APPENDIX A
Responsiveness Summary
In Response to Comments made on the Draft Stage I Rochester Embayment Remedial Action Plan

ROCHESTER EMBAYMENT REMEDIAL ACTION PLAN, STAGE I
RESPONSIVENESS SUMMARY
7-23-93

This responsiveness summary has been prepared to document and respond to questions and comments made regarding the Draft Stage I Rochester Embayment Remedial Action Plan that was distributed and commented on during January and February of 1993. Four meetings were held in January of 1993 on the Draft Stage I RAP. In addition, some individuals wrote letters with comments.

The responsiveness summary is organized into categories as follow:

1. Executive Summary, Introduction, Environmental Setting, and Project Administration Issues.
2. Goals
3. Use Impairments/Existing Conditions/Problems
4. Pollutants and Pollutant Sources
5. Waste Site Pollutant Sources
6. Public Involvement in RAP Development and Implementation
7. Drinking Water System Issues
8. Education
9. Comments Regarding Remedial Measures and the Stage II RAP

Comments or questions are labeled with a "C" and answers with an "A". In each case where the name of the commentor is known, their name is included after the written comment.

1. EXECUTIVE SUMMARY, INTRODUCTION, ENVIRONMENTAL SETTING, AND PROJECT ADMINISTRATION ISSUES

C.1: Can we get copies of the information presented in the slide show? (Judy Braiman)

A1: Information provided in the slide show at the public meetings is included in the Executive summary of the RAP. If you would like copies of the word slides used at the public meeting, they are available upon request.

C2: I am skeptical of this project because I don't know who funded the research.

A2: Funding for the development of the RAP came from two sources: federal grant funds made available under section 205(j) of the Clean Water Act, and from Monroe County.

C3: Is Canada included in this study? (Ed Murawski)

A3: Canada is also preparing Remedial Action Plans for Areas of Concern in that country. Canada is not directly involved in the development of the Rochester Embayment RAP, but Canada will review and comment on our final products (Stage I and Stage II RAP) through their participation on the International Joint Commission.

C.4: I was surprised that the executive summary has so little usable information. It is ludicrous to call this a summary of all the findings of the study, because there is not much which can be used in order to make concrete decisions. I would suggest that this be revised to include more information. (Bill Bayer) After reading the full Stage I report , I believe is not properly reflected in the Executive Summary, nor was it in the public presentation. (Diane Heminway)

A4. The Executive Summary is not a summary of all of the findings of the study. Instead, it provides highlights from the full Stage I RAP. In order to summarize all of the findings, the Executive Summary would be much larger. It is the belief of the technical staff and the advisory committee that it is more important for the document to be short so that the likelihood of people reading it will be greater. In response to the concern raised, we have included information in the final Stage I RAP Executive Summary about how the full Stage I RAP can be obtained.

C5. Are other areas in the country preparing Remedial Action Plans, or is this something that is only being done in the Great Lakes area? (Dennis Pellitier)

A5 There are other areas in the country who are doing basinwide water quality planning to clean up a water resource. One example is the Chesapeake Bay. Other efforts are not called Remedial Action Plans, however.

C6. The narrative definition of the Rochester Embayment on page 4 of the Executive Summary is inconsistent with the Figure 2 map that shows the western bound of the embayment as Bogus Point. This same comment holds true for the full Stage I. Figure 4 of the Executive Summary should have Bogus Point and Braddock Point added to it. (Paul Sawyko)

A6. We have changed the narrative of the Embayment definition so that Bogus Point is the western boundary of the Embayment in both the Executive Summary and the full Stage I document. Figure 4 of the Executive Summary, and Figure 2-3 has also been amended to include Bogus Point.

C7. The references to Basins and Sub-basins on the top of page 7 of the Executive summary seem to be used interchangeably and are confusing. The difference between these two terms needs to be clarified.

A7. The paragraph has been amended to make this more clear.

C8. Executive summary: At the bottom of page 11, under planning/regulating jurisdictions, we mention Monroe County and the City of Rochester. Should other counties and cities be mentioned here as well? This comment would hold true for the full Stage I as well. (Paul Sawyko)

A8: Yes. This paragraph has been changed to be less specific.

C9. Executive summary: Page 16 section IVB1(1): One option for change would be to eliminate the detailed information about the fish consumption advisory, and instead just note that there is a fish consumption advisory for Lake Ontario. (Paul Sawyko)

A9: Because many of the comments at the public meetings referred to the lack of information in the Executive Summary, we have chosen not to omit this. Without the specific fish consumption information included, the impairment loses meaning to people.

C10. The glossary describes Cladophora as a nuisance algae. We recommend that the definition be changed to read: *Cladophora--An algae, commonly known as "maiden's hair", which provides shelter and breeding habitat for many aquatic invertebrates.*. (Industrial Mgt. Council)

A10. We have changed the definition to read: *Cladophora--A genus of green algae, commonly known as "maidens hair", which provides shelter and breeding habitat for many aquatic invertebrates and in excessive quantities cause unsanitary beach conditions.*

C11. A sentence on page 2-20 reads "However, the New York State Department of Health (DOH) has issued a health advisory on eating salmonids from Lake Ontario because their flesh contains potentially harmful levels of contaminants" may mislead the reader into believing that fish advisories are caused by many contaminants. We recommend the sentence be rewritten as: "However, the New York State Department of Health (DOH) has issued a health advisory on eating salmonids from Lake Ontario because their flesh may contain potentially harmful levels of dioxin, PCBs, pesticides, and mercury." (Industrial Mgt. Council)

A11. The sentence has been changed to read: "However, the New York State Department of Health (DOH) has issued a health advisory on eating salmonids from Lake Ontario because their flesh contains potentially harmful levels of <u>some</u> chemical contaminants." An additional sentence has been added at the end of that paragraph to refer the reader to the full information

about the fish consumption advisory in chapter 6.

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2. GOALS

C12: One of the recommendations from the International Joint Commission was zero discharge of toxic chemicals, and I am curious if those people who work on the RAP also support that recommendation of zero discharge especially of persistent toxics. (Diane Heminway)

A12: Our stakeholders group, the Water Quality Management Advisory Committee, developed local goals and objectives for the RAP. During the development of the goals and objectives both before and after the publishing of the Draft Stage I RAP, the issue of zero discharge was debated at length. After much deliberation, one goal and several objectives developed by the Committee refer to "virtual elimination" or "elimination". One goal is "Virtual elimination of toxic substances which cause fish consumption advisories." An objective under that goal is "Scheduled elimination of the releases and runoff of persistent toxic substances that necessitate health advisories for the Rochester Embayment of Lake Ontario". Another objective is "Scheduled elimination of discharges of chemicals that contaminate sediments and harm aquatic life." The word "scheduled elimination" is used several other times throughout the goals and objectives which can be found in Chapter 3 of the final Stage I RAP.

C13. Three of the ten goals are related to problems that originate outside of the Rochester Embayment. The issues include fish, exotic species, and plants. How can we make sure that there is a coordinated effort so that we are not trying to accomplish something that is not accomplishable? (Larry Stid.) Since a major source of pollutants seems to be atmospheric, does our plan overlap with areas where there are some pollution concerns, i.e. the Ohio Valley? (Tom Low).

A13: There are several actions being taken in addition to our RAP to address the fish consumption advisory causes. For example, RAPs are being prepared in 42 other areas of concern in the Great Lakes. The actions to be implemented in these areas will contribute to remediating the problem. One objective we have stated in our RAP is to get a formal system in place to mandate the coordination of RAP jurisdictions. Also, the implementation actions of the already completed Lake Ontario Toxics Management Plan will help address the fish consumption problem. Those involved in that plan include the U.S. Environmental Protection Agency, Environment Canada, the New York State Department of Environmental Conservation, and the Ontario Ministry of the

Environment.

With regards to exotic species, the zebra mussel is the species of current concern in the Great Lakes. There is no realistic means of control of the proliferation of zebra mussels in the lakes. They will continue to spread and eventually reach a stable number. Local users of Lake Ontario are coping with the mussels by : 1) chlorination of service lines (by a restricted permit only), 2) use of hot water in pipes, 3) use of a molluskicide (by permit only), and 4) mechanical scraping of pipes.

Excess cladophora algae, is caused by excess nutrients, (especially phosphorus), to the shore zone of the lake. It will be important to determine, as part of the current development of the Lake Ontario Lakewide Management Plan (LaMP) by the U.S. and Canada, whether or not there is a need to reduce new inputs of phosphorus from all areas of the lake. Monroe County will need to get involved in reviewing the LAMP to insure that this is addressed. Meanwhile, Richard Draper, from New York State Department of Environmental Conservation has agreed to transmit this concern to those who are writing the LaMP.

Regarding atmospheric deposition, it is true that what happens in the airshed outside our jurisdiction is a problem. Our strategy is to deal with atmospheric deposition by treating stormwater runoff through mechanisms such as wetlands before the stormwater is discharged to Irondequoit Bay or Lake Ontario is a recognition of the magnitude of the airshed and limits on local control at the source. State and federal government agencies are now recognizing the need for "multi-media" pollutant regulation that recognizes the interconnection between pollutants on the land, in the water, and in the air. There are other USEPA initiatives stemming from the Clean Air Act Amendments of 1990 that will require an inventory of air sources that are contributing to toxics in the lake.

C14. Full Stage I: Page 3-16, 6th paragraph. The meaning of the sentence: "Now all permitted discharges in NYSDEC Region 8 have been brought into compliance with water quality standards." is unclear. Also in that paragraph, what is meant by "...waters that are above standard."? What standard? Also, are substance bans still a part of the Water Quality Enhancement and Protection Policy? (Chris Rau)

A14. The statement, *"All permitted discharges in NYSDEC Region 8 have been brought into compliance with water quality standards"*, is not clear and has been changed in the final Stage I document as follows: *" All permits for discharges in Region 8 have been written based upon conformity with minimum wastewater treatment requirements and current water quality*

standards (NYSDEC standards are referenced in 'Water Quality Regulations: Surface Water and Groundwater Classifications & Standards, NYCRR Title 6, Ch. X, Parts 700-705')".

The phrase that in the draft Stage I which was worded, *"...waters that are above standard"*, has been changed in the final Stage I to read, *"waters of a higher quality than existing standards"*.

The toxic substance bans are a part of the NYSDEC's Water Quality Enhancement and Protection Policy. Some persistent toxic substances are threatening to the environment and the only way to eliminate the release of those substances is to ban the use, manufacture, and storage of them. The NYSDEC will investigate the issue for the purpose of controlling the release of specific toxic substances through substance bans. Also, the statement in that paragraph, " The NYSDEC Division of Water is advancing a Water Quality Enhancement and Protection Policy..." now is a new paragraph to minimize confusion with the previous discussion of discharge permits.

