along the Cornwall waterfront has its own unique landscape of rock shelves, basins, steep slopes and valleys.
- **Sediment types**
  The sediment along the Cornwall waterfront ranges from boulders and gravel to mud and muddy sands. Some areas have dense growth of attached aquatic weeds.
- **Zones of sediment contamination**
  There are three zones of fine-grained sediment with elevated levels of mercury and other metals. These sediments have accumulated over time where slower currents allow the fine particles to settle and remain on the bottom.



CONCEPTUAL CROSS-SECTION OF THE ST. LAWRENCE RIVER IN AREA OF ZONE 1 AT CORNWALL

- **Main contaminant**
  Mercury is the contaminant of concern because of its potential to accumulate in aquatic organisms, and magnify up the food chain.
- **Sources**
  Mercury sediment contamination in the three zones reflects local discharges from more than 70 years of industrial activity along the waterfront. Other sources include natural and atmospheric mercury.
- **Concentrations**
  Mercury concentrations in surface sediments have decreased over the last 30 years, but are still elevated.
- **Natural Recovery**
  Deeper, more contaminated sediments are being covered over naturally with cleaner sediments that are accumulating in these areas at rates ranging from 0.8 to 2.6 cm per year in some areas.
- **Sediment Stability**
  Detailed scientific investigations into sediment stability, including underwater video of the effects of propeller-wash show that deposits are stable.
- **Sediment-dwelling organisms**
  Many different types of organisms live in the sediment along the waterfront: small organisms such as the burrowing mayfly, aquatic worms, and midge larvae. They feed on plankton, bacteria and other fine particles, and in turn are food for other sediment-dwelling organisms and fish. The communities of sediment-dwelling organisms at Cornwall are healthy and vibrant.
- **Fish**
  Many types of fish live in the area, including sport fish such as northern pike, walleye, yellow perch and white sucker and forage fish such as the spottail shiner and other minnows that feed on plankton and sediment-dwelling organisms. The river contains a very productive and diverse community of aquatic life.

Assessing the Effects of the *Contamination*

Thirty years of environmental data and recent studies on biomagnification show sediments along the Cornwall waterfront:

- are not toxic to sediment-dwelling organisms or to fish;
- are not a major source of mercury to fish in the area through the food chain;
- do not pose a risk to people or the environment;
- do not pose a risk to swimmers along the waterfront; and
- are not the cause of elevated levels of mercury in walleye in the Lake St. Francis and Cornwall area.

Mercury in Sportfish

Restrictions on consumption of some species of larger sportfish (e.g., walleye) in the Cornwall/Lake St. Francis area exist as a result of elevated levels of mercury. However, a recent biomagnification study found mercury-contaminated sediment along the Cornwall waterfront is not the source of mercury in fish in this area. A direct, significant link from the contaminated sediment in the three zones along the waterfront could not be established.

Elevated levels of mercury in these top predator fish may be attributed to a multitude of factors including diffuse, low-level mercury contamination within the northern portion of Lake St. Francis, drainage from the surrounding watershed, and atmospheric and upstream inputs of mercury.

Thirty years of data from the Ontario Ministry of the Environment and the Ontario Ministry of Natural Resources Sportfish Contaminants Program shows mercury concentrations in sportfish have declined.

Consult the Ontario Ministry of the Environment / Ontario Ministry of Natural Resources *Guide to Eating Ontario Sportfish* for consumption advice: www.ene.gov.on.ca/envision/guide/index.htm

Considering the *Options*

Environment Canada and the Ontario Ministry of the Environment commissioned an independent assessment and review of all possible sediment management options for the Cornwall waterfront, including dredging, capping and natural recovery. Each option was assessed based on technical feasibility and environmental effects.

The assessment concluded there would be no significant environmental benefit from dredging or capping, and recommended continued natural recovery as the most appropriate method for dealing with contaminated sediment along the Cornwall waterfront.

