

### IV.3 Toxic Substances and Sediment Remediation Component

The initial problems (pre 1990) with toxic substances and sediment remediation in Hamilton Harbour included a legacy of past abuses buried in Harbour sediments, high PCBs levels in Harbour waters relative to Lake Ontario, and airborne contaminants entering the water. The goals set out in the 1992 Stage 2 Report were to clean up Randle Reef and other suspected hot spots of coal tar contamination, as well as to find and eliminate other toxic contaminants and sources.

The Hamilton Harbour RAP Toxic Substances Task Group has assigned chemicals or chemical classes of contaminants of concern into one of two lists. These classifications are based on the Task Group's assessments of the impacts of these contaminants on the Harbour. This classification by priority was designed to facilitate the allocation of monitoring, abatement, and remediation resources so that delisting criteria can be met in the shortest timeframe.

The "A" list of contaminants includes compounds that are prevalent in the Harbour at levels that pose significant risk to fish and wildlife. These compounds include polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and a number of toxic metals. Levels of these compounds exceed provincial and/or federal water, sediment, or tissue guidelines designed for the protection of aquatic biota, and significantly exceed ambient levels in Lake Ontario. These compounds are also responsible for beneficial use impairments related to toxic contaminants. Coal tar-contaminated areas of the Harbour (e.g., Randle Reef) and contemporary sources of these compounds must be identified and remedial measures implemented before delisting criteria can be achieved. Mercury has been added to the "A" list because some forms of mercury are highly toxic; inclusion on the list is due in part to the shortage of information regarding current levels of mercury in the Harbour.

#### Hamilton Harbour "A" List Toxic Chemicals

- Polycyclic Aromatic Hydrocarbons (PAHs)
- Polychlorinated Biphenyls (PCBs)
- Toxic Metals (arsenic, cadmium, iron, lead and zinc)
- Mercury

The "B" list of contaminants includes some compounds that are highly toxic, but have not been demonstrated to be present in Hamilton Harbour at levels that threaten fish or wildlife. Examples include dioxins and furans, which have been detected in Harbour sediments at levels similar to other areas of Lake Ontario where fish and wildlife are not adversely impacted. Any of the "B" list compounds may be designated as "A" list contaminants should current or future studies identify potential threats to the ecosystem due to these substances.

#### Hamilton Harbour "B" List Toxic Chemicals

- Dioxins and Furans
- Organochlorine Pesticides (e.g. DDT)
- Current Use Pesticides (e.g. 2,4-D)
- Endocrine-Disrupting Compounds (EDCs)
- Ammonia

Mirex and DDT were among the organochlorine compounds identified as a local concern in the 1992 Stage 2 Report. The 1998 Status Report stated: “There is no source of mirex in the Hamilton Harbour watershed. Sources are in Niagara Falls and Oswego, New York. There is likely no source of DDT in the Hamilton Harbour watershed.” (p. 26)

By 2001, Harbour water met Provincial Water Quality Objectives (PWQOs) for metals due to large metal loading reductions that occurred before the RAP began. The levels of PAHs and PCBs associated with suspended sediment in the Harbour had also declined. However, whole water concentrations of these substances are still of potential concern when compared with interim PWQOs for some of the PAHs, and the PWQO for PCB of 1 ng/L (total PCB). Industries have been making efforts to improve the quality of discharges in both their water effluent and air emissions. This should lead to further reductions in concentrations of PAHs in Harbour water, particularly in the south eastern zone known as the Windermere Arm. Since 2000, work has also been underway by the City of Hamilton to remedy a potential source of PCBs to Red Hill Creek from a closed landfill site, and this may help reduce PCBs concentrations in the Windermere Arm. The effectiveness of these changes will need to be monitored over time.

The transfer of Windermere Basin ownership from the Hamilton Port Authority to the City of Hamilton in 2001 has resulted in the establishment of a dredging program to remove sediments. The basin acts as a settling pond or sediment trap for contaminants adhering to particles, thereby preventing them from entering the Harbour, but its effectiveness in this regard has declined because the basin is effectively full. Windermere Basin was last dredged to remove sediments in 1989-90 and is proposed for redredging in 2002/2003. Consultants for the City of Hamilton have been undertaking sediment investigations in Windermere Basin. Work to remediate Randle Reef and other hot spots is still pending.

Toxic Substances and Sediment Remediation is a high profile component of the RAP among the public. Spills in general are a concern, since there is a potential for the release of toxic substances and they may contribute to contamination of sediments in the Harbour. Existing data on spills reported to the Ontario Ministry of the Environment applicable to Hamilton Harbour RAP area will be provided to the RAP Office on an annual basis.

The issue of contaminants in sport fish taken from the Harbour is covered in detail under the Research and Monitoring Component, Recommendation RM – 2. The “2001-2002 Guide to Eating Ontario Sport Fish” lists consumption advise for eleven species of fish caught in Hamilton Harbour for a variety of toxics including, but not limited to: mercury, PCBs, and pesticides.

Emerging issues in toxic substances and sediment remediation include:

- determining the source and amount of toxic contaminants in municipal sewers,
- investigating the effect nitrates and ammonia from the King St (Dundas) wastewater treatment plant may have on Cootes Paradise marsh amphibians,
- investigating sediment contamination and associated toxicity at the Dofasco Boatslip, and
- updating the Contaminant Loadings report for 1996-2000.

### IV.3.1 Spill Reporting and Handling

**Recommendation No. TSSR – 1**

(1992 Rec. 7)

*That spills into the Harbour and in its watershed are reported publicly, and their severity, frequency and potential for further reduction be monitored. The process of spill handling should be reviewed every two years.*

*An ongoing public education campaign should inform on the hazards of improper disposal of household materials, on the proper disposal procedures for household materials, as well as encouraging people to report spills to the Ministry's Spills Action Centre.*

**Responsible Agencies**

OMOE, EC, City of Hamilton, Regional Municipality of Halton, City of Burlington, Canadian Coast Guard, Port of Hamilton Spill Control Group

**Short Term Targets**

- TSSR – 1.1 **(2005)** The process of spill handling, reporting, and public education programs should be reviewed by RAP processes in a biennial report.
- TSSR – 1.2 **(2005)** OMOE to produce a compilation of spills data from the Ministry's Spills Action Centre on an annual basis. The information to be provided will include the following: date, location, estimated volume, nature of the impact, pollutant, and number of spills occurring in the Area of Concern for the RAP.
- TSSR – 1.3 **(2005)** Develop a public education initiative that encourages minimizing spills from private citizens as well as expanding public awareness of programs and procedures in place for reporting of spills.

**Status**

In Ontario, *Part X of the Environmental Protection Act* outlines the requirements for addressing spills. The legislation defines what constitutes a spill, details what reporting is required when certain classes of spills occur, allows for reporting exemptions for certain types of spills, and defines what actions are required/allowed by the legislation. These actions include:

- clean up of the spill and restoration;
- provisions for the municipality in which the spill occurred to perform the clean up;
- provisions for the OMOE to perform the clean up; and
- provisions for the OMOE to issue orders regarding the clean up.

The OMOE's Spills Action Centre provides a 24-hour province-wide, toll free service for reporting, evaluating and initiating responses to spills and other urgent environmental matters. Generally, the OMOE is the lead regulatory agency for spills occurring in the province and for administering the Spills Regulation under *Part X of the Environmental Protection Act*. Exceptions to this include ship-source and international boundary water spills for which the Canadian Coast Guard assumes the lead, and spills at federally regulated facilities, for which Environment Canada assumes the lead. Police, fire or health officials normally provide the lead for incidents involving threats to human health, safety, life and property. The OMOE is responsible for providing support during these types of emergencies, including spill response advisory services and interagency spill response co-ordination. The OMOE may provide

information on chemicals and clean-up techniques to OMOE staff, industries, municipalities, and others assist in spill contingency planning activities, including training and mock spill exercises.

