VI. COSTS FOR IMPLEMENTATION ACTIONS

VI.1 Introduction

The overall economic benefit of the RAP to the citizens of the Harbour watershed is expected to be substantial because of the many spin-off benefits to the economy and an improved image of the community. A specific study of these benefits, while it would be valuable, was not part of this update. A cursory assessment of the financial benefits of the RAP was included in the original Stage 2 Report and indeed the preferred options for implementation were selected, in part, on the basis of the original analysis. Since then, as individual projects come forward, costs and cost effectiveness are considered at the project evaluation level.

The current capital cost estimates are provided by the Bay Area Implementation Team (BAIT) members and follow the categories used for the RAP Recommendations.

The original RAP Stage 2 Report, 1992, identifies four areas where further clarification of costs was required. These are addressed in the following section under the same headings as the original report.

The original RAP Stage 2 Report, 1992, includes estimates of operating costs in addition to capital costs. This Stage 2 Update Report only contains capital costs. While estimates of operating costs can be developed, over time RAP operating costs become the norm and it becomes more and more difficult to define these costs with any certainty. This is as it should be since the cost of maintaining enhanced environmental conditions ought to be the norm. There are also examples in the Hamilton Harbour Remedial Action Plan where upgrades to waste water treatment facilities have resulted in lower operating costs. Reporting of these cost savings is done separately by the implementing partners. In some cases annual costs are identified. This normally occurs for some project components such as Research and Monitoring and Public Education and Information.

VI.2 Undefined Costs

VI.2.1 The Cost Of Dealing With The Main Body Of Contaminated Harbour Sediments

Harbour Sediments have been extensively studied over the past ten years. Consistent with the approach in the original RAP Stage 2 Report, 1992, three categories of sediment have been loosely defined: severely toxic (hot spots), intermediate toxicity (not identified for immediate remediation but in many cases still above acute toxicity levels) and low toxicity (west harbour conditions which do not seem to be significantly lethal to in situ biota). The costs for remediation of severely toxic hot spots are included in the cost estimates in section VI.4.4. The cost of remediating the intermediate toxicity areas is also included in this section but the option remains open to monitor the condition over time and determine if any intervention is required. The areas of low toxicity are not intended to be remediated, preferring to allow biodegradation and sedimentation, over time, to improve the condition of these sediments. In this case little monetary outlay is required.

VI.2.2 Costs Of Potential Future Industrial And Residential Development

The plan set out in the original Stage 2 Report, 1992, proposed, "to correct the existing problems with the current sewage volume". This updated Stage 2 Report proposes to maintain the same loading targets for the harbour while recognizing that municipal growth is anticipated. This will require higher levels of technology resulting in increased costs in order to meet the loading targets. For example, the City of Hamilton anticipates spending $160 million at the Woodward Waste Water Treatment Plant on increased capacity for growth. The cost of municipal growth requires a systematic examination of current planning and the implications of growth on the environmental conditions within the Harbour and its watershed.

VI.2.3 New Standards For Water, Sediment, Fish And Bird Contamination Levels

As our understanding of environmental processes and their outcomes increases, we can expect revised or additional standards to be developed. Seldom are new standards less stringent than the older standards. Consequently, if new standards are set, a number of the cost estimates within this report will have to be revised.

VI.2.4 Ancillary Costs/Air Quality

As science advances, the link between air quality and its impact on Harbour enjoyment and water quality increases. As with the original RAP Stage 2 Report, 1992, this update does not propose specific remedial actions to improve air quality. Such actions are being undertaken through initiatives of the federal, provincial, and municipal governments along with the private sector. In particular, a citizens group, Clean Air Hamilton, exists with a mandate to monitor and encourage enhancement to local conditions affecting air quality.