C15. The RAP may have gone beyond the requirements of the Great Lakes Water Quality Agreement as it relates to the RAP process. The draft Stage I RAP inappropriately has as one of its objectives the "virtual elimination of the releases and runoff of persistent toxic substances..." In many other objectives the terms "elimination" and "virtual elimination" appears. Nowhere does the Great Lakes Water Quality Agreement (GLWQA) identify "virtual elimination" or "elimination" as a RAP goal or objective. Rather, the GLWQA has as one of its objectives "...Pending virtual elimination of persistent toxic substances in the Great Lakes System, the Parties...shall identify and work toward the elimination of...critical pollutants pursuant to Annex 2 (the section of the GLWQA dealing with RAPs). The GLWQA also calls for RAPs to "...serve as an important first step toward virtual elimination of persistent toxic substances." There are levels at which pollutants may be present in the environment without causing adverse effects or impairments. This concept is the basis for the Clean Water Act's water quality standards system. Annex II, Subsection (6)(b) of the GLWQA appears to support this concept. "Virtual Elimination" and "elimination" are not appropriate goals for the RAP. Also, the footnote appearing on page 3-11 stages: "*it is recognized that the most effective way to achieve this objective is by dealing with the toxics at the source." This footnote should apply to all objectives relating to pollutant sources. (Industrial Mgt. Council)

A15. The goals and objectives were developed by the Water Quality Management Advisory Committee which had IMC representation on it throughout the RAP process. The WQMAC has considered the new IMC objection to the terms "virtual elimination" and "elimination" in the objectives. As a result, a definition of virtual elimination has been included. It now says: "In the following objectives, virtual elimination" or

"elimination" refers to a process that must be negotiated among all affected parties in order to obtain reasonable and achievable results. It is recognized that the most effective way to achieve this objective of virtual elimination is by dealing with the toxics at the source." The first goal of the WQMAC is now "Virtual elimination of toxic substances which cause fish consumption advisories." The first objective under that goal now reads "Scheduled elimination of the releases and runoff of persistent toxic substances that necessitate health advisories for the Rochester Embayment of Lake Ontario."

C16. The first WQMAC objective under the goal of "Shorelines and waterways are free of objectionable materials which degrade water quality and appearance" is "Reduction of Cladophora, zebra mussels, and alewives within the Rochester Embayment to below nuisance levels." The alewife population has already declined and this forage food may have fallen below levels capable of supporting the desired salmon populations in Lake Ontario. To reduce the alewife population further may not be consistent with State policies. (Industrial Management Council)

A16. The objective has been changed to eliminate the words "and alewives".

C17. The second objective under the goal of "Contaminated sediments in the lower Genesee River have no negative impact upon the water quality and biota in the Rochester Embayment; sediment quality is suitable for open lake disposal" currently reads "Scheduled elimination of discharges of chemicals that contaminate sediments and harm aquatic life." It should be noted that there is little evidence to substantiate claims that the sediments in the Genesee River are contaminated <u>and</u> affect aquatic life. (Industrial Mgt. Council)

A17. Information on evidence of impaired uses is included in chapter 4. The evidence that we have on this issue is presented in the section entitled "Degradation of Benthos" in chapter 4. In that section, under the heading "Causes (possible)" there is an acknowledgement that "The presence of elevated levels of contaminants in tissues (of organisms) suggests that pollutants <u>might be</u> adversely affecting the benthic communities, but more specific tests would be needed to determine exact cause and effect relationships." The words "might be" replace the words "are".

C18. The last sentence of the first paragraph in section 2(a) in chapter 3 should be changed to read " The State has set water quality criteria for many toxics. The State has also prepared a nonpoint source strategy." (Industrial Mgt. Council)

A18. This change has been made.

C19. Chapter 3, Section B(2)(b) states, with respect to sediment guidelines that; "In addition, the IJC has identified background levels of 18 substances in several areas of the Great Lakes, including the Rochester basin (Eastern Lake Ontario). There is cause for concern if actual concentrations exceed the background levels." It is unclear whether this statement refers only to the 18 (undefined) substances which the IJC has identified background levels for or to all substances. From a scientific perspective, and to be consistent with the overall goals for the RAP Chapter 1A2 which are correcting existing impairments, prevention of future pollution of the waters and protection of human health, we ask that the Final Stage I RAP state that desired sediment concentrations be tied directly to these three goals and not to "background levels". (Industrial Mgt. Council)

A19. The reference in chapter 3 has been changed to be more clear as follows: "In addition, the IJC has identified background levels of 18 substances in sediments in the Great Lakes. That includes data on 10 substances (2 nutrients, 7 metals, and volatile solids) in the Rochester basin of Lake Ontario. The IJC Surveillance Work Group recognizes that additional work is necessary to quantify background levels of pollutants in the basins where no data currently exists. The Work Group suggests that sediment with concentrations less than or equal to background levels is acceptable." The goal that has been established by the WQMAC for sediments is that "Contaminated sediments in the lower Genesee River have no negative impact upon the water quality and biota in the Rochester Embayment; sediment quality is suitable for open lake disposal." This is contained in Chapter 3.

C20. In chapter 3, section 2(c) 1, under the section entitled Ecosystem Objectives, it states that one recommended ecosystem objective made by the Ecosystem Objectives Subcommittee is "Aquatic communities: The waters of Lake Ontario shall support diverse, healthy, reproducing and self-sustaining communities in dynamic equilibrium, with an emphasis on native species." This objective contrasts with the objective of some Rochester Embayment users as well as many state game management programs that the lakes sustain recreational and commercial fisheries. Coho and Chinook salmon are not native to Lake Ontario, and may not be self-sustaining at population densities desired by fishermen. The phrase "emphasis on native species" needs to be reconsidered. All ecological communities are dynamic. "Dynamic equilibrium" may not be a useful phrase for this objective. Certainly any community, impacted or not, will be at some kind of dynamic equilibrium. To the extent that the term "reproducing" is repetitive of "self-sustaining," it adds little to the objective. It does not occur in the wildlife objective. Many of the ecosystem objectives contain the verb "shall" implying that the objectives are mandatory. Neither Articles III or IV of the

GLWQA nor Annex II (specifically relating to RAPs) include a list of "mandatory objectives. Rather, Article III expressly indicates that "these waters should be free from substances..." Use of mandatory terms goes beyond the GLWQA and may prohibit the use of cost-effective approaches to remediating the Rochester Embayment. As noted in the USEPA's "Framework for Ecological Risk Assessment" (1992), the relationship of the indicators to the objective must be considered before adopting the indicators. Unless the indicator clearly reflects changes in the objective, it is not useful. Thus, changes in residue levels in fish might be useful as an indicator for evaluating human health objectives or wildlife objectives, but would not necessarily show that an aquatic community ecosystem objective was attained (unless better associations between body burdens and ecological function are developed). The RAP should identify usable indicators of achieving the ecosystem objectives and it should be an integral part of the objective development. Aquatic ecosystems have several basic functions. They convert sunlight to produce organic compounds, take up phosphorus, nitrogen, silicates, etc. and incorporate them into organic compounds (i.e. ecochemical cycles), and they provide food for aquatic and terrestrial communities. They also degrade compounds, both biotic and xenobiotic, demonstrating what is described as assimilative capacity. The challenge is to incorporate these functions into objectives. Thus, we recommend the following ecosystem objective for aquatic communities: *The waters of Lake Ontario should support diverse and self-sustaining communities capable of significant primary and secondary productivity. Populations of native species are to be encouraged. Management practices should optimize commercial and recreational uses of aquatic populations such as fish.* Controlling critical pollutants will not in and of itself solve the Embayment's use impairment problems. Habitat destruction, exotic species, and over fishing may be of equal or greater significance in the destabilization of the Embayment's ecosystem. (USEPA's Great Lakes Five Year Strategy). The RAP should state more clearly that the identified Genesee River and Lake Ontario Ecosystem objectives and goals cannot be met solely through implementation of the RAP. (Industrial Mgt. Council)

A20: The objectives in this section are ones recommended by a subcommittee of the IJC. Your concerns about the wording of these objectives will be relayed to the IJC and the NYSDEC for consideration through the submittal of this responsiveness summary to them as with the Stage I RAP. One of the goals of the WQMAC is "Diversity of plant and animal communities within the Rochester Embayment." An objective is "Self-sustaining populations of walleye, lake trout, Hexagenia (fly larvae) and fish eating birds and mammals (ospreys, mink, eagles)." Regarding your concern that the term "reproducing" is repetitive of "self-sustaining," we disagree. Reproduction can occur with a reproduction rate low enough that the population is not

sustainable. The Stage I RAP recognizes that Lake Ontario Ecosystem objectives and goals cannot be met solely through the implementation of the RAP. This will be reiterated in the development of the Stage II RAP which will outline implementation measures to be conducted in the Rochester Embayment.

C21. The chronic value for silver listed in Table 3-3 as 0.12 µg/l is incorrect and should not be used. As of this date, USEPA has not issued a chronic water quality criterion for silver. Also, the acute value of 4.1 µg/L applies to water with a hardness of 100 mg/L (as CaCO3). We recommend the deletion of the chronic value of 0.12 µg/L for silver and the addition of ** after the acute value of 4.1 µg/L. We also recommend the footnote ** be changed to read: *"**Hardness-dependent; value assumes 100 mg/l hardness. The value of the criterion increases as the hardness of the water increases."* (Industrial Management Council)

A21. These changes have been made. The note also includes the value of Lake Ontario hardness– 120 mg/L.

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3. USE IMPAIRMENTS/EXISTING CONDITIONS/PROBLEMS

C.22: You have defined four major chemical pollutants that necessitate fish consumption advisories. Is there a study being done on how to deal with eliminating these? (Dave Miller) C.32 An EPA study shows that even though industrial pollution has been monitored and reduced, stormwater runoff is a major concern because it carries pesticides that impact the fish. (Orlean Thompson)

A22. The four pollutants that necessitate the fish consumption advisories , the sources, and what is being done to deal with eliminating them are briefly outlined below: 1. Polychlorinated Biphenyls (PCBs) may come from some dumps, in-use electrical equipment, and cycling exchanges between sediments, water, and air. PCBs have been banned in any new uses, but are still in use in older electrical equipment much of which is the subject of an ongoing removal program. Some landfills known to have PCBs are being remediated. 2. Mirex was used as a pesticide in the south, especially against fire ants, but not in this area. It was manufactured in the Niagara Falls area and has also been found in the Oswego River area where it was used in a product manufactured in Fulton. The use of mirex has been banned in the United States. 3. The principal sources of dioxin are two dumps from the Niagara Falls area. (Dioxin was probably released as a by-product by a manufacturing process on the Niagara River that has now been

discontinued.) There is an effort to remediate landfills in the Niagara Falls area that are leaking mirex and dioxin. No source of mirex has been found in the Rochester Embayment. Sources of dioxin may exist locally from the combustion process. 4. Chlordane, an insecticide now banned from use, was once in widespread use and may still contribute to stormwater contamination. A Lake Ontario Toxics Management Plan has been prepared that includes actions that need to be taken to help address these pollutants that are a lakewide problem. In addition, a Lake Ontario Management Plan (LaMP) is being prepared that will also address this issue by identifying a binational load reduction strategy to reduce inputs of critical pollutants contributing to lakewide problems such as fish consumption advisories.

C23: The DEC says you can eat the fish, and the Health Department says you cannot. Do you expect people to take such written information on fishing trips? Some people have been advised to eat more fish in their diet because of certain benefits to health and many poor people eat fish because it is affordable. Articles are published in the paper about how to fillet the fish so that you minimize contamination. We are getting mixed signals. For people who eat the fish for sustenance because of its affordability, there should be an opportunity to obtain uncontaminated fish.(Mr. Frank, John Schoth, Susan Sarini, Dick Streeter)

A23. The New York State Department of Health issues advice yearly about eating sportfish and wildlife taken waters of New York State (including Lake Ontario). The Health Department issues the advisory because some of these foods contain potentially harmful levels of chemical contaminants. The advisory is a recommendation rather than a mandate.