The Cornwall Sediment Strategy

Continued natural recovery, combined with Administrative Controls, and long-term monitoring

Given that there was no demonstrated environmental effect of mercury contaminated sediments at Cornwall, and since sediments are stable and being covered over naturally with cleaner sediment, community and agency partners agreed that the best way to deal with those sediments is to leave them in place and to allow natural recovery to continue.

Partners in Long-term *Protection*

- Environment Canada
- Ontario Ministry of the Environment
- Department of Fisheries and Oceans
- Ontario Ministry of Natural Resources
- Raisin Region Conservation Authority
- City of Cornwall
- Mohawk Council of Akwesasne

Administrative Controls *Protocol*

To ensure the sediments are not disturbed, an Administrative Controls Protocol was implemented. Environment Canada and the Ontario Ministry of the Environment have also established a long-term monitoring program to make sure the strategy remains effective.

The Administrative Controls Protocol is a partnership between seven agencies with waterfront permitting authority, to work together to ensure no human disturbance of contaminated sediments in the St. Lawrence River at Cornwall. The Protocol:

- outlines principles, decision process, roles and responsibilities;
- harmonizes agency mandates;
- strengthens and coordinates a common review process for regulating activities that have potential to disturb sediments; and
- establishes lead coordinating agency – Raisin Region Conservation Authority.

What are Administrative *Controls*?

Administrative controls are the planning, approval and permit control mechanisms which municipal, provincial, federal governments, and the Mohawk Council of Akwesasne can apply to regulate activities along the river.

Development of Administrative Controls

They began with a thorough evaluation of existing regulations for environmental protection, planning and permitting activities along the waterfront. The evaluation:

- considered all activities that could potentially impact the sediments;
- identified existing administrative controls and authority;
- assessed the effectiveness of current administrative controls and identified any gaps;
- identified overlapping jurisdictions and linkages between agencies;
- identified other solutions or controls; and
- assessed the potential to improve existing administrative controls.

Harmonizing Mandates

The Administrative Controls Protocol outlines principles, decision process roles and responsibilities of all participating agencies. It harmonizes agency mandates and strengthens and coordinates a common review process for regulating activities that have potential to disturb sediments.

Guiding Principles

There must be no disturbance, exposure or re-suspension of contaminated sediments. All permit applications and proposed projects along the Cornwall waterfront will be assessed by all seven agencies based on the Protocol's decision-making framework.

Lead Agency

The Raisin Region Conservation Authority is the lead for coordinating the application review process, confirming the response of all agencies and notifying the proponent of decisions.

Open Communication

The Protocol promotes open communication and facilitates discussion between parties to review applications, and exchange new information. The Protocol also calls for shared responsibility and commitment to long-term public education and awareness.

Considering a Project along the Cornwall Waterfront?

Please contact the Raisin Region Conservation Authority for a complete information package on Administrative Controls.

Administrative Controls Guidance *Document*

The seven parties to the Administrative Controls Protocol developed an Administrative Controls Guidance document. The document outlines legislation that may apply to different types of projects and provides guidance to those who may be considering a project along the Cornwall waterfront.

Ministry of the Environment

Ministry of the Environment

Ministry of the Environment

Long-term Environmental Monitoring

Environment Canada and the Ministry of the Environment will conduct long-term comprehensive environmental monitoring to ensure conditions continue to improve, and to ensure the strategy is working. The monitoring program includes assessments of sediment quality, sediment-dwelling organisms, and fish.

Can the Cornwall Sediment Strategy be Changed if there is *New Information*?

The Cornwall Sediment Strategy may be changed if new information supports taking a different approach. Any change in the strategy must be done in consultation with community and agency partners.

Cornwall Sediment Strategy: A *Model Approach*

In developing the Cornwall Sediment Strategy, community and agency partners used a leading-edge science-based decision-making framework which employs a weight of evidence approach.

Using this approach, multiple lines of evidence including sediment chemistry, toxicity, health and abundance of bottom dwelling organisms and the potential for contaminant biomagnification in the food chain are considered in combination to reach a determination about the need for remediation.

For *More Information*

For More Information about the Cornwall Sediment Strategy, Administrative Controls and the St. Lawrence River Remedial Action Plan contact:

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