Existing data on spills reported to the OMOE applicable to the Hamilton Harbour RAP area will be provided to the RAP office on an annual basis upon request. This information will include: date, location, estimated volume, nature of the impact, pollutant, and number of spills occurring in the area. It is important to note that in the format provided that the data represent initial reports into the Ministry; that the data has not been compiled or analyzed; and, that caution will need to be used to interpret the data. For example, quantities reported may be initial estimates of the potential amount spilled, and are not actual or measured amounts. The status of clean-up is reported at the time of the initial report, and may not reflect the follow-up or clean-up activities that were completed subsequent to the initial report.

Environment Canada offered to be the lead for the production of a spill trend report looking at spills to Hamilton Harbour over the past 10 years. A draft of this report was available in the Fall of 2002. Environment Canada has also committed to the organization of a spill prevention workshop for businesses in the Hamilton Harbour area. This workshop was delivered in October 2002 in Hamilton.

There is also a Port of Hamilton Spill Control Group (PHSCG). They respond to member spills and report spills to Coast Guard. As it is not a commercial entity, they cannot compete with private spill control response companies. If there were a spill in the Harbour that a contractor cannot get to, the Port Authority as a member of the PHSCG would contain the spill until a contractor arrives.

### IV.3.2 Wildlife Management Strategy for Confined Disposal Facilities

#### Recommendation No. TSSR – 2

(1992 Rec. 20)

*A management strategy be established and implemented to minimize contaminant uptake in wildlife/waterfowl in the confined disposal facilities (CDF) in Hamilton Harbour.*

#### Responsible Agencies

Hamilton Port Authority, EC - CWS

#### Short Term Target

TSSR – 2.1 **(2003)** Establish and implement a management strategy to minimize contaminant uptake in wildlife/waterfowl in the confined disposal facilities.

#### Status

A study undertaken by the Canadian Wildlife Service (CWS) examined the accumulation of organic contaminants in sentinel mallards utilizing the confined disposal facilities (CDF) at Hamilton Harbour (Gebauer and Weseloh, 1993). The results of the study indicated that the ducks had PCB concentrations exceeding Health and Welfare Canada and United States Food and Drug Administration guidelines for edible poultry. Since many species of both resident and

migratory waterfowl use Hamilton Harbour CDF, the effects of elevated contaminant concentrations on waterfowl and the public health implications to hunters should be addressed.

The Hamilton Port Authority (HPA) has proposed to undertake a study on the management of the CDF from 2003-2005. The CWS has proposed to consult with the HPA on the development of a CDF Wildlife Management Plan for Hamilton Harbour.

### IV.3.3 Goal of Zero Discharge of Trace Metals and Organics

#### Recommendation No. TSSR – 3

(1992 Rec. 28)

*To meet the goal of zero discharge or virtual elimination of trace metals and trace organics within as short a time as possible, it is recommended that remedial measures be implemented for industries, public and private organizations and citizens discharging toxic substances to the Harbour, to the watershed or to the municipal sewer systems under both the criteria for 'Best Available Technology that is Economically Achievable' (BATEA), and the criteria deemed necessary to ensure good water and sediment quality in the Harbour and its tributaries and reduction of contaminants in fish and biota to the maximum extent possible.*

#### Responsible Agencies

City of Hamilton, Regional Municipality of Halton, EC, OMOE, Industries

#### Short Term Targets

Continue work to detect and remediate the discharge of metals and trace organics through but not limited to the following actions:

TSSR – 3.1 **(2001)** Review the status of municipal sewer use bylaws and recommend amendments in 2002/2003.

TSSR – 3.2 **(2001)** Include trace organics in the monitoring of WWTP effluents immediately.

TSSR – 3.3 **(2003)** Review the status of leachate escaping landfill sites in 2002–2003 and prepare a strategy with timelines for containment, clean up or treatment of these toxic substances.

#### Ongoing Target

TSSR – 3.4 OMOE will continue to report on the MISA program via the Ministry web site.

TSSR – 3.5 Industry to continue implementation of the MISA requirements.

#### Status

With respect to metals, best available technologies are being used and there are general reductions in metals loadings to the Harbour (metal standards are normally being met for the water column). With respect to trace organics, levels for PCBs and PAHs in the Harbour are dropping, but are high relative to those in Lake Ontario.

The Municipal-Industrial Strategy for Abatement (MISA) regulatory program, including the Iron and Steel Sector regulations, was passed to work towards the virtual elimination of toxic contaminants in industrial discharges into Ontario's waterways. The OMOE will continue to

ensure regulatory requirements are enforced in Hamilton Harbour. Limits were set for gross loadings of: benzo[a]pyrene and naphthalene (PAHs), total cyanide, ammonia plus ammonium, total suspended solids, lead, zinc, phenolics, benzene, oil and grease, but not iron. OMOE will continue to report on the MISA program via the Ministry web site.

Attention needs to be focused on municipal sewer use by-laws, pollution prevention plans, and the detection of toxic substances from old landfill sites and wastewater treatment plant discharges. The OMOE has begun the development of guidance material for municipalities implementing sewer use by-laws in Ontario. The initial consultations with stakeholders have been held. The City of Burlington and the Region of Halton are updating their sewer use bylaws in 2002. The City of Hamilton is updating its sewer use bylaws during 2002 and 2003.

Goals for the discharge of metals and trace organics have been met at Dofasco since the implementation date of the MISA regulation in 1998. Dofasco signed an Environmental Management Agreement (EMA) with Environment Canada and the Ontario Ministry of the Environment in 1997. This proactive, voluntary agreement extends beyond existing regulatory requirements and contains commitments to air, water quality, energy use and waste management. Dofasco publicly reports on progress towards specific objectives (the EMA and associated progress reports can be found on the Dofasco web site at <http://www.dofasco.ca>). In 2001 the organization obtained ISO 14001 certification (an environmental management system) to comply with auto industry requirements. Future work will include the continual improvement of all effluent at Dofasco through projects such as:

- Optimization of existing plants (ongoing),
- Ground water study (2001),
- Additional storm water retention pond(s) (proposed for 2002), and
- Cokemaking - Flushing Liquor Ammonia Removal Plant upgrades (proposed for 2002).

Stelco has implemented additional effluent controls that have reduced MISA limit exceedences dramatically. Further controls are being implemented, such as redirecting some cooling water flows through treatment systems. Although cooling water flows are non-contact, there is still the potential for a leak of material within the system and this redirection is a safeguard against those inadvertent failures. Stelco has started a stormwater runoff management plan for its properties. The development of the plan was in place in 2001, with approval of the plan expected in 2002. The organization obtained ISO 14001 certification (an environmental management system) in 2001 to comply with auto industry requirements.

Net loadings for some monitored substances in the effluent streams from Dofasco and Stelco are presented in Figures 32 - 38. The MISA regulations require reporting of gross loadings, which is to say that the concentrations present in the incoming water are not deducted from the concentrations measured in effluent. However, for the RAP it is of interest to understand the net contribution of contaminants for each source. Net numbers are generally calculated by subtracting the background concentrations measured on Harbour intake water from the effluent concentrations. Further functions accounting for flow and yearly averages are also used to produce useable numbers.