The New York State Department of Environmental Conservation prints the Health Department advisory in the annual edition of the Fishing Regulations Guide, received by those who buy fishing licenses.

For those individuals who decide to eat fish, information is available from both the New York State Departments of Health and Environmental Conservation on methods to prepare the fish in order to minimize contaminant intake. The State Health Department, in its written advisory, recognizes the health benefits of eating fish, but notes that fish with high contaminant levels should be avoided. The advisory suggests that when deciding whether or not to eat fish which may be contaminated, individuals should weigh the health benefits of eating fish against the health risks. The Health Department notes that, "For young women, eating contaminated fish is a health concern not only for herself but also to any unborn or nursing child, since the chemicals may reach the fetus and can be passed on in breastmilk. For an older person with heart disease, the risks, especially of long term health effects, may not be as great a concern when compared to the benefits of reducing the risks of heart disease." For your own copy of the 1993-

94 Health Advisories: Chemicals in Sportfish or Game, contact the NYSDOH at 1-800-458-1158.

The Monroe County Water Quality Management Advisory Committee has also prepared a smaller pamphlet on the fish consumption advisory that could be used by individuals. This pamphlet will be targeted specifically to cultural and socio-economic groups that depend on fish for sustenance. There are also many species and sizes of fish that can be caught in Lake Ontario that are less contaminated, and therefore have a less restrictive advisory to eat no more than one meal per week. However, it is recommended that women of childbearing age and children under the age of fifteen eat no fish from Lake Ontario.

C24: Some months ago I attended a presentation by the Monroe County Health Department regarding the health study done near Kodak, and one of the things they did not look at was brain tumors. We need to look for things which **are** causing problems and not things which **might** cause problems.

A24. The presentation by the Health Department was regarding the Disease and Symptom Prevalence Study done near Kodak Park. That particular study did not deal directly with cancer. However, a cancer incidence study was done by the New York State Department of Health in the Kodak Park area and it was found that the incidence of brain cancer was not elevated. This study was released to the public in 1991.

C25. When you looked at the list of 14 possible use impairments identified by the International Joint Commission, you found that there was not enough information available to determine whether or not two use impairments exist in the Rochester Embayment (the two impairments are tainting of fish and wildlife flavor, and fish tumors or other deformities). Will there be any local effort, or funding, to find out if these impairments exist? Garry Schmitt.

A25. In preparation of the RAP, we looked at the list of 14 use impairments identified by the International Joint Commission to see whether we know or suspect the impairments to be a problem in the Rochester Embayment. We answered these questions as best as possible with existing information. In many cases we did find known problems and known sources and in some cases we did not have enough data to determine whether or not we had a problem, or what the cause of the problem was. In the two cases where we could not determine whether or not we have use impairments, we are considering what actions need to be taken to determine whether we have the impairments. Any research actions deemed important will then be recommended for implementation in the Stage II RAP.

C26. In the Exec. Summary and the full Stage I RAP (Exec. Sum Page 24, item 3), it is stated that the cause for degradation of benthos is unknown; however, earlier in the text one known cause is listed as oxygen depletion. (Paul Sawyko)

A26. This has been amended to recognize that some but not all causes for the degradation of benthos is known

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C.27: Are there any hard facts on the levels of pollution and why are these facts not in the executive summary? (Barbara Clark)

A27. Chapter 4 of the Stage I RAP includes extensive information on the current levels of pollution. Portions of this information is included in the Executive Summary in the form of the status of the use impairments. Members of the RAP Technical Group and Advisory Groups felt that more detailed information on current conditions was not easily extractable for inclusion in the Executive Summary.

C.28: Is there a definition of the word Embayment? (Peter Smith)

A28. For purposes of the Rochester Embayment RAP, the definition of the Embayment is "...the area of Lake Ontario formed by the indentation of the Monroe County Shoreline between Bogus Point in the Town of Greece and Nine Mile Point in the Town of Webster, both in Monroe County. The northern boundary is the straight line between these two points. The southern boundary of the embayment also includes approximately six miles of the Genesee River that are influenced by lake levels from the river's mouth to the Lower Falls." Maps showing the embayment are included in chapter 2 of the Stage I RAP, and in the Executive summary.

C.29: Is the Embayment given a higher priority for monitoring than the watershed? (Peter Smith)

A29. The EPA, US Geological Survey, NYSDEC, and local Health Department all monitor at locations that they feel are appropriate. In many cases monitoring is of higher priority in the watersheds because that is the source of many pollutants.

C.30: You are probably familiar with the Leggett Report. Has a good comprehensive ground water quality study been done? Also, have you looked at mapping the watershed in terms of land use with GIS? (Peter

Smith)

A30. The Monroe County Health Department is familiar with the 1935 Leggett Report which inventories many of the groundwater wells in existance at that time and provides limited information on groundwater quality in Monroe County. The Monroe County Health Department also has a great deal of data on groundwater quality. While a recent comprehensive groundwater study has not been prepared for all of the watersheds tributary to the Rochester Embayment, Dr. Richard Young from S.U.N.Y. Geneseo is reviewing groundwater data needs. Monroe County is in the process of implementing a computerized Geographic Information System (GIS) to map county watersheds and land use. The maps prepared by Dr. Richard Young are being incorporated into this system. Monroe County has a working relationship with the U.S. Geological Survey (USGS) who has a GIS system capable of such work. The County currently has a joint agreement with the USGS to provide such information in the East Branch of Allens Creek watershed. It should also be noted that several other counties have GIS systems. As part of the Stage II RAP, where remedial measures will be considered, the application of a GIS system will be integrated, and used as a tool to create a relational geographic database.

C.31: Can anyone respond to a question on the solubility of heavy metals, lead, mercury and its potential impact in the environment on fish and wildlife? (Diane Heminway)

A31. Certain forms of lead and mercury are soluble. For example, methyl mercury and tetrethyl lead are soluble, while many other forms of these metals have limited solubility. These soluble forms of the metals can enter the tissue of fish and wildlife through the food chain and cause various kinds and degrees of health problems in fish and wildlife.

C32. We use a gas liquid chromatograph to test fish that we process into animal feed from the Lake Ontario system, and found no PCB's, DDT or Mirex this past year. (Bill Stappenbeck)

A32. The datareferred to, including information on the detection limit of the equipment used to analyze the fish, would be very helpful information to include in the RAP.

C33. Full Stage I: Page 3-27. This map shows the wrong location for the Water Authority intake pipe. (Paul Sawyko)

A33. This has been corrected.

C34. Full Stage I: Page 4-41: Table 4-12 is titled "Priority Toxic Pollutants in Water of Embayment." The use of the word "priority" needs to be considered carefully. It needs to be clear whose "priority" it is. Perhaps the word "priority" should be dropped from the title. (Chris Rau)

A34. The word "priority" has been removed from the title.

C35: Was the contribution of groundwater to surface waters considered as part of the study? (Steve Trojanczyk)

A35. A considerable amount of information about groundwater is available in the Irondequoit Basin. On a basinwide scale, the groundwater contribution can be reasonably estimated by using the base flow of rivers (base flow means low flow in rivers after a long period of no rain). This was not, however, done as part of the development of the Stage I RAP.

C36. Chapter 4 may present a major misimpression to most readers that the Embayment is impaired in 12 out of 14 possible categories without any attempt being made to highlight the common causes, such as the buildup of pesticides and PCBs in fish tissue (impairments 3, 4 and 5), the presence of BOD exerting substances (impairments 6 and 7) and the presence of elevated nutrients (ammonia and phosphorus) (impairments 7,8,9,10 and 11). The existence of these common causes strongly suggests that addressing these causes first would yield the greatest benefits, in terms of reducing the number of identified impairments. Most of the data in Chapter 4 (Water Quality Conditions/Problems) was collected more than ten years ago. Most of the analyses of sediments for PCBs were performed in 1981 (Table 4-2). Analyses of toxic substances in fish (Table 4-3) were performed between 1981 and 1984. If the RAP restricts itself to analyses performed within the last few years, the measured concentrations of chemicals in water and sediments would typically be lower than those previously reported. In table 4-5 (Bulk Sediment Analysis: Metals and Cyanide) the concentrations measured during 1985 and earlier are almost always higher than the corresponding 1990 values. This improvement is consistent with the information provided on dredging activities. Prior to 1992, restrictions were in place to prohibit overflow dredging. In 1990 sediment analysis showed most chemicals in the sediment were in the "nonpolluted" or "moderately polluted" range. A few fell in the "heavily polluted " range. Since 1992, sediments from the Genesee River are deemed suitable for open lake disposal. There is ample evidence that the presence of chemicals, particularly metals, in the Embayment sediments has decreased during the past few years. Much of the data is old and may not provide an accurate picture of the current situation in the Rochester

Embayment. Using historical data to determine impairment will lead to incorrect conclusions. As such, before conclusions are established in the final Stage I RAP, good information (data) and good science are necessary inputs to this process. (Industrial Mgt. Council).

A36. A sentence has been added to chapter 4, paragraph 1c to acknowledge some of the pollutants that cause more than one impairment. It states: *"Table 4-1 shows that 12 of the 14 use impairments exist in the Area of concern. Some common causes include build-up of PCBs in fish tissue, the presence of biological oxygen demanding substances, and an overabundance of sediments and the nutrient phosphorus."* In finalizing table 5-2 (High Priority Pollutants) during the development of the Stage II RAP, the linkage to multiple use impairments will be considered. It is true that much of the data in chapter 4 is not recent. We feel it is important to include this information to show that trends indicate a general improvement in sediment and water quality. The 1985 205(j) study of Genesee River Sediments, lead by the Monroe County Environmental Health Laboratory, made specific recommendations for follow-up analysis to extend trend data. The importance of this recommendation will be considered as part of the RAP Stage II Development as well.
It should be noted that restrictions to prohibit overflow dredging were in place both before and after 1992 and that the sediments were deemed suitable for open lake disposal both before and after 1992. The restrictions on overflow dredging were not due to designation of sediments as nonpolluted, moderately, or heavily polluted. The reason for restrictions on overflow dredging are to reduce the release of toxic chemicals to the river (e.g. ammonia, which is toxic to fish), to reduce incidents of increased oxygen consumption in the river, and to reduce the impact of resuspended sediments and fecal coliform on the swimming beach. Even if the sediments are cleaned up, it is expected that overflow dredging restrictions will continue to reduce the impact of resuspended sediments and fecal coliform on the swimming beach.
Further data is important and will be considered for implementation projects as part of the Stage II RAP.

C37: Under the possible causes section of the Degradation of Benthos impairment, the last sentence reads: "The presence of elevated levels of contaminants in tissues suggests that pollutants are adversely affecting the benthic communities, but more specific tests would be needed to determine exact cause and effect relationships." This may lead the reader to believe that conclusions have already been made with regard to contaminants adversely affecting benthic communities. The only information that is used to associate metals with the impairment of benthos is the presence of elevated concentrations of the metals copper, iron, nickel and silver in benthic

organisms. The presence of these elements in the organisms does not necessarily indicate a problem. Copper and iron are essential nutrients. Some concentrations can be regulated and perhaps utilized beneficially by the organisms. Nickel and silver are not essential elements, but they are ubiquitous in the environment and are present in varying amounts in most organisms. Comparing the data in the Appendix Table 2, page B2, for copper and iron to the data in Table 3, page B-9, the present concentrations of copper and iron in Embayment sediments are less than pre-industrial concentrations in Great Lakes sediments. There is no evidence that the organisms in the Embayment benthos have accumulated detrimental amounts of these or any other elements. It is just as likely, if not more so, that COD, manganese, phosphorus and total Kjeldahl nitrogen would have an adverse effect. It also seems unreasonable to imply an impairment associated with high levels of titanium and aluminum based on the data from a single crayfish, particularly since there was no mention made as to the health of the single crayfish. We recommend that this sentence be deleted. (Industrial Mgt. Council)

A37. This sentence has been changed to read: "The presence of elevated levels of contaminants in tissues suggests that pollutants might be adversely affecting the benthic communities. More specific tests would be needed to determine whether these pollutants or other conditions (such as low dissolved oxygen or type of substrate) are affecting these benthic communities."