VI.3 Past Expenses

VI.3.1 Pre RAP to 1990

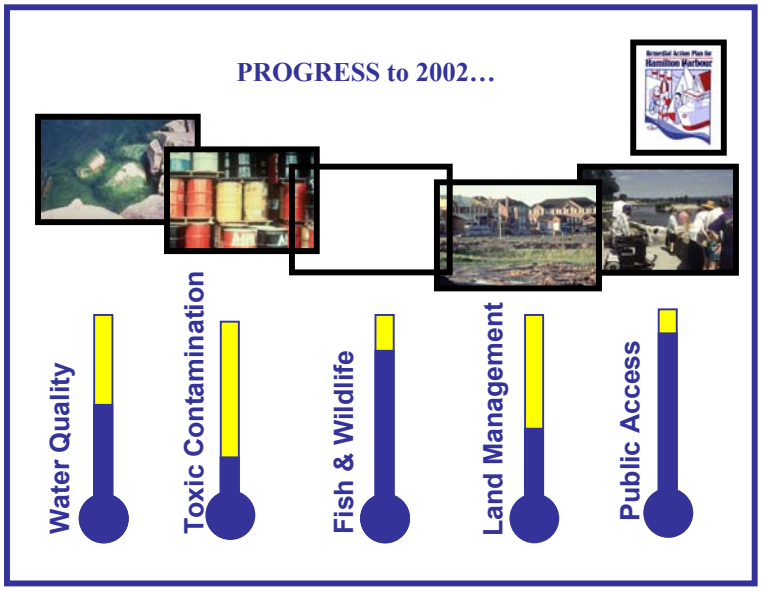
Expenditures for Hamilton Harbour cleanup are estimated in 1990 dollars as:

- $500 million by industry (Dofasco and Stelco)
- $100 million by municipalities (Hamilton-Wentworth and Halton)

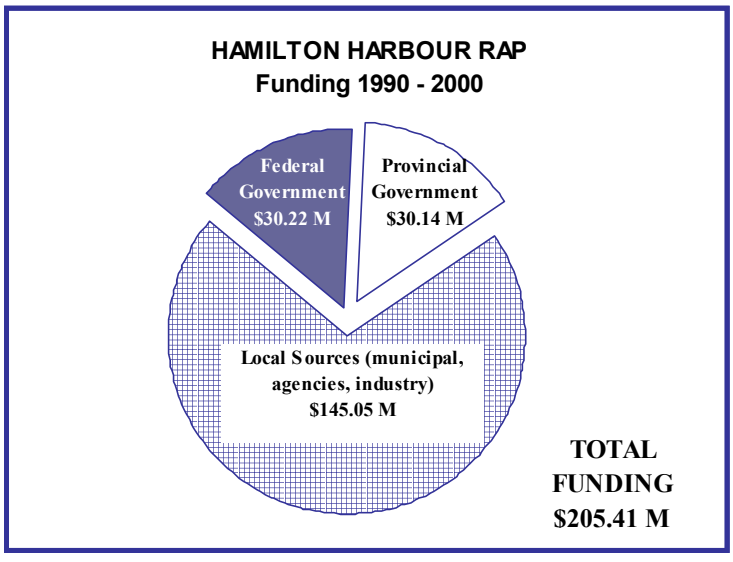
These expenditures, in the case of industry, relate to improvements in water quality and reductions in toxic contamination. In the case of the municipalities, the expenditures relate to improvements to waste water treatment plants affecting the RAP components for water quality and bacterial contamination.

VI.3.2 RAP 1990 to 2000

Significant progress has been made in the RAP, particularly in the area of fish and wildlife restoration and public access. Water quality has improved with swimming returning to the Harbour and the Municipal Industrial Strategy for Abatement, MISA, program has resulted in substantial reductions in contaminant loadings from industries.



Relative progress is shown on the chart above. Total spending on the RAP is shown on the chart below with municipal wastewater treatment and industrial abatement making up the largest local expenditures.



VI.4 Hamilton Harbour RAP Preliminary Cost Estimates (2000 - 2015)

VI.4.1 Overview and Summary

It is conservatively estimated that the capital cost to complete all remedial actions is approximately $650 million. This cost is summarized as follows.

Rap Component	Capital Cost	Annual Cost
Water Quality and Bacterial Contamination	$543,000,000.00	
Urbanization and Land Management	$10,110,000.00	$777,000.00
Toxic Substances and Sediment Remediation	$81,020,000.00	$48,000.00
Fish and Wildlife	$8,510,000.00	
Public Access and Aesthetics	$19,700,000.00	
Education and Public Information	$96,000.00	$933,000.00
Research and Monitoring		$740,000.00
Totals	**$662,436,000.00**	**$2,498,000.00**

The funding of the Remedial Action Plan was originally based on shared funding of major public remediation projects on the basis of 1/3 from the federal government, 1/3 from the provincial government and 1/3 from local sources. A user pay principle was followed for pollution abatement and for environmental cleanups attributable to known polluters. This approach will continue to apply as a funding principle.