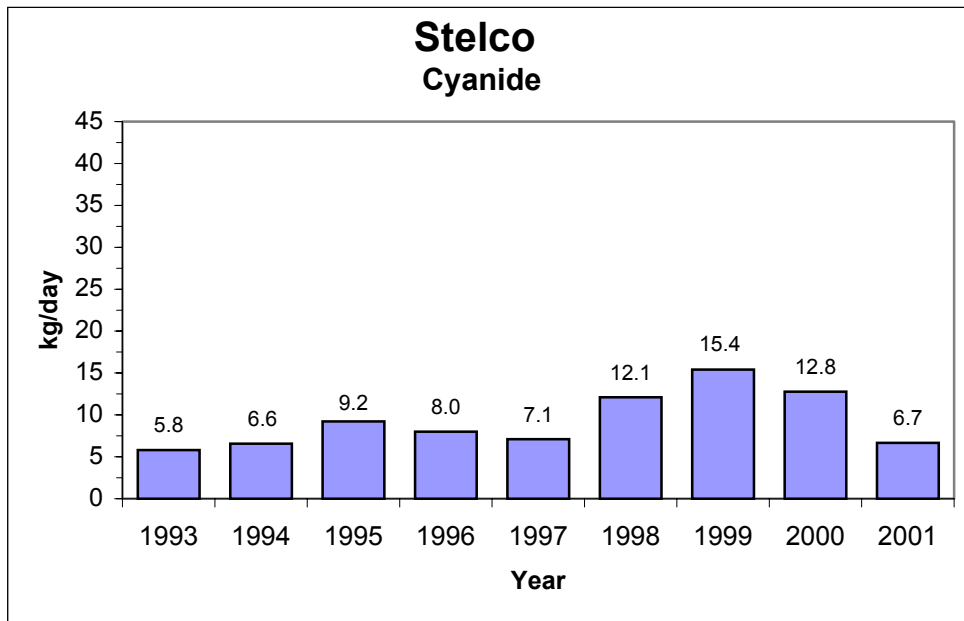
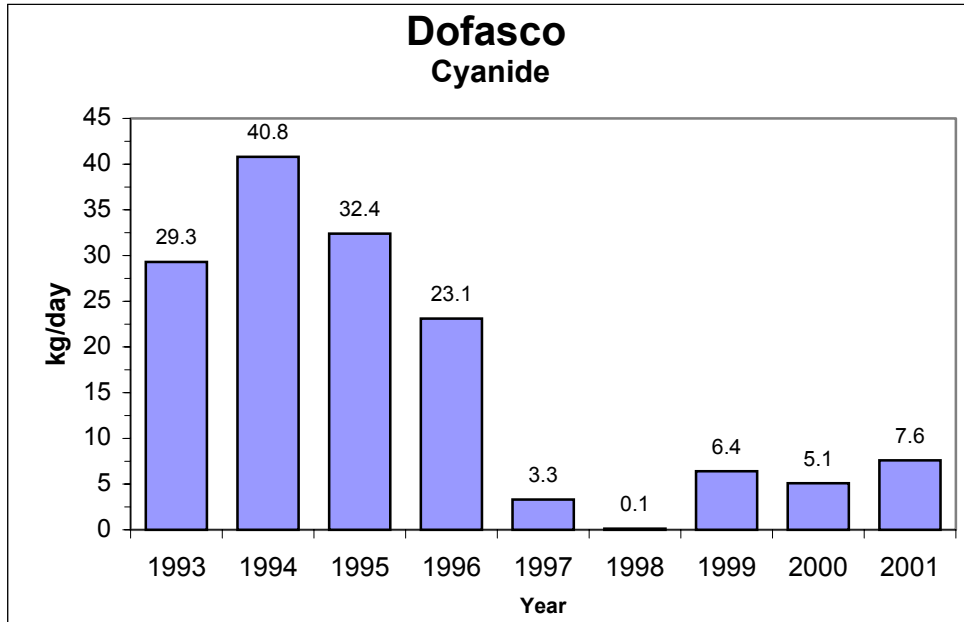
Both Stelco and Dofasco divert some effluents from their coke-making operations to the Woodward WWTP. Stelco has been using the WWTP for this purpose for decades, but Dofasco

only started in 1996 to comply with MISA in the most cost-effective way possible. A 1993 study found that Woodward WWTP was capable of removing more than 98 % of PAHs from the waste stream. However, this additional input has likely resulted in an increase in PAHs loadings from the WWTP to the Harbour; unfortunately, PAH measurements have historically been insufficient to calculate an average daily loading to the Harbour. This issue needs to be addressed by the City of Hamilton to determine whether PAH loadings to the Harbour have changed since MISA implementation.

Columbian Chemicals Canada (CCC) has a Water Management Plan to target zero discharge by recycling all storm water. The engineering design was started in 2001 with hopes to obtain project funding approval in 2001 and a proposal to implement the preferred alternative by 2004.

A study by Environment Canada scientists at the National Water Research Institute (NWRI) showed that road salt has numerous harmful impacts on freshwater systems and biota. These findings were an important contribution to the ongoing determination of whether or not road salts should be considered toxic substances under the Canadian Environmental Protection Act. Locally, part of the Strategic Plan for the City of Burlington includes the recommendation to investigate alternative winter control measures to minimize the use of salt.

Figure 32. Net Loading of Cyanide from Dofasco and Stelco to Hamilton Harbour

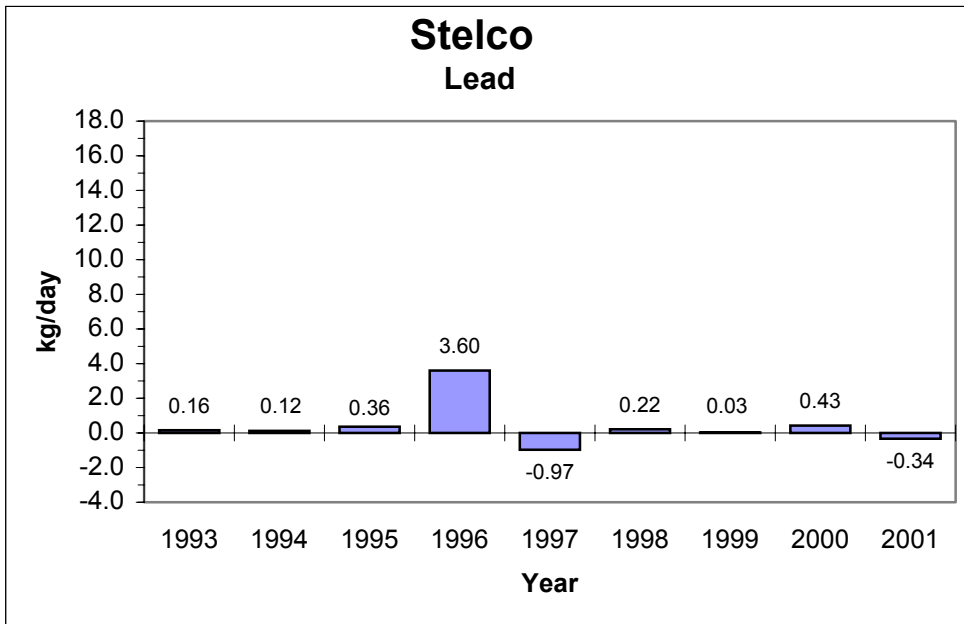
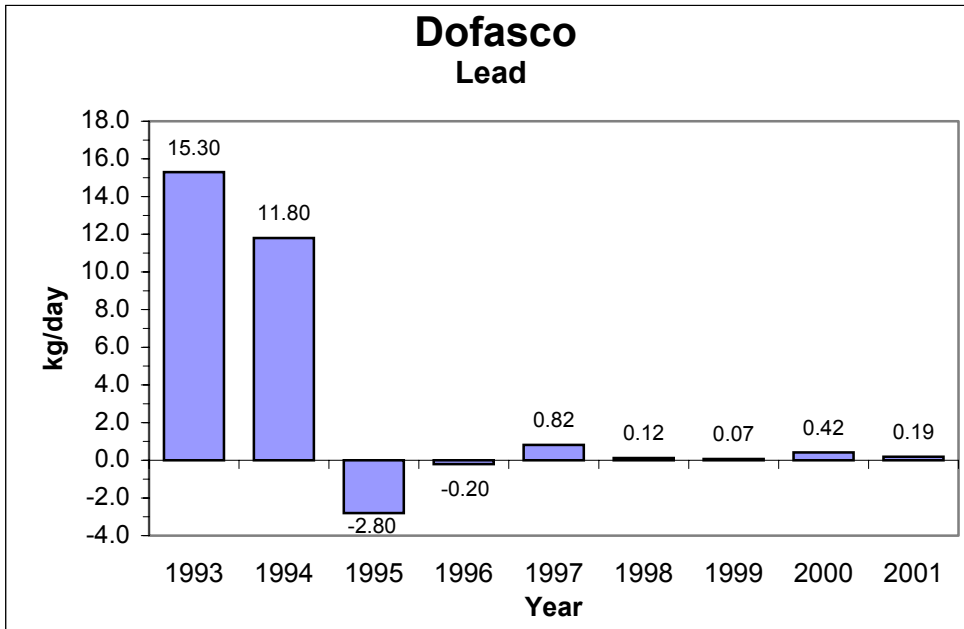