C38. Can the extent of undesirable algae and taste/odor problems in drinking water be quantified? (Tom Low)

A38. We have changed the text of impairment number 9 in chapter 4 to reflect the fact that taste and odor problems due to algae are occasional. This usually occurs in the late summer and/or early fall. The County Health Department keeps records about beach closures, including if the reason is due to algae. The County Parks Department is responsible for removing the algae from the beaches. Actual numbers on the amount of algae cleaned off the beach are not kept, but could be estimated from employee time records.

C39. The RAP should clearly explain to the reader why some beneficial use impairments are not applicable in the Genesee River and/or Lake Ontario. (Great Lakes National Program Office of the U.S. Environmental Protection Agency).

A39. This information is included in the narrative in chapter 4. The tables in chapters 4 and 6 which summarize the use impairments have been amended to refer the reader to the text or to include short explanations regarding the "not applicable" designations.

C40: Many of the discussions of beneficial use impairments point to data gaps and research needs required to make an accurate assessment of the impairment. The suggestions are interspersed throughout the RAP. It would be helpful if these suggestions could be summarized at the end of the use impairment chapter or in a separate chapter. A chart may be a useful tool to illustrate these needs with such column headings as: Use Impairment; Data Gaps/Research Needs; Ongoing Studies. (Great Lakes National Program Office, U.S. Environmental Protection Agency).

A40: Such a chart has been prepared and is included as part of chapter 6.

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4. POLLUTANTS AND POLLUTANT SOURCES

C41: Kodak is the number one polluter in the state and while they are voluntarily reporting their emissions, they are still emitting nearly 14 million pounds of pollutants into the air and over 600,000 pounds into the water. (Diane Heminway)

A41. The reporting of emissions as stated above appears to be those reported by Kodak as required by the federal Superfund Amendments Reauthorization Act (SARA). The act requires that industries report, on a yearly basis, the discharges of certain substances to the environment via water, air, and fugitive discharges. The water discharges of 639,000 pounds is for the calendar year of 1991 at Kodak Park. The air emissions of 14.08 million pounds is the calendar year 1991 at Kodak Park. Because we were interested in data based on the "water year" which is not the same as the calendar year; we did not use SARA data in chapters 4 or 5 of the RAP. We use the water year because it is used by the U.S. Geological Survey who collects substantial amounts of data in our watershed. For further information on SARA data, interested individuals can call a toll-free number: 1-800-535-0202.

C.42: Is there a master list of SPDES permits within the area of concern? (Steve Lewandowski)

A42. Along with the RAP, we are also preparing basin water quality management plans for each of the three basins that flow to the Rochester Embayment. The Basin Plan format is similar to the RAP format. In each of the 3 basin plans, a list of major SPDES permits is included in Chapter 2. These lists do not include relatively small SPDES permits, and depending when you look at the basin plans, the information may be out of date. The New York State Department of Environmental Conservation has a master list of SPDES permits on a computer system. For specific information on the master list of SPDES permits within the NYSDEC Region 8, contact Tom Pearson at 226-

2466.

C.43: I can name 10 hazardous waste sites which are being started right now which DEC knows about. There are also collision shops, junk yards, and septic systems. These problems are known. When are these abuses going to be stopped and by who? (Mr. Frank)

A43. Specific inquiries into the status of enforcement actions at specific sites should be made to the New York State Department of Environmental Conservation in Avon, telephone 226-2466.

C44: Kodak has been dumping chemicals for over 100 years in the Genesee River and the atmosphere. Why this is not mentioned or alluded to? (Dick Streeter) C.3:The presentation did not include information on industrial pollution. There is a lot of talk about non-point source pollution, but Kodak is the number one polluter in the state. I have a problem with Kodak putting out 14 million pounds of toxicity into the air and 600,000 into the water, and this not being discussed at any great length. 4. Information should be included in the Stage I report about specific sources of pollutants. The names of polluters and their associated loading should be included. (Diane Heminway)

A44. Chapter 5 of the Stage I RAP discusses pollutant sources. This chapter provides information on pollutants in two different ways. First, the chapter contains information on loadings of pollutants to the water and to the air. In this section of the chapter, no specific sources are identified because the purpose is to identify the total loadings by pollutant, and by method the pollutant enters the ecosystem (non-point source runoff, point source discharge from regulated pipes, emissions to the air, and deposition from the air onto impervious surfaces). The second way the chapter provides information on pollutant sources is to provide detailed information on the pollutants that have been directly linked to use impairments identified in chapter 4. In this part of the narrative, Kodak is identified as a source of metals and phosphorus. It is also acknowledged that in the past Kodak used to be a part of the cause of oxygen depletion in the lower Genesee River. As part of the Stage II RAP development, pollutants will be prioritized. For the highest priority pollutants all known specific sources will be identified. This detailed information is needed to design appropriate remedial measures, not to state the problem.

C45: Lamprey eels should be noted in the report as part of the problem with fish. (Larry Moriarty)

A45. In the 1970's the sea lamprey was responsible for impairing the trout and

salmon populations by predation. However, under the current control measures, the lamprey is NOT posing a major problem for the survival of trout and salmon. The Great Lakes Fish Commission is controlling the lamprey population by using a lampricide in those streams that the sea lamprey spawn in, such as Marsh Creek near Bogus Point.

C46: Algae on the beach does not come from the Rochester Embayment, but from Lake Ontario away from the Embayment. (Larry Moriarty)

A46. Algae does wash up on the beach from the Embayment and from other areas depending on the wind direction. The cause of excess algae is nutrients such as phosphorus in the near shore areas of the lake system. The density and growth is greatest on stable substrate (e.g. rocks) near human populations such as the Rochester Embayment. It is important that we do our part to limit the amount of phosphorus that enters the system and causes this problem whether our area causes local problems or drifts onto someone elses beach.

C47: Has any thought been given to road salt going into the Lake? (Robert White)

A47. Road salt does enter the Lake via stormwater runoff. The road salt has not resulted in any specific use impairments in the Rochester Embayment or Lower Genesee River. However, in the past it has interfered with the normal turnover of water in Irondequoit Bay. A campaign to reduce the use of road salt, together with relatively mild winters has reduced that problem in recent years. It is still important to prevent road salt use from causing an impairment in Irondequoit Bay again. The major long-term concern with road salt is the impact it can have on groundwater used for drinking. When road salt gets into the water supply, it can increase the rate of corrosion of the plumbing, and trace metals from the plumbing may enter the water. Road salt also damages vegetation along heavily salted roads and damages automobiles and bridges.

C48: Is there any quantitative information available on how much sediment in the Genesee River is due to human activity? (Doug Stinson)

A48. Chapter 5 of the Stage I RAP provides extensive information on sediment. The primary information available on sediment sources is from the Genesee River Watershed Study published by the U.S. Environmental Protection Agency, and prepared by the U.S. Geological Survey. The study provides good estimates based on standardized sediment measurements and three years of data. The study found the Canaseraga Creek watershed to be the most prominent source area for suspended solids. Intensive agricultural areas on calcareous soils were among the highest contributors to the loadings. Black Creek (Genesee County), Oatka Creek, the middle Genesee (Mt. Morris to

Henrietta) and Conesus Lake watersheds followed in order of total sediment load. All received the majority of their sediment from cropland erosion. The upper Honeoye Creek had the highest loading per acre, 80% of which was from cropland. Several of the creeks, primarily in the upper Genesee Basin, had a greater sediment load from bank erosion than from cropland. Using data provided in the March 1975 Soil Conservation Service report entitled Erosion and Sediment Inventory, it is estimated that 480,000 tons per year of sediment enter the Genesee River from stream and river bank erosion in the stretch from Mt. Morris to Rochester. We do not have any more data specific to how much comes from human activities. In urban and suburban areas, unprotected soil is more likely to be associated with construction sites than with agriculture. Streambank erosion also can be accelerated by real estate development due to the increase in impervious surfaces which cause increased storm flows in local streams. Numerous studies in individual watersheds have shown construction sites to be a significant source of sediment in urban areas.

C49: There was no mention of nuclear contamination in the report, or any mention of radioactive chemicals in fish. (Dick Streeter)

A49. To our knowledge, radioactive chemicals are not causing any use impairments in the Rochester Embayment. Radioactive thorium was discovered by Kodak near its Hawkeye Plant located near Driving Park Bridge in the City of Rochester in June of 1991. A workplan was prepared and implemented to identify the extent of the thorium. The workplan included sampling in the Genesee River gorge, the water, and sediment. The results found levels to be below regulatory limits.

C50: Do people still dump diapers and solid waste in the Lake? (Ed Murawski)

A50. Solid waste is not currently, and has not historically been known to be dumped in Lake Ontario. Solid waste products found in the Embayment area are likely carried to the Embayment with stormwater runoff or are from litter from boaters or shoreline users. In the case of Durand-Eastman Beach (which is specifically where the diapers were seen), there is littering by people who use the beach, despite the available garbage cans near the parking lot. Periodic clean-ups are done by the Monroe County Parks Department crew but are not sufficient to keep up with the heavy usage of the park area especially on summer weekends. The Monroe County Parks Department has started to encourage people to carry out what they carry in via signage and general advertising.

C51: Is DEC tracking the path of pollutants? (Barbara Clark)

A51. The NYSDEC keeps track of the amounts of pollutants discharged from permitted wastewater facilities as reported by the dischargers. There are also a few water quality monitoring stations operated by the NYSDEC, the U.S. Geological Survey, or the Monroe County Health Department that collect and analyze water samples at specific locations on a regular basis. Special studies are also conducted at locations where there are indications of water quality problems. Efforts that have been undertaken to trace the path of pollutants from a specific discharge point have been related to the study of closed landfills and they are generally very costly. Chapter 4 of the Stage I RAP includes extensive information on water quality monitoring data including the quality of water, sediments, and air.

C52: What are some examples of air pollutants which are discharged? Are air emissions the major source of PCB's?

A52. Examples of pollutants discharged to the air locally include lead, silver, zinc, acetone, benzene, methylene chloride, toluene, and methyl chloroform. There are no reported air discharges of PCBs in the 5-County area around the Embayment. However, PCBs are in the air. It is estimated that atmospheric deposition to the surface of Lake Ontario amounts to 42 kilograms per year. These PCBs may come from portions of the airshed outside the 5-County area or may leak from small sources or landfills, or evaporate from the lake surface.

C53: Are there any studies on industrial accidents?

A53. Chapter 5 of the Stage I RAP includes estimated amounts of pollutants spilled.

C54. Did the question of medical waste emerge? Peter Bush?