VI.4.2 Water Quality and Bacterial Contamination

RAP Recommendations and Major Actions	Capital Costs	Annual Costs	Comments
WQ - 1, 2, 3 Actions required to reduce loadings of phosphorus, ammonia, suspended solids and bacteria from WWTPs and CSOs	$543M		$267M - Hamilton WWTPs $211M – Hamilton CSOs $65M - Halton Skyway WWTP
WQ - 1, 2 Water Quality Assessment and studies	$0.7M		$400K – Hamilton Harbour "WINS" (wastewater infrastructure needs strategy) $300K – Assessment of loadings targets for Cootes Paradise and Estuary of Grindstone Creek as related to Dundas and Waterdown WWTPs respectively
Totals	$543.7M		

Explanation: The capital costs identified for the Hamilton WWTP upgrades are those preliminary costs estimated for upgrading the WWTPs to meet RAP final water quality targets. Hamilton anticipates spending an additional $160 million to expand the capacity of the Woodward WWTP from approximately 400 mega litres per day to 600 mega litres per day to accommodate future growth. The expanded capacity of the plant will continue to maintain the same net loading targets identified for the WWTPs discharging to the Harbour as per RAP Recommendation WQ-1b. Expansion costs will form part of development charges levied for new development.

The City of Hamilton as part of the Hamilton Harbour "WINS" (wastewater infrastructures needs strategy) may refine the costs for the WWTPs and CSOs.

The Region of Halton's costs include both expanded capacity and upgrades to the Skyway WWTP to meet RAP water quality targets.

VI.4.3 Urbanization and Land Management

RAP Recommendations and Major Actions	Capital Costs	Annual Costs	Comments
ULM - 1, 2, 3, 4, 5, 6, 7, 10, 12, 13 Actions required to reduce environmental impacts of urban and rural development and land uses.	$10K	$137K/yr.	Most of the actions taken by municipalities and various government agencies are integrated into their budgets as staff time. The ongoing fund of 137K/yr., for the most part, represents new and/or enhanced programs.
ULM - 8 Water conservation actions (e.g. water metering program in Hamilton)	$9.35M	$444K/yr.	Hamilton's water metering program accounts for the bulk of this capital expense. The ongoing funding of 444K/yr. includes education and subsidy programs targeting water use reductions.
ULM – 9, 11 Watershed and groundwater studies	$753K	$192K/yr.	The capital costs include watershed studies and establishing a groundwater monitoring network. The ongoing funding of 192K/yr. is for groundwater monitoring
Totals	$10.11M	$777K/yr	

Explanation: Ongoing pollution abatement costs of storm water management and groundwater controls implemented by major Harbour industries are not included in the above chart. Similarly, most ongoing Urbanization and Land Management costs are integrated into the planning and development processes of the municipalities and are not identified as capital or ongoing costs.

The Urbanization and Land Management costs shown as "annual" may start as new costs but as time goes on they normally become part of ongoing normal operating costs for industry, municipalities and new developments.

VI.4.4 Toxic Substances and Sediment Remediation

RAP Recommendations and Major Actions	Capital Costs	Annual Costs	Comments
TSSR - 1 Actions related to spills; and contaminant uptake at Hamilton Port Authority CDF.	$5K	$25K/yr.	Most of the spill control actions are part of ongoing budgets of the MOE, EC and municipalities. The 25K/yr. is the cost of the Harbour spill control group.
TSSR - 3 Actions to meet goal of zero discharge of trace metals and organics through MISA program.	$11M $24M		$6.5M – Dofasco $4.5M - Columbian Chemical stormwater management controls Substantial ongoing costs are part of operational budgets of industries and not presented in this summary. City of Hamilton, Brampton and Rennie Street landfill remediation
TSSR – 4 Remediation of contaminated sediment in the area of Randle Reef >800 ug/g PAH less naphthalene. 200-800ug/g less naphthalene. Dofasco Boat Slip Ottawa Street Boat Slip Windermere Arm/Strathearne Channel	 $46M		$31M – Randle Reef remediation including >200ppm PAH less N in Harbour and incorporating Dofasco and Ottawa Street Boat Slip contamination. $15M – Contingency cost for remediation of Windermere Arm, Dofasco and Ottawa Boat Slip contamination
TSSR - 5, 6 Actions targeting household hazardous waste reduction and reduction of pesticide use	$15K		Little capital cost or new ongoing expense since part of existing ongoing programs
TSSR - 7, 8 Reducing air emission of toxic substances	Costs not available		Most significant upgrades made prior to 2001 by industries.
Totals	$81.02M		

Explanation: At the time of writing this Stage 2 Update, cost analysis were being refined for RAP Recommendation TSSR-4 and therefore this cost component may vary substantially from that shown in the above chart. Similarly RAP Recommendation TSSR-3.3 "Status of Leachate Escaping Landfills" requires that a study be undertaken to define this issue. The costs of remediation may be substantial. As an example the cost to control leachate escaping the Brampton and Rennie Street landfills is estimated at more than $13 million.