Data Source: Dofasco and Stelco  
 Prepared By: K. O'Connor, HHRAP

Date: August 20, 2002



Figure 33. Net Loading of Lead from Dofasco and Stelco to Hamilton Harbour



Data Source: Dofasco and Stelco  
 Prepared By: K. O'Connor, HHRAP

Date: August 20, 2002

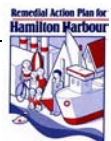
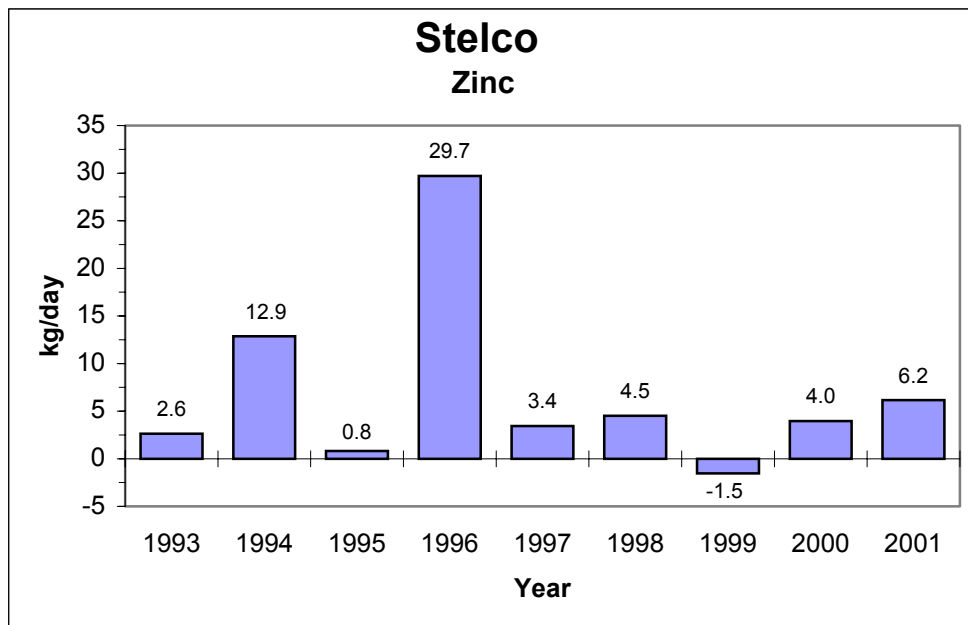
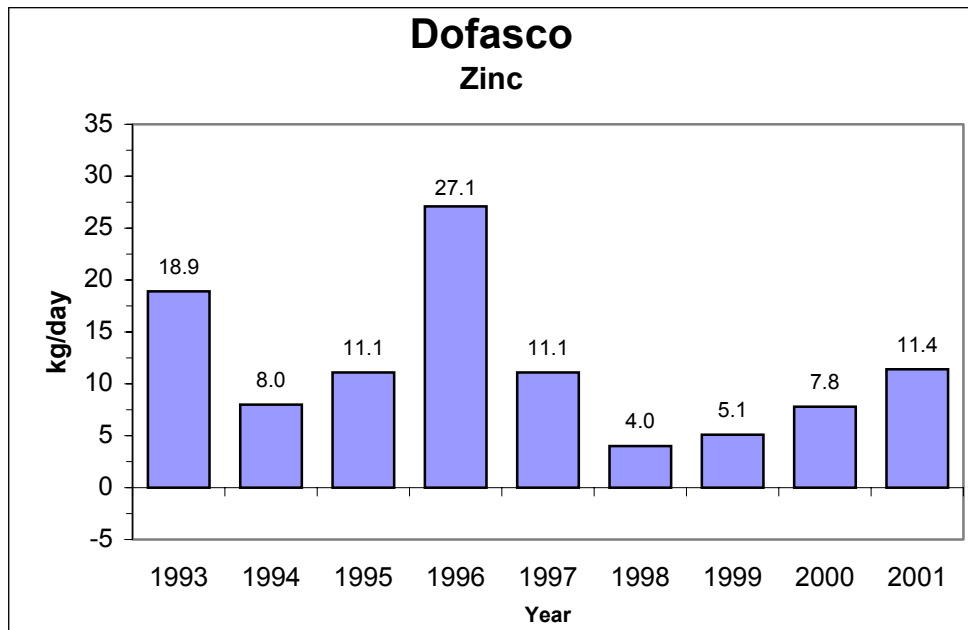


Figure 34. Net Loading of Zinc from Dofasco and Stelco to Hamilton Harbour

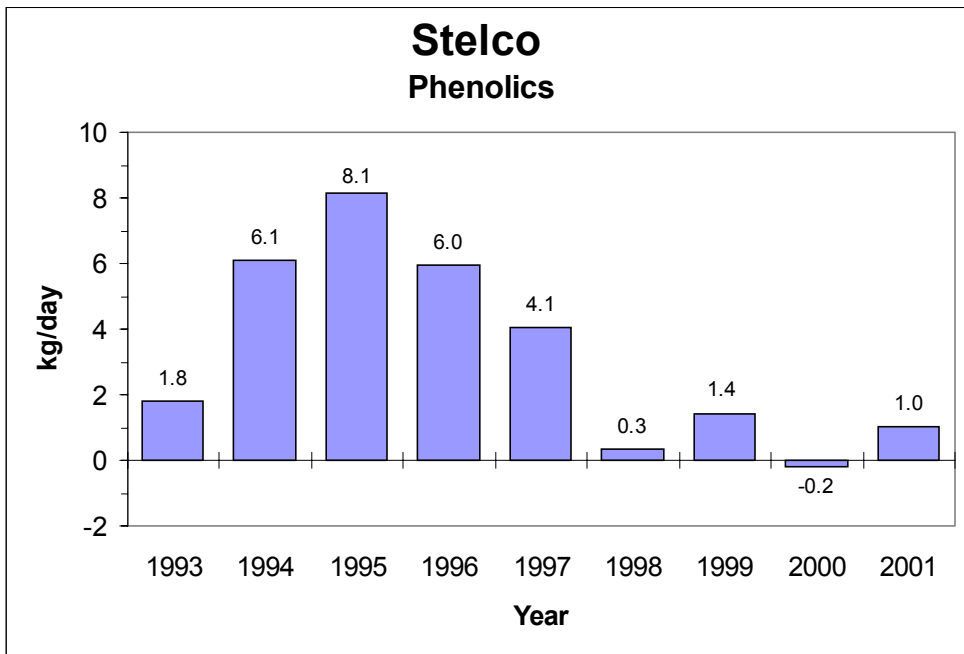
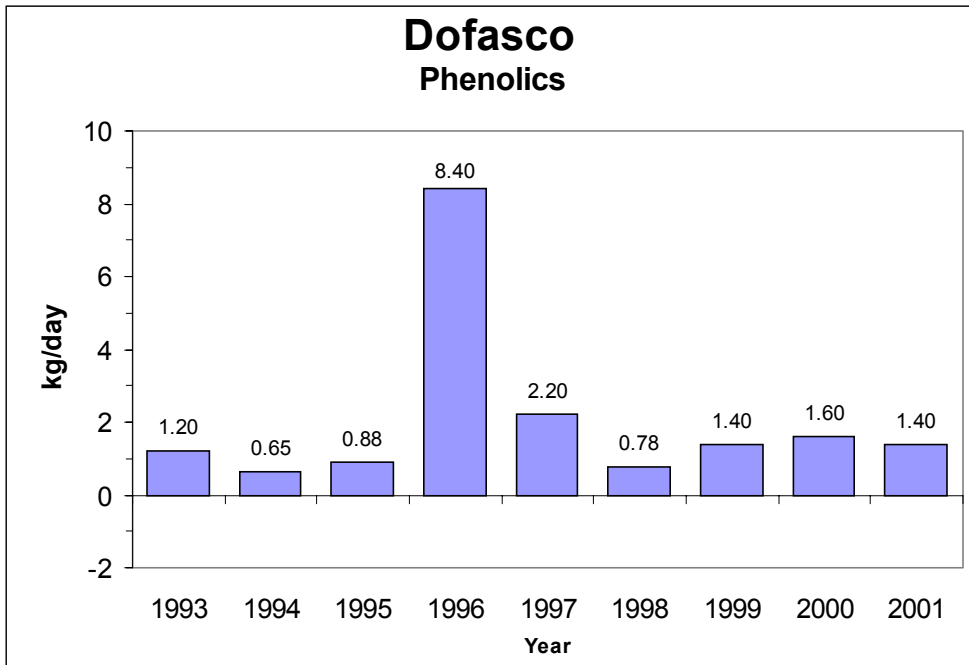