A54. We did not quantify medical waste as a part of this project. Occasionally hypodermic needles are found on beaches (Sommerville and Rock Beaches in Irondequoit). The Health Department requires beach safety plans for public beaches that include routine surveys of the beaches for needles and other unsafe materials and proper disposal. The source of needles is suspected to be from individuals who may be using the needles for insulin injection or illegal drug use. The needles found are from the careless discard of needles by individuals participating in recreational activities near the shore, or in or near the storm sewer system. There is no indication that medical waste from institutions is making its way to public places directly, however medical waste, like all waste has the potential to contribute pollutants into the system.

C55. Land use along Erie Canal will change over the next decade, and that could have a dramatic impact on the water quality. (Clark King).

A55. The Erie Canal Corridor Plan is considering the impact of changed land use on water quality. There are goals and actions in the Erie Canal Corridor Plan that complement the goals and objectives of the RAP. Local land use controls will be a key element of protecting water quality. Development review standards have been recomended in model ordinances contained as attachments in the Draft Canal Plan. It will be important to mitigate the impacts of land use on water quality. This will be further considered in the Stage II RAP.

Q56. Is the DEC or any other state agency doing anything to study herbicides? (George Turner)

A56. Information in this area is very limited. To our knowledge, herbicides have not been linked as a source of any of our identified use impairments in the Rochester Embayment of Lake Ontario, but no specific studies have been done on herbicides in this watershed. One study that has been done by the New York State Water Resources Institute at Cornell University conducted an "Assessment of Pesticides in Upstate New York Groundwater" from 1985 to 1987 at farms and found a few groundwater samples contained residues of two herbicides (atrazine and simazine). There are also reports that well-maintained, dense turfgrass lawns minimize runoff and associated pollutants. More work is needed in this area.

C57. On page 5-3 of the full Stage I Report, under the discussion about the SPDES discharges, it isn't clear that industrial wastewater is part of the discussion. It sounds as though this SPDES information is only for publicly owned treatment facilities. (Diane Heminway)

A57. This has been changed to make it clear.

C58. The information provided in the Stage I RAP about pollutant prioritization was confusing. It is not clear what the prioritization process was or that it is as yet incomplete. (Diane Heminway)

A58. This has been changed so that it is more clear.

C59. I am surprised about the Mercury figures in Table 5-11 in the full Stage I report and do not believe the lead figures. A lawyer once told me that Kodak discharges 50 pounds per day of lead which is far more than the lead loading shown in Table 5-11. (Diane Heminway)

A59. The pollutant loadings at Rochester in table 5-11, including those for Mercury and Lead were estimated based on 23 data points collected by the U.S. Geological Survey. For a full explanation of the method of calculating the data in table 5-11, see Appendix C in the Stage I RAP. The lead loading reported on table 5-11 is estimated at 8 tons per year between Geneseo and Rochester. That works out to be approximately 44 pounds per day total lead. Regarding Kodak discharges of lead, NYSDEC SPDES data shows an average Kodak lead discharge of 7.8 lbs./day with a range of 4.5 to 14 lbs. /day. Atlantic States Legal Foundation estimates Kodak lead discharge at 12 lbs./day and the 89/90 average at 10.7 lbs./day. The 50 lbs/day value may derive from the 1984 permit maximum value, but there is no evidence of a 50 lb./day average.

C60. Exec Summary, page 32, number 12. Regarding total suspended solids SPDES information. We do have TSS calculations that were done locally. We should use them. This comment holds true for the full Stage I RAP also. Also, in Full Stage I, table 5-15 (page 5-63) it appears as though some kind of SPDES TSS figures were used. (Paul Sawyko)

A60. We do have some estimates of Total Suspended Solids that have now been included in table 5-3. Estimated Total Suspended Solids discharged from wastewater facilities add up to approximately 26,500,000 pounds per year. This works out to be approximately 13,250 tons per year, compared to 626,000 tons per year to the Rochester Embayment estimated to come from non-point sources.

C61. Full Stage I: Page 2-12/13. The chart at the top of page 2-13 lists industrial flows. In the narrative that precedes the chart, it says that "The largest industrial discharges in the drainage basins are from facilities owned and operated by RG&E & Kodak. Together they account for 259.84 mgd or over half of the flow from the major permittees." Why is the small 1.13 mgd flow from Kodak Apparatus included? Also, the 27.6 mgd for Kings Landing is an average--not design flow. Design flow is 36 mgd. (Chris Rau) Average flows at Russell Station is 125.28, and Beebee is 53.4. (Paul Sawyko)

A61. This chart has been removed because the information it provides is not particularly useful. The narrative still includes the major points.

C62. Full Stage I: Page 5-16: First full paragraph notes that "Any dischargers to the public (sewer) system must conduct pretreatment." Not every industry needs to conduct pretreatment. (Chris Rau)

A62. This is true. Only industrial dischargers who have wastewater that exceeds specified pollution limits are required to conduct pretreatment. For some

compounds listed in the Sewer Use Law, industrial users pay a surcharge in order to discharge to the public sewer. This sentence has been revised in the Final Stage I RAP.

C63. Table 5-18, page 5-66. This information on PCB Equipment Inventory should include comparable information for RG&E, and table 5-19 should be deleted. Information provided should be consistent among the utilities. (Paul Sawyko)

A63. We agree. Table 5-19 has been removed and PCB Equipment Inventory information for RG&E that is comparable to that from other utilities has been included in the Final Stage I Report. The information provided has been updated from the draft.

C64. Full Stage I: Table 5-3. Many of the numbers seem low because Kodak discharges more than the total SPDES loadings in this chart. Some specific pollutants that seem low include manganese, chloroform, phenolics, and xylene. The reason for the discrepancy in some cases may be that Kodak does not have permit conditions restricting discharge, so reporting is not required. (Ed Cooper, 2-18-93)

A64. The values shown in the table are correct for the 90/91 SPDES data base, and are the values reported by the dischargers to the NYSDEC. Manganese is not covered in the Kodak SPDES permit. Some of the discrepancy may be explained if Mr. Cooper is quoting 1989 data, while we have used the water year (October to September) of 1990/91. Xylene is not listed separately in our table 5-3, only as a part of BTX (Benzene, Toluene, Xylene).

C65: Page 5-22, Paragraph E of the full Stage I RAP states "The pollutants discussed in Section D were those that have been linked to impairments in the AOC. There is also a need to reduce the discharge of persistent toxics into Lake Ontario even if no impairment in the AOC is known to be associated with them. Work is being done as part of Stage II RAP to identify all pollutants of concern..." All pollutants discussed in Section D are not linked to impairments in the AOC. We suggest that this title be changed to read: "Sources of Pollutants in the AOC." Reducing the discharge of persistent toxics into Lake Ontario even if no impairment in the AOC is known goes beyond the intent of the GLWQA (Annex 2, (Para 2)(a) and Para 4). Para 2 states that "Remedial Action Plans and Lakewide Management Plans shall embody a systematic and comprehensive ecosystem approach to restoring and protecting beneficial uses in Areas of Concern or in open lake waters". Para 4 describes the requirements for RAPs for AOCs and makes no mention of persistent toxics in the open lake waters. Clearly the intent of the GLWQA is for RAPs to focus on AOCs and LaMPs to focus on the open lake waters. We

recommend that Paragraph E be deleted. (Industrial Mgt. Council)

A65. The GLWQA (Annex 2, paragraph 2, (b) also says that RAPs should "...serve as an important step toward virtual elimination of persitent toxic substances and toward restoring and maintaining the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem." The title of Section D has been retitled "Sources of Pollutants in the AOC." An additional sentence has been inserted in the cyanide paragraph noting that "Cyanide is not known to be causing any impairments in the AOC, However, high levels are found in both the Genesee River and Irondequoit Bay." Paragraph E has been modified as follows:
"Most of the pollutants discussed in Section D were those that have been linked to impairments in the AOC. There may also be a need to reduce the discharge of persistent toxics due to potential concerns for human health. Work is being done as part of the Stage II RAP to identify all pollutants of concern."

C66. The Draft RAP appears to place more emphasis on point source discharges than on pollutants from nonpoint sources. The Draft Plan identifies use impairments in the Embayment and clearly links nonpoint sources as major contributors to pollutant loadings. Page 5-3 (B)(1) Paragraph 2 states that "As part of the Stage II RAP, a table showing individual wastewater dischargers of the chemicals deemed to be of highest priority will be prepared. This will be an important tool in selecting remedial measures to be implemented." This section, relating to point source discharges is the only section that makes such a deliberate statement of how these priority chemicals will be handled. The reader may conclude that it is the intention of the RAP authors to treat point source water dischargers differently than all other pollutant sources. In the case of nonpoint sources, a table should also be prepared showing sources of the chemicals deemed to be of highest priority and that list should be used as a tool in the selection of remedial measures to be implemented on controlling nonpoint sources.
Page 5-7, Paragraph 5 describes how stormwater runoff loading estimates were calculated for presentation in this document. The closing statement suggests that the runoff estimates may be inaccurate and hence the warning that each reader "is encouraged to consult the appendix to make a judgement about the accuracy of the estimate." This disclaimer suggests the lack of credible data on nonpoint source runoff loadings. The absence of credible nonpoint source loading information will make it very difficult if not impossible to address impairments using a risk/prioritization process as recommended by USEPA. The Stage I and II RAP must insure that all sources issues are placed in their proper perspective with appropriate attention to the "real" loading and use impairment issues. Without good nonpoint source data the tendency may be to de-emphasize their contribution at the expense of already strictly regulated and controlled point source dischargers. Without accurate nonpoint source

loading information, Stage I of the Rochester Embayment RAP is incomplete. A risk prioritized Stage II cannot be developed in the absence of this data. (Industrial Mgt. Council)

A66. Non-point source pollution (whose origin includes point and fugitive air pollution) is considered to be a major source of pollution as evidenced by the section C of Chapter 5 which goes into extensive detail about the Comparative Importance of Point and Nonpoint Sources of Pollution. Several tables and figures go with this section that evidence the contribution of nonpoint sources. We have added a sentence in the non-point source runoff section of chapter 5 (B)(5) that says: "Table 5-13 also gives an indication of pollutants with large non-point source contributions. Non-point source pollutants of greatest concern due to their link with a use impairment, and the quantity of pollution include Copper, Nickel, Total suspended solids, and total phosphorus. After pollutants are prioritized as part of the Stage II RAP, those known to have significant loadings from non-point sources will be identified and used in the selection of remedial measures.
On page 5-7, Paragraph 5, the closing statement suggesting that runoff estimates are inaccurate has been removed. We believe our methodology is sound.