VI.4.5 Fish and Wildlife

RAP Recommendations and Major Actions	Capital Costs	Annual Costs	Comments
F&W – 1, 2,3, 4,9,10,11,13 Fish and Wildlife Project Steering Committee and implementation actions for enhancing and creating fish and wildlife habitat.	$8.508M		Cootes Paradise marsh $2,161,000.00 Grindstone Estuary $1,112,000.00 Northeastern Shoreline $1,755,000.00 Fisherman's Pier $2,015,000.00 Windermere Basin $1,465,000.00 Total $8,508,000.00
F&W – 5 & 8 Ongoing wildlife management.		$48K/yr.	Ongoing cost of controlling ring-billed gulls and other nuisance species. Many costs yet to be determined.
F&W – 6 & 7 Biological effects due to exposure to contaminants and indicators of fish and wildlife health			Costs associated with these recommendations form part of the remediation costs under the Toxic Substances and Sediment Remediation components of the RAP.
F&W - 12 Actions to maintain "no net loss" of fish habitat; measure reductions in fish and wildlife contaminant levels			Studies required for determining condition of fish and wildlife communities are included with Research and Monitoring component of the RAP.
Totals	$8.51M	$48K/yr	

Explanation: Additional costs complementary to fish and wildlife restoration form part of other components of the RAP. In addition, the Cootes Paradise and Grindstone Creek restoration project is a twenty-five year program and involves the ongoing involvement of five staff members of Royal Botanical Gardens.

VI.4.6 Public Access and Aesthetics

RAP Recommendations and Major Actions	Capital Costs	Annual Costs	Comments
PAA - 1 Increasing public access to 35% of shoreline.	$19.7M		Canada Discovery Centre $10.0M West Harbour Trail $2.5M Pier4 to Pier8 Trail $2.5M Windermere Basin $1.2M Fisherman's Pier and Trail $3.5M
PAA - 2, 3 Natural lands appreciation and trails; viewshed study			These actions are part of ongoing agency budgets.
Totals	$19.7M		

Explanation: In 2000, the Hamilton Harbour Commissioners, now the Hamilton Port Authority, transferred lands along the Harbour shoreline and at Windermere Basin to the City of Hamilton along with $6.3 million. The City of Hamilton established the Hamilton Waterfront Trust with a mandate to develop waterfront open space and amenities. In 2003, Parks Canada will open the Canada Marine Discovery Centre and provide a major new interpretive feature focusing on the Great Lakes Environment and the Hamilton Harbour Remedial Action Plan. Royal Botanical Gardens has ongoing access and interpretive displays focusing on the RAP and the Cootes Paradise and Grindstone Creek Restoration Projects.

VI.4.7 Education and Public Information

RAP Recommendations and Major Actions	Capital Costs	Annual Costs	Comments
EPI - 1, 2, 3, 5, 6 Education on individual actions and informing public about Harbour cleanup.	$96K	$781K/yr.	A variety of programs provided by many agencies.
EPI - 7 Hamilton Harbour Stewardship program.		$152K/yr.	$120k – Watershed Stewardship $32k – RBG programs
Totals	$96K	$933K/yr	

Explanation: A variety of programs are delivered by the Conservation Authorities, Royal Botanical Gardens, the municipalities, federal and provincial agencies. There are in fact so many individual initiatives in this area that it is difficult to determine the level of effort funded on an annual basis. The most significant program directly related to the RAP is the Watershed Stewardship Program of the Conservation Authorities. This program also contains a component of capital works not reflected on the above chart.

VI.4.8 Research and Monitoring

RAP Recommendations and Major Actions	Capital Costs	Annual Costs	Comments
RM - 1, 2 Monitoring of fish and wildlife.		$140K/yr.	Estimate of RBG and DFO annual monitoring effort.
RM – 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,14 Monitoring of water quality and conditions within Harbour and Watershed		$600K/yr	Ongoing Research and Monitoring and management of the RAP cost approximately $600k per year between 1990 and 2000.
Totals		$740K/yr	

Explanation: One strength of the Hamilton Harbour RAP is the substantial level of ongoing research and monitoring. The major partners in this monitoring carry a large part of the costs within their ongoing operating budgets and the amount reflected above reflects principally the effort of the federal and provincial governments and Royal Botanical Gardens. Additional monitoring costs, not included above, are incurred by the municipalities and conservation authorities. McMaster and other universities also contribute substantial ongoing research on specific topics related to the RAP.