Data Source: Dofasco and Stelco  
 Prepared By: K. O'Connor, HHRAP

Date: August 20, 2002



Figure 35. Net Loading of Phenolics from Dofasco and Stelco to Hamilton Harbour



Data Source: Dofasco and Stelco  
 Prepared By: K. O'Connor, HHRAP

Date: August 20, 2002

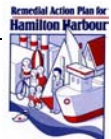
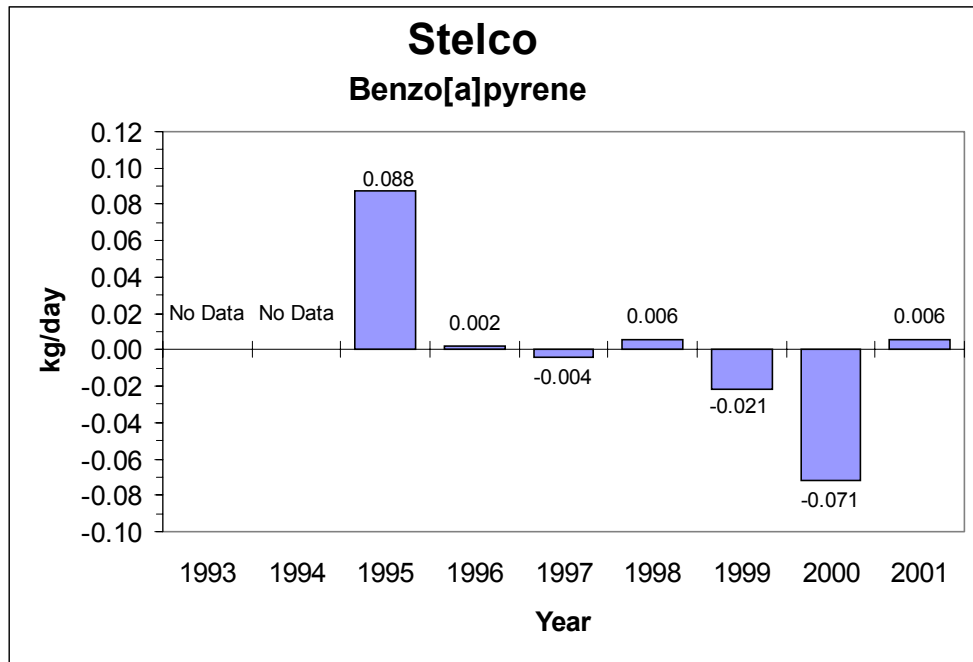
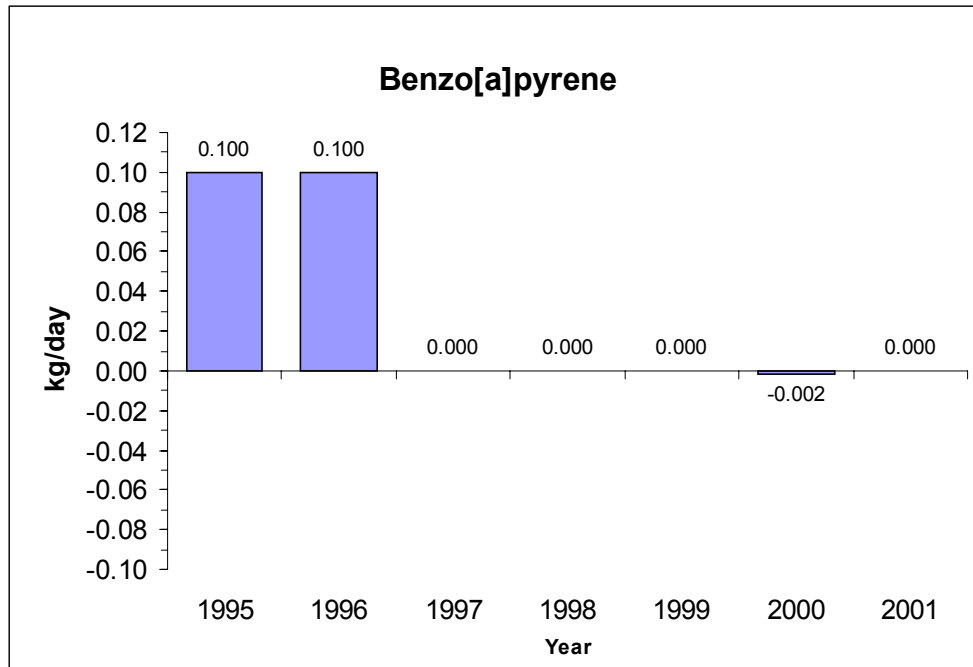


Figure 36. Net Loading of Benzo[a]pyrene from Dofasco and Stelco to Hamilton Harbour

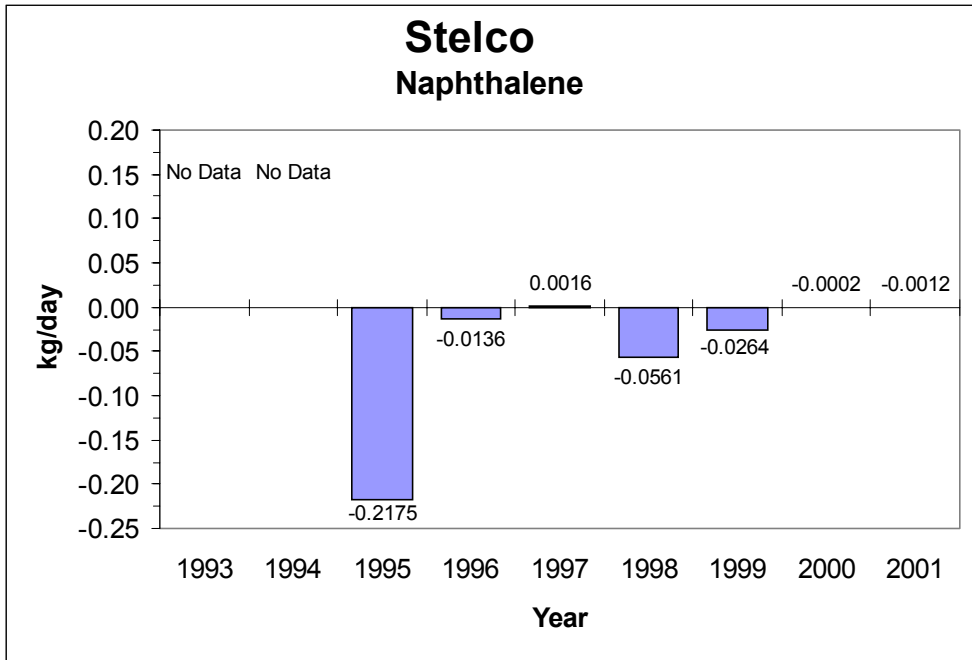
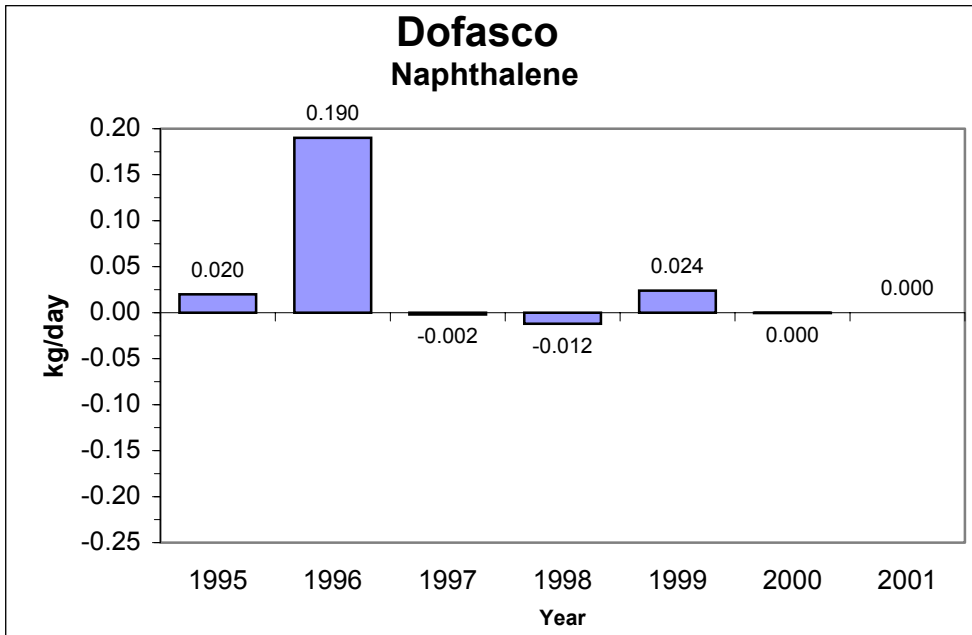