C67. The loading estimates used to discuss air deposition to the embayment are uncertain and based on extremely limited and variable data. Consideration should be given to including a reference to the Clean Air Act Amendment of 1990 as the mechanism to collect meaningful air deposition information. It is generally acknowledged that wet and dry deposition of chemicals occurs in the Great Lakes Basin, but the characterizations of this deposition are subject to a great deal of variation due to an imperfect understanding of the physical science affecting such processes. Thus, assumptions and incomplete data must often be used to even approximate loadings from deposition (Air and Waste Management Association, 1991). While issues concerning deposition of particulate chemical contaminants are uncertain, this is even more true of vapor contaminants and, in particular, dry deposition of vapors, since such deposition is very difficult to measure. Many of the chemicals of concern that are deposited on the Embayment originate in other areas from nonpoint sources. While transport of contaminants from one region to another presents one set of concerns, loading due to deposition from local sources presents quite another. Volatile materials such as organic hydrocarbons released locally are expected to be dispersed largely outside of the Embayment. Many of these materials are not persistent in the environment because they degrade in the atmosphere. Many of those which reach water sources are further degraded. Significant percentages of other materials may be deposited on soil and persist there, such as metals, and would not be expected to reach the Embayment (EPA, 1990). Thus, any considerations having to do with

point sources of air emissions within the Rochester Embayment should have a contaminant-specific basis, where factors such as particle size, chemical characteristics, and physical form are properly evaluated. Any attempts to use data on atmospheric releases of materials to estimate loading should recognize all of these uncertainties and should be structured accordingly. The Clean Air Act Amendments (CAA) of 1990 (Section 112(m) requires a monitoring network in the Great Lakes to assess deposition by 12/31/91, a report by USEPA to Congress pertaining to atmospheric deposition by 11/15/93, and promulgation of any emission standards deemed necessary to prevent adverse effects from bioaccumulation, etc. from indirect exposure by 11-15-95. Atmospheric deposition of chemical contaminants is a complex issue that is not well understood. Data generated in accordance with the CAAA should be utilized, and any data incorporated into the RAP should be done with a description of the uncertainties involved.(Industrial Mgt. Council)

A67. The loading estimates used to discuss air deposition to the embayment are from three different sources. The calculated loadings vary among the 3 data bases. In order to answer some of the points you raise, the narrative under air deposition (Chapter 5, (B)(2)) has been expanded to include the following paragraph taken from your comments: "There is an imperfect understanding of the physical science affecting atmospheric deposition. It is assumed that many of the chemicals of concern that are deposited on the Embayment and its watershed originate from a large geographic area from both point and nonpoint sources. Volatile materials released locally may be dispersed outside of the Embayment watershed, and those released hundreds of miles away may be deposited in the Embayment watershed. Some pollutants degrade in the atmosphere, and some may be deposited on soil and persist there. The Clean Air Act Amendments (CAAA) of 1990 (Section 112(m) requires a monitoring network in the Great Lakes to assess deposition by 12/31/91, a report by USEPA to Congress pertaining to atmospheric deposition by 11/15/93, and promulgation of any emission standards deemed necessary to prevent adverse effects from bioaccumulation, etc. from indirect exposure by 11-15-95. When this data is available, it will be considered to update the RAP."

C68: There is a reasonable concern that the criteria used to establish the lists in Chapter 5 "Priority Pollutants for the Rochester Embayment", Table 5-1 and "Highest Priority Pollutants",Table 5-2 may have been inappropriate; hence the criteria should be reevaluated. It must be clearly stated why a pollutant is listed and whether listing is consistent with the objectives of the RAP. This demonstration is not made for every substance listed. This information should be added to the draft and the public given a chance to comment before

the Stage I RAP is finalized.
The list of 80 pollutants (Table 5-1) was compiled from lists that have limited or no relevance to this Embayment. For example, "substances evaluated in the Niagara River Toxics Management Plan" were included on this list. We question why "the substances which exceeded Lake Ontario Management Plan standards" were included if these chemicals are not present in the Rochester Embayment. Table 5-1 should be reestablished to contain a list of pollutants of concern comprised of all other chemicals present in the Embayment. Since the chemicals on this list are not presently linked to any use impairment, their Prioritization in the Stage II RAP should consider the likelihood of causing an impairment. In this way we focus our attention on what we need to address, rather than being concerned about the things we cannot nor need to control.

The statement is made on page 5-1(A) that; "Of this initial list of chemicals, an additional technical group (The Priority Pollutant Task Group) determined which pollutants were of greatest concern to the Rochester Embayment based on toxicity, environmental effects, bioaccumulation, persistence, linkage with the use impairments identified in Chapter 4, and the known local pollutant loadings." A list of twenty chemicals was initially selected for Prioritization, based largely on the considerations listed here. This list has been referred to as "highest Priority Pollutants" (Table 5-2). While it was believed that many of the listed chemicals represented high concerns for the Embayment, this conclusion was based almost entirely on qualitative assessments, and no process had been established to evaluate them quantitatively. In addition to the criteria that are being used to rank pollutants, some chemicals appear to have been chosen simply because relatively large quantities of them are discharged to air or water. Thus, while some chemicals on the list of twenty might be considered high priority for evaluation using the above criteria, all of the chemicals on the list of twenty have not yet been characterized as being the highest concerns for the Rochester Embayment. It is improper to characterize these materials as being the highest concerns until a quantitative analysis is finalized. It should be clearly stated that some materials, listed in Stage I may not, upon further evaluation, be considered highest priority. After a review of the Draft Stage I RAP many pollutants identified are not linked to an impairment or its tendency to bioaccumulate. For example both methylene chloride and silver have very low bioaccumulation potential and there are no known impairments associated with either chemical in the Rochester Embayment. The term "Pollutants of Highest Concern" does not accurately describe the intent of or the conclusions reached to date by the Priority Pollutant Task Force. Once a more accurate identification of priority pollutants of concern is made then the plan can more correctly focus its efforts." Table 5-2 should be limited to those chemicals present in the Embayment that are known to be causing a use impairment. (Industrial Mgt.

Council).

A68: Table 5-1 has been amended to refer to a new appendix where information can be found on the origin of how chemicals got on the list. The table has also been amended to include a note that "It is recognized that the pollutant list should be dynamic and responsive to new information. This list should change as new information becomes available."The overall purpose of RAPs is to improve the quality of the Great Lakes. Therefore, the pollutants of concern to Lake Ontario are of concern to the Rochester Embayment RAP. In the effort to prioritize the importance of pollutants in the Rochester Embayment as part of the Stage II RAP, an important criteria will be whether or not a source of the pollutant exists in the Area of concern, and whether or not the pollutant is linked to a use impairment. It is true that Table 5-2 was based on qualitative rather than quantitative data and that the Priority Pollutant Task Group is currently developing a quantitative method of identifying the highest priority pollutants. The text in the Final Stage I RAP has been amended to recognize how table 5-2 was developed, and that it may change after a quantitative analysis is conducted. The title of table 5-2 has been changed to read "Preliminary List of High Priority Pollutants."

C69: We suggest that the first sentence in Chapter 5(A) be amended to say: "This chapter discusses the sources of pollutants and associated loading factors, measured and estimated, which may be contributing to use impairments in the Rochester Embayment AOC, and attempts to identify persistent toxic pollutants that may have sources in the AOC drainage basin." (Industrial Mgt. Council)

A69: This change has been made.

C70: In chapter 5, section A 1, a statement is made that "Pollutant sources were prioritized by evaluating a selected list of pollutants..." Prioritization of pollutants will appropriately take place in Stage II of the RAP. To more accurately reflect the RAP Stage I process, the word "prioritized" should be replaced by "identified". (Industrial Mgt. Council)

A70: This change has been made.

C71: In chapter 5, section 3a, is a narrative about nondetectables. The use of the 25% method for estimating nondetectable values may be an appropriate screening tool and probably sufficient for the purposes of the Stage I RAP. However, this method may significantly overestimate loadings from large volume point source dischargers. In a memo from USEPA Region 6 dated

November, 1992 Mr. Jack Ferguson recommends: "If any individual analytical test result for a permitted pollutant is less than the applicable quantification level you should treat the concentration of that pollutant as zero (0) when calculating daily maximum and weekly and monthly average loading and concentration values for the purposes of reporting on your DMR." Recognizing that most of the loadings to the AOC are coming from nonpoint sources and the inherent uncertainty in quantifying point source loadings based on nondetects, it may be more appropriate to utilize the Region 6 procedure, developing the list of pollutants of highest priority to the Embayment. (Industrial Mgt. Council)

A71: A discharge monitoring report (DMR) is the reporting mechanism used to demonstrate compliance with a SPDES permit. The SPDES permit is resultant of State and Federal Law, water quality limitations, and negotiation with the permittee. As part of the RAP process, an effort has been made to estimate pollutant sources and loadings discharged to the Rochester Embayment Area of Concern. A subcommittee of the Pollutant Loadings Task Group of the RAP Technical Group, including representatives of the major industrial and municipal dischargers to the Area of concern, were all aware of the difficulty in dealing with data at concentration values less than minimum detection limits (MDL). In the case of Monroe County, the pollutants were identifiable in the plant influents, but in many cases undetectable in the effluent. Since conventional treatment incidentally removes these pollutants at variable rates, the likelihood of some pollutants being discharged is real. To account for this, the Task Force felt that if a pollutant was detected in the effluent 25% of the time, it is reasonable to calculate the resultant pollutant loading at one half the MDL. The suggestion that the USEPA method be used when prioritizing the pollutants for inclusion in the Stage II RAP will be submitted to the task group for their consideration.

C72: In chapter 5, section A 3 b, the statement is made that "Air emissions from industries are often highly variable, with most emissions occurring during short periods." The basis for making this statement is unclear and appears to be an assumption not supported by data. The variability of air emissions is emitter specific. We recommend that this sentence be deleted. (Industrial Mgt. Council)

A72: The sentence has been amended to state: "Air emissions from industries may be highly variable over time."

C73: It is widely accepted that metals can exist in different chemical forms (species) and these species can differ in bioavailability and toxicity. Therefore, the

relationships between chemical speciation and effects must be considered to prepare a proper environmental assessment. This is an essential consideration for silver which appears on both Table 5-1 and 5-2. Silver sulfide, the most prevalent form of silver in the environment, is essentially nontoxic. Laboratory studies confirm that no acute or chronic aquatic toxicity occurs upon exposure to silver sulfide, even at concentrations that are orders of magnitude greater than those likely to occur in the environment. Neither have any field studies shown evidence of a cause-effect relationship between silver sulfide and impairment of the aquatic habitat. Other species of complexed silver, such as silver thiosulfate and silver chloride, have also been tested for aquatic toxicity and found to be relatively nontoxic. The only species of silver that is known to cause adverse aquatic effects at concentrations less than 20 µg/L is silver ion, Ag+. This species of silver is very reactive and readily forms complexes with substances containing sulfur, nitrogen, and oxygen. Silver ion does not persist during biological waste treatment, but forms complexes/compounds with other chemicals, eventually ending up as silver sulfide. Even if silver ion were somehow discharged directly it would not persist. Recent studies at the University of Wisconsin have shown that silver ion is rapidly adsorbed onto particulates suspended in the water column and present in the benthos. Adsorption occurs quickly, within minutes, while desorption has not been observed because it occurs so slowly. The binding constant for silver ion to particulates is sufficiently large to ensure that in waters containing suspended solids, no significant amount of silver ion will be present. Trying to environmentally categorize "silver" is technically unsound because of speciation and the wide range in toxicity and concentration of silver species. The species of silver, e.g. silver ion, silver sulfide, etc., must be specified in order to select the correct environmental properties. If silver is listed on Table 5-1 and 5-2 it should be expressed as silver ion, Ag+. The presence of a metal in the waters or sediments of the Rochester Embayment does not indicate harmful or deleterious exposure. The relationship between chemical speciation and effect must be considered. (Industrial Mgt. Council)

A73: The speciation issue raised is important. However, current reporting of chemical discharges is not broken down in this manner, and if we put only some species of substances on the list, data would not be available. Table 5-1 remains as it did in the Stage I report. However, for the finalizing of table 5-2, which is being done by the Priority Pollutant Task Group as part of the Stage II RAP, this issue be considered.