Data Source: Dofasco and Stelco  
 Prepared By: K. O'Connor, HHRAP

Date: August 20, 2002



Figure 37. Net Loading of Naphthalene from Dofasco and Stelco to Hamilton Harbour



Data Source: Dofasco and Stelco  
 Prepared By: K. O'Connor, HHRAP

Date: August 20, 2002

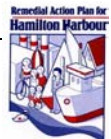
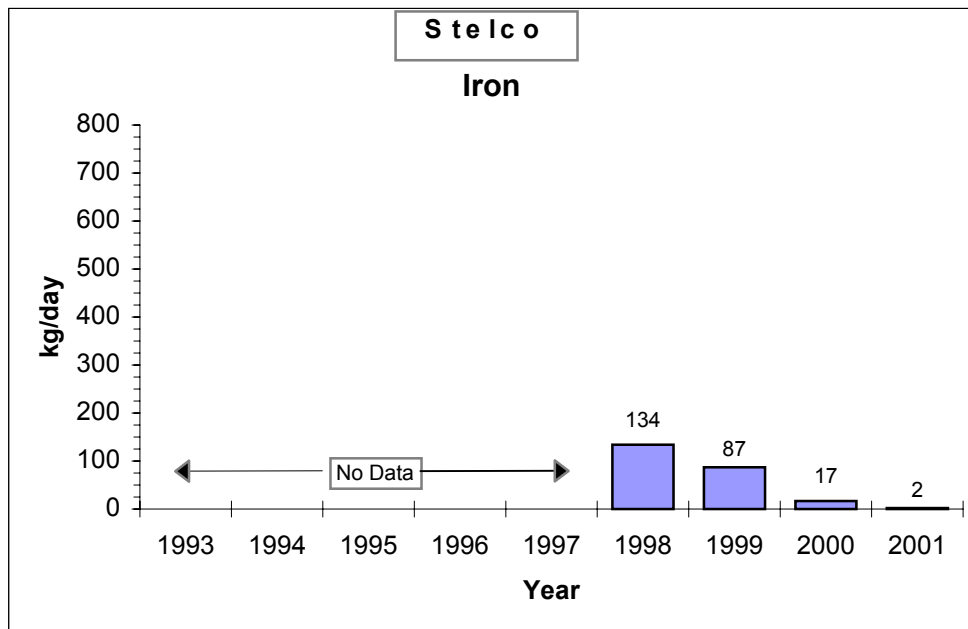
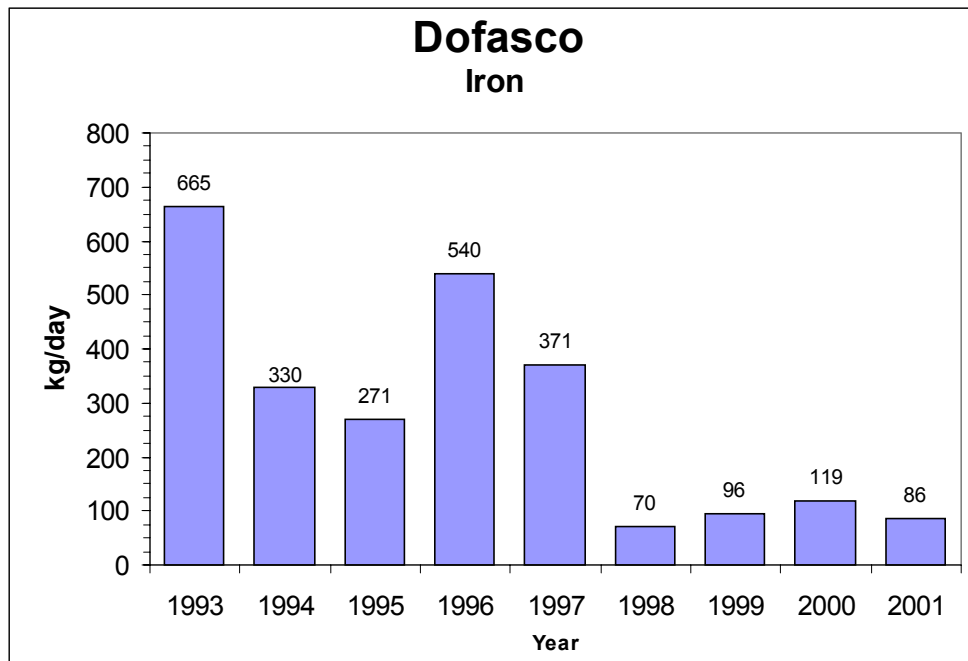


Figure 38. Net Loading of Iron from Dofasco and Stelco to Hamilton Harbour



Data Source: Dofasco and Stelco  
 Prepared By: K. O'Connor, HHRAP

Date: August 20, 2002



### IV.3.4 Management Strategies for Contaminated Sediments

**Recommendation No. TSSR – 4**

(1992 Rec. 29)

*The final management strategy needs to be completed for PAH/metals -contaminated sediment at Randle Reef having concentrations greater than 800 µg/g total PAH less naphthalene,*

**Short Term Targets**

TSSR – 4.1 **(2002)** Complete the final management strategy for PAH/metals -contaminated sediment at Randle Reef having concentrations greater than 800 µg/g total PAH less naphthalene.

TSSR – 4.2 **(2003)** Initiate remediation for PAH/metals -contaminated sediment at Randle Reef having concentrations greater than 800 µg/g total PAH less naphthalene.

*In addition, a detailed management strategy needs to be developed for:*

- a) PAH-contaminated sediments at Randle Reef having concentrations greater than the biologically-based clean-up criteria of 200 µg/g total PAH but less than 800 µg/g total PAH less naphthalene,*

**Short Term Targets**

TSSR – 4.3 **(2002)** Complete the final management strategy for PAH-contaminated sediments at Randle Reef having concentrations greater than the biologically-based clean-up criteria of 200 µg/g total PAH but less than 800 µg/g total PAH less naphthalene.

TSSR – 4.4 **(2003)** Initiate remediation for PAH-contaminated sediments at Randle Reef having concentrations greater than the biologically-based clean-up criteria of 200 µg/g total PAH but less than 800 µg/g PAH less naphthalene

- b) PAH/PCB/metals-contaminated sediments in the Dofasco boatslip, and*

**Short Term Targets**

TSSR – 4.5 **(2002)** Complete the final management strategy for PAH/PCB/metals-contaminated sediments in the Dofasco boatslip.