C74: Methylene chloride is not discharged to the Genesee River in quantities to cause any use impairment or to result in human health concerns. Although methylene chloride is released into the atmosphere, its dispersion patterns and physical characteristics suggest that it is transported largely outside of the

Embayment. Moreover, those quantities that are discharged or deposited into water are unlikely to persist in the environment (Stover and Kincannon, 1983; Klecka, 1982; Tabak et al., 1981). In view of the lack of potential effect or persistence, it is inappropriate to list methylene chloride in a manner that associates it with actual environmental effects or concerns. It should be stated where appropriate why materials that do not appear to be high concerns are listed, or alternatively, these materials should be removed from the lists. Methylene chloride discharged to the embayment does not result in use impairments or in concentrations indicative of potential impairments, nor is methylene chloride persistent in the environment. If methylene chloride and other chemicals were selected primarily due to the quantity of discharge, it should be clearly stated that these chemicals are listed for purposes of evaluation, but are not necessarily chemicals of concern by RAP definition. (Industrial Mgt. Council)

A74: Methylene Chloride is on Table 5-1 because it was a chemical of concern in the Niagara River Toxics Management Plan. The way in which chemicals were chosen to include in Table 5-1 is now included in the Chapter 5 Appendix D. Inclusion of methylene chloride on Table 5-2 was because of the amount emitted in this area. However, the table and the narrative also recognizes the fact that this information is preliminary, and that a more quantitative methodology for preparing a final list will be conducted as part of the Stage II RAP. The information you have provided will be considered by the task group working on this in the Stage II RAP development. Copies of the references you note will be helpful to the Stage II RAP work.

C75: In chapter 5, section B9 has a first sentence that reads "The pollutant sources discussed above do not represent all sources, but only those for which there is a comprehensive information base..." This sentence suggests that there is a comprehensive information base for nonpoint source runoff. Extrapolating the NURP data for Irondequoit Bay to the Genesee River does not represent a comprehensive information base. Our previous comments referring to page 5-7 clearly demonstrates that this is not the case for nonpoint source runoff. We recommend the sentence be changed to read: "The Pollutant sources discussed above do not represent all sources." (Industrial Mgt. Council)

A75: This sentence has been changed to say "The pollutant sources discussed above do not represent all sources, but only those for which there is a good base of information."

C76: The fourth paragraph in chapter 5, section C (Comparative Importance of Point and Nonpoint Sources of Pollutants) states that *"Table 5-11 shows total loadings and loadings per square mile for the Genesee River above and below*

Geneseo. Even though the lower basin is more highly urban and industrial, the upper basin contributes half or more of all pollutants listed. The area of the upper basin is 58% of the area of the entire basin, so it would be expected to contribute 58% of the pollutants if area were the only factor." Using this logic, one could conclude that since the loadings to the Genesee River above Geneseo is primarily due to agricultural runoff and air deposition, those loadings should be similar below Geneseo. One could therefore conclude that after subtracting out agricultural runoff and air deposition below Geneseo, the contributions from urban and industrial areas are small and probably deminimus. (Industrial Mgt. Council)

A76: This is one conclusion that could be reached for the 3 pollutants that represent 58% or less of the total loading. The other 3 pollutants for which data is able to be estimated for the portion upstream and downstream of Geneseo shows higher percentages in the downstream portion. The result supports the theory that much of the loading is uniform as would be expected if non point source loads dominate. The analysis does suggest that point sources are not hugely dominant for some parameters.

C77: We concur with the statement in chapter 5, section D7 that states: "Atmospheric deposition appears to account for most of the mercury discharged by the Genesee River." The statement "However, NYSDEC data indicate only three air dischargers emitting less than 2 lbs/yr. of mercury to the air in Monroe Livingston, Allegheny, Genesee and Orleans County" should be expanded to include "...therefore, it appears that most mercury loadings to the Rochester Embayment are from sources beyond the Genesee River Basin and that additional studies may be necessary to determine mercury loading sources." (Industrial Mgt. Council)

A77: This section has been amended to read: "However, NYSDEC data indicate only three air dischargers emitting less than 2 lbs/yr. of mercury to the air in Monroe, Livingston, Allegany, Genesee and Orleans County. Therefore, it appears that significant mercury loadings to the Rochester Embayment are from sources beyond the Embayment watershed. Studies ongoing or planned by federal and/or international agencies should be sought to help address this issue."

C78: In chapter 5, section D5, it is stated that "Benzo(a)pyrene is one of the most toxic PAHs. It has been documented to cause liver tumors in freshwater fish." Many PAHs have very low toxicity's, and the implicit comparison of them to Benzo (a) pyrene may be misleading. This point should be emphasized. (Industrial Mgt. Council)

A78: The last sentence of the first paragraph of this section now reads: "As a group,

they are widely distributed in the environment and have varying levels of toxicity."

C79: Figures 5-6, 5-7, 5-8, and 5-9 appear to add little value to the RAP document. They should be either expanded to provide clarification or deleted. (Industrial Management Council)

A79: The purpose of these figures are to show in a different format, the relative magnitude of pollutant sources for 4 pollutants. We have left these figures in for those who find this kind of representation helpful.

C80: The charts contained in chapter 6 which summarize the linkages between uses, pollutants and sources are very helpful. Even though the chart notes the difficulty in prioritizing and quantifying loadings from sources, it would be very helpful to have this information included. These charts could become a frontpiece for the RAP and/or a one page summary to be handed out at meetings, conferences, etc., for quick and easy reference. (Great Lakes National Program Office, U.S. Environmental Protection Agency)

A80: This will be considered during the work of the Stage II RAP.

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5. WASTE SITE POLLUTANT SOURCES

C81: What exactly is the seepage in the lower falls, who is responsible, and why is it still seeping? (Bill Bayer) What is the contribution of pollutants from chemical seeps at the lower falls of the Genesee River? (Steve Trojanczyk)

A81: In the early 1970s, a coal-tar like material which included the pollutants benzene, toluene, xylene and an oily substance were found seeping from the face of the Lower Falls of the Genesee River just north of downtown Rochester. Tunnel construction and maintenance activities upstream of the falls during the mid-1980's also encountered similar substances flowing from bedrock fractures into the tunnel. When the contamination was encountered in the tunnel, measures were taken to prevent the pollutants from entering the river. Excavated material was removed for safe disposal, and water pumped from the tunnel was treated in holding ponds. After the tunnel project was completed, the material in the ponds was excavated and properly disposed of and the ponds were backfilled. Sampling and analysis is proposed for the site of the work later in 1993.

Recent (1988) sampling and analysis of the seeps at the Falls was conducted by Malcolm Pirnie for the City of Rochester. Benzene, toluene, xylene, and a variety of Polynuclear aromatic hydrocarbons were detected. More recent non-

scientific observations by City and RG&E staff may suggest that the amount of seep material present on the face of the Falls is diminishing. An odor is, however, occasionally noticeable. The source of the seeps is unknown. While there is no formal regulatory investigation, the site remains of concern to local authorities including the Monroe County Health Department who feels there is a need to define the source of the material. Potential sources include historic coking plants which were located on the banks of the river, upstream of the lower falls. The total amount of pollutants that have been entering the river from this source is not known but is estimated by the Monroe County Environmental Health Laboratory to be in the kilogram per day range. This estimate will be updated during the summer of 1993.

C82: I understand that the salmonids have not been able to spawn in the lower Genesee River. Is this related to the chemical seeps? (Steve Trojanczyk)

A82: The primary reason that salmonids are unable to spawn in the Lower Genesee River is the lack of proper habitat substrate (gravel beds) in which to lay their eggs. Another problem is that the water temperature in the river becomes too warm for salmonid spawning. According to the New York State Department of Environmental Conservation Region 8, these are the reasons for lack of spawning and they are not known to be related to the chemical seeps (also see the previous comment, C81).

C83: How many hazardous waste dumps are leaking into the River and the Rochester Embayment? I have concluded that dump sites are actually the main source of pollution going into the Niagara River. (Diane Heminway)

A83: The Stage I RAP has identified 78 waste sites in the watershed of the Embayment that have some potential for leaking pollutants of concern in the watershed.

C84: For many years, one hazardous waste site on the State Registry was the Lower Genesee Gorge Site. This was delisted from the Stage Registry and is no longer on the registry because coal tar is no longer considered toxic. This is a travesty! (Diane Heminway)

A84: A recent ruling has been made, as the result of a legal challenge, that coal tar is not automatically considered a hazardous waste unless it is tested and fails the federal Toxicity Characteristic Leaching Procedure test (TCLP). The NYSDEC has not adopted the federal TCLP test for characterizing hazardous wastes. Once the NYSDEC adopts the TCLP rule and conducts testing of coal tar substances, many of the coal tar sites may be relisted on the registry as inactive hazardous waste sites. The apparent rationale for the delisting of Coal Tar as a hazardous material is that the process that creates coal tar is no

longer in use, and the main purpose of the regulations is to regulate wastes that are currently being produced. The Genesee River Gorge site also included many areas where coal gasification or coal tar disposal never occurred. Both the coal tar rule and the site boundaries contributed to the delisting of the Genesee River Gorge site from the inactive hazardous waste site registry.

C85: I have come to realize that hazardous waste sites are very difficult to clean up. Why do we keep manufacturing all of this waste which we don't know what to do with and why do we continue to put it out into the environment? (Diane Heminway)

A85: One answer is that products from which the hazardous waste results have been deemed by many to have benefits which exceed enviornmental costs.

C86. One source of pollutants not mentioned in the Draft Stage I RAP is the runoff of glycol used as deicing fluid at the Monroe County Airport. This source should be identified. (Chris Rau)

A86. Chapter 5 of the Stage I RAP has been amended to recognize this source of pollution which is an oxygen demanding chemical. It should be noted that the Monroe County Airport is in the process of studying alternative methods for eliminating the pollution caused by the use of deicing fluids at the airport.

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6. PUBLIC INVOLVEMENT IN RAP DEVELOPMENT AND IMPLEMENTATION

C87: You mentioned that there are 27 members of the Committee and that there is a Government Policy Group, a Public Outreach Committee and a Technical Group. Are any members employees of the Kodak company? I have a problem with Eastman Kodak's employees serving on committees where policy decisions are made for our welfare when they have been found criminally guilty. This is like having Arthur Shawcross advise people on what we should do against murdering women! (Dick Streeter) C.14: One of the frustrations with people who have gotten involved is that there is almost too much cooperation with the industries and that there may be a conflict of interest. (Diane Heminway) C14B: How was the Advisory Committee picked? (Bill Bayer) Is a Monroe County Fishery Advisory Board representative on one of your committees? (John Schoth)

A87. The 27-member Water Quality Management Advisory Committee has a member who represents the Industrial Management Council. That member is an employee of Eastman Kodak. The WQMAC also has a member representing the Fishery Advisory Board. The WQMAC has been in existence

for over 13 years. The advisory group has members representing 4 categories of stakeholders: citizens, public interest groups, public officials, and economic interests. The membership categories include the kinds of groups that have a stake in the issues we are dealing with. A balanced number of members in each category is sought. At the beginning of the RAP, the County considered citizens already serving on the advisory committee, and in addition sought applications for citizen membership through an Open Appointments Board. Announcements were made in the newspaper that we were looking for members. Many of the members representing other categories (public officials, public interests, and economic interests) were sought through groups that represent stakeholders (such as the Town Supervisors Association, the Sierra Club, and the Industrial Management Council.) It is important to have the involvement of all stakeholders. Stakeholders that are part of the problem must be part of the solution.