TSSR – 4.6 **(2003)** Initiate remediation for PAH/PCB/metals-contaminated sediments in the Dofasco boatslip

c) *PAH/PCB-contaminated sediment in Windermere Arm.*

### Short Term Targets

TSSR – 4.7 (2001) Initiate problem definition for PAH/PCB-contaminated sediment in Windermere Arm.

TSSR – 4.8 (2003) Complete problem definition for PAH/PCB-contaminated sediment in Windermere Arm.

TSSR – 4.9 (2004) Complete the final management strategy for PAH/PCB-contaminated sediment in Windermere Arm.

TSSR – 4.10 (2005) Initiate remediation for PAH/PCB-contaminated sediment in Windermere Arm.

*The regulatory, jurisdictional, and funding issues potentially associated with contaminated sediment removal, storage, treatment, transport, and disposal should be anticipated, examined and resolved as soon as possible in order to avoid delays.*

### Responsible Agencies

EC, OMOE, Hamilton Port Authority, City of Hamilton, Dofasco, Stelco, Hamilton Conservation Authority

### Status

In 1995, a report, “Contaminated Sediment in Hamilton Harbour: An Update to the Remedial Action Plan Stage 2 Report” was published by the Hamilton Harbour RAP Technical Team in response to Recommendation 29 in the 1992 Stage 2 Report. As stated in the executive summary, “it consists of refined strategy for sediment remediation, consolidating and building on new scientific and technical information generated between 1992 and 1994.” The study suggested a focus on PAHs due to high concentrations and potential carcinogenic effects.

In 1998, a report prepared by a consultant, “Summary Report: 1990-1996 Contaminant Loadings and Concentrations to Hamilton Harbour” was submitted to the RAP. It is anticipated that a report on the contaminant loadings and concentrations since 1996 will be produced starting in 2002.

Randle Reef has been an area targeted for remediation for many years. There have been numerous preparative works, investigative studies, a pilot scale demonstration, and strategy sessions. Efforts to clean up contaminated sediments at Randle Reef continue with the formation of a Project Advisory Group (PAG) in 2001. Members of the PAG re-evaluated a range of remediation options and in April 2002 reached a consensus on a preferred option for cleanup.

Since the publication of the 1995 update there have been some additional scientific findings regarding sources and trends for PAHs and PCBs in water and sediment in the southeast corner of the Harbour (Dofasco Boatslip and Windermere Arm).

Pilot scale in-place treatment of Dofasco Boatslip sediments was undertaken with amendments of nutrients and oxidants to encourage biological degradation processes. Success was noted in the biodegradation of some petroleum hydrocarbons, but results on PAHs were less conclusive and full-scale remediation using this approach could not be recommended at this time. A final draft

report summarizing all the investigations conducted at the Boatslip has been prepared by the OMOE and EC with input from Dofasco. It is anticipated that this report will be finalized with Dofasco in 2002 and it will be used as the basis for the assessment of remediation options and the development of a sediment management strategy during 2002 and 2003.

Environment Canada researchers at NWRI began studying the downstream Windermere Arm/Strathearne Shipping Channel in 2001 to identify sediment characteristics and quality. Physical properties and “hot spots” are mapped using technologies utilized in studies throughout Hamilton Harbour such as: side-scan sonar surveys, multibeam surveys, box cores and penetration cores. It is anticipated that the completion of the problem definition will be achieved in 2002/2003. This will allow for the identification of unknown hotspots and/or provide background information for future comparison. A management strategy and any remediation efforts are dependent on the results of the problem definition.

As part of a separate research initiative outside of the RAP, sponsored by Environment Canada, an experimental sand cap was placed over bottom sediments near LaSalle Park by researchers at NWRI to determine its effectiveness in sediment remediation. Unfortunately, due to the activity of shipping in current hot spots in Hamilton Harbour, a sand cap would not likely remain intact in shallow areas such as Randle Reef. The efficacy of the cap is still being determined with a monitoring program.

The BEAST protocol (Benthic Assessment of Sediment) being used by researchers at NWRI is an approach for assessing sediment quality that involves comparing conditions in test sites, such as those in Areas of Concern (AOCs), with conditions in uncontaminated reference sites. Over a five year period, BEAST will be performed in the 16 Canadian AOCs. The method uses information on benthic community structure, selected habitat attributes, and the responses of four benthic invertebrate species in sediment toxicity tests. Data for the reference sites establish the natural variability for toxicity endpoints and benthic community conditions, against which observations from test sites are compared. Habitat attributes are also used to improve comparisons of biological conditions at the test site with reference sites by adjusting for differences in natural conditions.

The BEAST methodology was applied to Hamilton Harbour to supplement previously collected sediment data. Field work was undertaken by NWRI in the fall of 2000 and once available, will provide the opportunity for formal documentation of statistically based recovery targets for benthic invertebrates and toxicity in the various habitats found within the Harbour. These targets will correspond with the Low, Medium, and High priority areas identified in the 1995 Sediment Update, and will be the primary means of tracking progress for the “natural recovery” and eutrophication related actions which will address sediment contamination throughout most of the Harbour area.

“Since the mid 1980’s, samples of sediments have been taken in two locations in the Harbour (the deep hole and the West end) once a month from April to November so that benthic organisms could be identified and counted. The intent of this study is to determine seasonable variability in the benthic populations, but because data collection has been consistent over a long period, it will also provide trend information once the analysis has been completed. Results have not yet been analyzed for any of the years in the 90’s.” (p. 22, HHRAP, 1998 Status Report)

Previous recommendations concerning the need for development of biologically-based cleanup criteria, “hot spot” mapping, assessment of Harbour wide sediment toxicity, assessment of in-situ sediment treatment and capping, and mass balance model prediction of recovery periods (Ling *et al.* 1993, Diamond and Ling-Lamprecht 1996) have all been accomplished to some degree.

### IV.3.5 Household Hazardous Waste Collection Services

#### Recommendation No. TSSR – 5

(1992 Rec. 30)

*Expand and conveniently locate household hazardous waste collection services, undertaken by municipalities.*

*Continue to encourage citizens and public and private corporations through education programs to reduce their use of environmentally damaging chemicals and when such products are used, to dispose of them at hazardous waste collection depots.*

#### Responsible Agencies

City of Hamilton, Region of Halton, Citizens

#### Short Term Targets

- TSSR – 5.1 (2003) Report on annual monitoring of amounts collected.
- TSSR – 5.2 (2003) Municipalities undertake a study to evaluate progress and success of the existing programs.
- TSSR – 5.3 (2003) Undertake study to determine ways of making disposal of household hazardous chemicals more convenient. (e.g., municipalities initiate a pilot curbside hazardous waste pickup program)
- TSSR – 5.4 (2003) Advertise to all citizens and businesses to promote reduction in the use of household hazardous chemicals and proper disposal techniques.

#### Status

Residents of the City of Hamilton can dispose of household hazardous waste (HHW) either at the permanent Household Special Waste Depot (open every Saturday, year round) or on Enviro Days (currently held in six locations, twice a year since 1993). Both services are free to Hamilton residents. The City has educational information both in print and on their website about HHW, alternatives products, and proper disposal of HHW. HHW disposal opportunities are included in regular advertising and specific advertising for the Enviro Days. The total HHW recovered has increased steadily from 403 metric tonnes in 1996 to 648 metric tonnes in 2000. The City is in the process of re-evaluating the program with the intent to enhance it further. This review will encompass the success of the existing programs to date.

Residents of Halton Region can dispose of HHW free of charge at Halton’s Waste Management Site (open Mon – Sat, year round). Halton promotes proper disposal of HHW, blue box recyclables, and yard waste throughout the year through advertising and their Public Works calendar. Halton Region monitors the type and quantity of HHW at depots and holds a HHW

Environmental Day in Burlington every three years. The HHW program is evaluated continuously as part of a statistical waste operation report produced every year, and changes/improvements to the program are taken on an as needed basis. Halton Region endorsed a Solid Waste Management Strategy (completed in 1999) that identified methods of achieving maximum waste reduction and diversion from landfill. Halton is not considering curbside HHW collection, as it is prohibitively expensive and prone to abuse.

### IV.3.6 Reduction of Pesticide Use

#### Recommendation No. TSSR – 6

(1992 Rec. 31)

*Public and private organizations continue to limit their use of pesticides (herbicides, insecticides, etc.) in maintaining parks, conservation areas, or other lands within the watershed. Public and private organizations increase in number and size naturalized areas; thus reducing the need for lawn maintenance.*

#### Responsible Agencies

City of Hamilton, City of Burlington, Regional Municipality of Halton, Conservation Halton, Hamilton Conservation Authority, private organizations and businesses, Hamilton Naturalists' Club

#### Short Term Targets

- TSSR – 6.1 **(2003)** All public and private organizations reduce their use of pesticides by at least 10 % per hectare each year and review periodically.
- TSSR – 6.2 **(2003)** All public agencies identify opportunities to naturalize areas that are currently in grass cover (particularly those adjacent to watercourses, valleys and forests) to reduce their requirements for lawn maintenance. Formulate a naturalization plan for each location and initiate implementation of plan.
- TSSR – 6.3 **(2003)** That municipalities adopt policies banning the use of pesticides on public lands except in cases of emergency or exceptional circumstances

#### Long Term Target

- TSSR – 6.4 **(2015)** The complete elimination of the non- essential use of pesticides.

#### Status

All public agencies involved with the RAP have reduced their use of pesticides (including herbicides, insecticides, etc.) in maintaining their lands. However, this program also needs to be expanded to private organizations that own large tracts of land (e.g., business parks). Education programs are also necessary and are dealt with through the Education and Public Information Component, Recommendation EPI – 4. Private and public organizations should be encouraged to expand naturalized areas thus reducing the need for lawn maintenance.

In 2001, the Hamilton Coalition of Pesticide Issues formed through the leadership of the Hamilton Naturalists' Club, Conserver Society, and Action 2020 initiated a range of activities to

reduce pesticide use through both education and lobbying for municipal policies and bylaws. The initiative is working towards the complete elimination of the non-essential use of pesticides in the long term. This group has contacted major landowners such as the Hydro Commission and the School Boards.

The Region of Halton has a pesticides working group investigating means of reducing or eliminating use of pesticides on Regional properties. The pesticides working group not only targets the corporation, but recommends strategies to Regional staff, their families, friends and neighbours. However, no timelines are set for this work.

The City of Burlington reduced pesticide use from 1999-2000 on 200 hectares of parklands. Only irrigated sports fields (20 hectares) were treated to protect the corporation's investment. The City purchased an aquacide machine in 2000 to kill undesired vegetation with hot water instead of herbicides.

Hamilton City Council requested a staff report with respect to reduction of pesticides. Implementation of the pesticide reduction plan was to start in 2002. City staff also plans to develop a naturalization policy/program for naturalization of selected public open spaces.

The Hamilton Conservation Authority (HCA) has two properties, Dundas Valley Conservation Area and Westfield Heritage Village, which are pesticide free. Pesticide use in other areas is minimal. Mechanical harvesting is used instead of pesticides in the aquatic environments of Christie and Valens Conservation Areas for aquatic weed control. The HCA is reviewing naturalization opportunities for its own holdings when feasible and the process is done gradually so as to not upset their patrons.

Conservation Halton has eliminated its use of pesticides on Conservation Halton owned lands in the Hamilton Harbour watershed. Conservation Halton's Administration Centre in Lowville is a project site outside the watershed that capitalized on an opportunity to demonstrate naturalization techniques.

Columbian Chemicals Canada completely eliminated the use of herbicides on company property by 1999. Brush and weeds are now hand cut or removed.

### IV.3.7 Air Emission Control

**Recommendation No. TSSR – 7**

(1992 Rec. 37 + 2001 Rec. L)

*That the Ontario program to control air emission sources be continued in order to eliminate visual and odorous emissions, to make the Harbour area more aesthetically pleasing.*

**Responsible Agencies**

OMOE, EC, City of Hamilton, Regional Municipality of Halton, McMaster University, Industries

**Short Term Target**

TSSR – 7.1 (2003) That an examination of emissions of toxic substances to air be carried out and that the effects of local emissions on the harbour water by direct deposition and through fall out on the watershed and transport via runoff be evaluated with an aim of reducing and eliminating local sources.

**Ongoing Targets**

TSSR – 7.2 OMOE enforce regulations to limit the emissions, which cause unsightly plumes and foul odours, which detract from the quality of the aquatic environment and its enjoyment by the citizens.

TSSR – 7.3 Industry respond to regulations and to new opportunities to limit air emissions causing problems.

TSSR – 7.4 Workshops be held for air quality scientists and researchers to assess the impact of airborne contaminants on runoff and direct deposition and identify practical short term steps that can be taken.

**Status**

Air quality concerns complete the cycle of pathways into the water. However, other than on a general reporting level by the RAP, the study and improvement of air quality in Hamilton is being left to another environmental group dedicated to this topic, Clean Air Hamilton.

Clean Air Hamilton (formerly the Hamilton Air Quality Improvement Committee, HAQIC) is putting forward a substantial program for improving a full range of air quality conditions. Clean Air Hamilton is working to implement the 28 recommendations identified to improve air quality in Hamilton in the 1997 reports prepared by the Hamilton Air Quality Initiative. Several targets and indicators have been identified to ensure goals are achieved. The group held a successful and informative international conference in Hamilton on air quality in 2002 entitled “Upwind, Downwind: A Practical Conference on Improving Air Quality”. The group has become the coordinating body for a new industrial self-monitoring initiative monitoring air emissions and off-site impacts. Clean Air Hamilton reports will soon be available on their website (<http://www.airquality.hamilton.on.ca>).

Scientists at McMaster University and the University of Toronto are doing leading edge research on the deposition of particles from the air. The City of Hamilton is part of this research, which uses windowpanes as collection devices. This line of research has the potential to identify

loading numbers from the air into the water; an assistance to the RAP in the further understanding of total loadings into Hamilton Harbour.

In response to regulations and to new opportunities to limit air emissions, the industrial members of the RAP Stakeholders (Dofasco, Stelco, Columbian Chemicals Canada) have made a number of changes to their plants.

Dofasco continues to make progress on reducing air emissions even exceeding the commitments made in their Environmental Management Agreement. Specific items on target with continued reduction expected include:

- Reduction in PAH emissions by 65 % (1993 baseline) and
- Reduction of benzene by 83 % (1993 baseline)

Dofasco also utilizes an ongoing program of greenbelting projects on its properties.

Efforts by Stelco to reduce air emissions include:

- Sinter Plant Ventilation Upgrade (1999),
- Sinter Plant Stack Emission Control System (2001),
- Sinter Plant Fugitive Emissions Controls (Ongoing),
- OMOE Strategic Targeted Air Compliance (STAC) dispersion air modeling,
- CO<sub>2</sub> Blanket in Scrap Burning Yard, and
- Reduction of H<sub>2</sub>S Emissions in conjunction with Lafarge (Started in 2001).

In an effort to minimize road dust emission, Stelco has an ongoing sweeping and maintenance program for its network of roads.

In 1997, Columbian Chemicals Canada (CCC) began using lower sulphur content feedstocks to lower emissions. CCC also reduced releases due to process upsets by the introduction of:

- Teflon Bags in Collection Equipment (1997),
- Preventive Maintenance /Predictive maintenance systems (1998),
- Installation of particulate monitors (1999), and
- Bag Collector Inlet Temperature Control (proposed for 2001).

In 2000, CCC completed a strategy to reduce particulate emissions from its site by replacing aging equipment and making upgrades where appropriate. Verification stack testing was conducted with OMOE oversight.

The OMOE will continue to ensure industrial compliance with environmental legislation to control and monitor air emissions to limit unsightly plumes and foul odours.

Historically, air quality initiatives have tended to focus on stack emissions. However, approximately 80 % of the particulate loadings in the air come from non-stack sources, such as fugitive emissions, roadway dusts, and long-range transport. At a municipal level, the City of Burlington has started an anti-idling initiative to encourage drivers to turn off their engines, thereby reducing the burden of vehicular emissions.