C88: Citizens need to get involved in the permit process with industry. However, the amount of work needed to understand the issues is overwhelming. (Steve Trojanczyk, Diane Heminway)

A88. The issues involved in the permit process are extremely complex.

C89: Because of the difficulty for citizens to press lawsuits when the permits are in violation, the DEC should take more responsibility. (Judy Braiman)

A89. The DEC does accept the responsibility for following up on non-compliance with permits that have been violated. The Department has a policy of following up on all cases within the limits of resources that are available. The actions of the agency related to permit violations are subject to prioritization and protection of human and wildlife health are high priorities. The damage or threat to the environment created by the violation, and the benefit of taking action are some of the factors considered by the Department when allocating resources to non-compliance follow-up. It is a policy of the Department to encourage public citizens to support our actions by forming a partnership with DEC through the authority given in Section 505 of the Clean Water Act. The best partnership is one where citizen actions following up on cases of non-compliance are not duplicative but additive, covering areas beyond the resources of DEC. There are a number of examples of citizen groups working successfully with DEC to take actions related to permit violations. In some areas of the state, DEC extends its resources available for follow-up through formalized agreements with local governments such as counties. The Department encourages citizen participation in the monitoring of environmental problems, the resolution of differences and the development of solutions.

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7. DRINKING WATER SYSTEM ISSUES

C90: Is research being done on cleaning up pipes that carry drinking water? The pipes in Rochester are very old. (Susan Sarini) There are drinking water quality problems in Brighton that occur when there is a change in flow direction. (Marion Gilmour)

A90. As part of the development of the RAP, no research has been done on drinking water distribution systems. The RAP is focusing on the quality of the water in the Rochester Embayment. However, both the City of Rochester and the Monroe County Water Authority have aggressive water main cleaning/lining and replacement programs to upgrade the water distribution systems. The City of Rochester Water Bureau is in the process of evaluating water pipe corrosion control technologies that, once implemented, should lower lead levels in water, reduce "red" water problems, and help reduce biofilm bacteria within the distribution system whose water comes from the Hemlock Lake water supply.

Distribution system turbidity problems such as those that occur in Brighton, most often result from hydraulic disturbances (e.g., flow reversals and hydrant flushing). These episodes are usually very localized and of short duration and represent an aesthetic rather than a sanitary problem. Parts of Brighton are particularly susceptible because the distribution system contains some older unlined cast iron pipe, the area is supplied primarily by the unfiltered Hemlock supply that the Monroe County Water Authority purchases from the City of Rochester, and major flow reversals can occur when the area is switched over to the Lake Ontario supply. Since taking over operation of the water distribution system from the Town of Brighton, the Water Authority has aggressively targeted these problem areas with its pipe replacement and cement relining programs. A study is also currently under way to minimize flow reversal disruptions in the area. Further relief should occur with the completion of the City of Rochester's filtration plant at Hemlock Lake in 1993.

C91. Lead can leach from faucets, and pipes. (Judy Braiman)

A91. It is true that lead can leach from solder used to connect water pipes in homes. In some cases there may be old lead pipe in homes as well. Efforts are being made by the New York State and Monroe County Health Departments to educate people on how to minimize the impact of the leaching of lead. For further information on how to minimize exposure to lead in your drinking water, contact the Environmental Protection Agency Lead Hotline at 1-800-LEAD FYI or the Monroe County Health Department at 274-6057.

C92. All kinds of things have accumulated on the inside of the water mains to taint the water just as much as they do the fish. (Marion Gilmour) I represent Citizens of East Rochester for Reverse Osmosis. I have an EPA study that notes that of 400 compounds, only 40 have been reduced in the Great Lakes. It is because of the concern of chemicals in Lake Ontario that our group feels it is important to have our own groundwater supply in East Rochester. (John Ryan) Where is the data which tells us what the concentrations of various types of chemicals are in the drinking water?

A92. Drinking water taken from Lake Ontario and treated by the Monroe County Water Authority meets all state and federal standards including those for toxic compounds. The Monroe County Water Authority conducts an extensive quarterly monitoring program for 140 different inorganic and organic compounds. A report summarizing the quarterly data is available to customers upon request. The source of the fish consumption problem stems from contaminated sediments, and the processes known as bioaccumulation and bioconcentration, rather than a problem in the water. Most of the persistent organic pollutants such as mirex and PCBs are not very soluble in water and end up settling with sediments. Through bioaccumulation and bioconcentration, toxic compounds that settle in the sediments move up the food chain into the fish, eventually returning to the sediments when the fish die. The State Health Department and others continue to survey drinking water quality with the latest methods.

C93: What kind of water filtration is used by the Monroe County Water Authority? (John Ryan)

A93. The Monroe County Water Authority water drawn from Lake Ontario is treated at the Shoremont Water Treatment Plant, a 140 million gallon a day direct filtration facility using constant rate dual media filters. The filter media consists of approximately 10 inches of anthracite coal on top of approximately 20 inches of sand. After filtering, the water is then treated with chlorine for disinfection.

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8. EDUCATION

C94: People need more education. As a nurse I have been asked by people if they can throw antibiotics down the toilet, and I cannot answer that question. (Susan Sarini)

A94. Education on water quality issues and the water system is needed. Small

quantities of antibiotics can be flushed down the toilet for disposal.

C95: We all have a personal responsibility for keeping the environment safe and clean. We all have to share the responsibility rather than assuming the government will clean it all up. How can we develop a way to change the way people look at our environment? (Tom Baird)

A95. We recognize that an education program will be crucial to improving and protecting Rochester Embayment water quality. We will be further developing ideas of how to achieve this education as part of the Stage II RAP. We welcome the involvement of as many people as possible in developing such remedial measures. If you would like to assist, contact Margit Brazda at the Monroe County Department of Planning and Development, (716) 428-5466. Meanwhile, throughout the writing of the RAP, educational projects are being done. For example a major effort is being taken to educate people on the proper disposal of household hazardous waste. Storm drains in street gutters will be painted with a message, "Don't dump, drains to a stream" and brochures indicating where to recycle these materials will be circulated.

C96: I would welcome anyone coming out to talk to the college students at Finger Lakes Community College as part of the Environmental Conservation/Law program. (Steve Trojanczyk)

A96. This will be kept in mind when developing the educational program needs.

C97: The best project I ever ran with the schools was with storm drain painting and it was done with 5th and 6th graders. This can be done in conjunction with education on how a storm sewer system works and on proper disposal methods of household hazardous waste. It is worth doing. (Steve Lewandowski)

A97. This is a project that is hoped to be implemented soon within Monroe County.

C98: Regarding educational programs, where would the money come? If it came from industry the perspective might be biased. (Judy Braiman)

A98. The Stage II RAP scheduled for completion in the summer of 1993 will evaluate the various possible funding sources for remedial measures including education. The concern about industry funding will be considered.

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9. COMMENTS REGARDING REMEDIAL MEASURES AND THE STAGE II RAP

C99: Are we going to study this to death? There are so many reports sitting on shelves and nothing is done, so I get frustrated when I see another study. Is anything being done now to solve some of these problems? (Tom Baird, Dick Streeter, Jerry Brixner.)

A99: This document (the Stage I RAP) identifies the water quality problems and causes and documents many known improvements that have been made. The second part of this document (the Stage II RAP) is an action plan that will identify what more needs to be done, who should do it, where the funding should come from, and what should be done when. The Stage I document provides much of the justification for required resources to implement actions that will be identified in the Stage II RAP. Continuing public involvement and support will be crucial to insure that actions are taken.

C100: Will conditions improve if the other Counties along the river do not participate in water quality management? (Steve Trojanczyk)

A100: In order to meet many of our goals and objectives, other Counties in the Genesee Basin must be involved and are involved. Each County in the Genesee Basin has already prepared a water quality strategy. We have initiated a Genesee Basin Coordinating Committee to work together to coordinate water quality protection/improvement activities. The Stage II RAP will consider actions that need to be taken throughout the watershed--not just at the Embayment itself.

C101: How are industries such as RG&E and Kodak going to be held accountable? (Dave Miller)

A101: The Stage II RAP, expected to be drafted by summer of 1993, will specify what local pollutant sources are to the extent known. For known sources of pollutants of concern, specific actions will be proposed in the Stage II RAP.

C102: I have been attending meetings on the Lake Ontario Toxics Management Plan for eight years. What I heard at this year's meeting is no different from what I heard five years ago. When asked how many industrial discharge permits had been renewed over the last five years there was no answer. We do not know how to measure progress. The LOTMP calls for reducing PCB discharges yet DEC gives permits to discharge PCBs. When we asked how many permit renewals mandated reductions, they couldn't name one. A report was issued several years ago saying that in five years it will be possible

to achieve 50% reduction in the toxics being produced and put out. We are nowhere near that target. Industries fought against approaching even a 20% reduction, and we have a government which is not strict enough when issuing discharge permits. DEC has admitted that they have not mandated any industries to reduce toxics and in fact Kodak is asking for increases, not decreases. When is DEC going to stop giving permits to pollute? How can we get industries to stop polluting, and do you expect industries to work with communities? (Diane Heminway & Judy Braiman)

A102. Permits are given to dischargers of PCBs in order to have a regulatory means of limiting the amounts of the substance released to the waters. PCB loadings from known sources could not be controlled without SPDES permits that include limits on the substance. In most cases, the PCB limits in SPDES permits are at the level of detection of available analytical methodology. The SPDES program has required mandatory reductions in the amounts of pollutants released, along with a schedule to do so, when reductions are necessary to achieve compliance with minimum treatment requirements or receiving water quality standards. This was more common in the past when waste treatment facilities were being required to upgrade. Generators of hazardous waste are currently required to have reduction plans and New York State is developing new regulations requiring generators of other pollutants to have waste reduction plans. SPDES permits are not "permits to pollute" they are a means of limiting the quantities of pollutants discharged to amounts that do not cause water quality standards to be exceeded under worst case conditions in the environment. Industries will work with the local community if it is clear that there is a mandate for a healthy environment and a willingness to accept the costs associated with achieving one.

C103: I would like there to be a real push--including a recommendation in this RAP for toxic use reduction with strict time tables stating written percentage decreases. Before permits (air or water) are given, there should be mandatory reductions of persistent toxics. An example of an end goal that might be set to guide the reductions might be a 50% reduction in 5 years. (Diane Heminway

A103: This idea is being considered in development of the Stage II RAP.

C104: I am very cognizant of the frustrations of the State Agencies because there are a lot of good people working for them. DEC and EPA are both underfunded and understaffed and they do not have the resources to do adequate checking. (Diane Heminway)

A104: No Response

C105: Will the funding for implementation actions be shared by the federal government, industry, and the public? (Steve Trojanczyk)

A105: Specific funding sources will be identified in the Stage II RAP. It is likely that funding will come from all levels of government, business, industry, agriculture and the public.

C106: What are the standards and what progress is being made toward achieving the standards--of really breaking the backs of these pollutants? (John Schoth)

A106: Chapter 4 of the Stage I RAP focuses on current water quality conditions and specific standards. For information on the quality of drinking water obtained from Lake Ontario, see Comment 92 on pages 39 and 40. There is a great deal of information in chapter 4 that includes data on the quality of water, sediment, and biota along with the standards that have been set. For example, chapter 4 notes that some sediment samples taken in the Genesee River have levels of one or more of the following pollutants that are high enough to have the sediments considered as being "heavily polluted." The pollutants of concern are total PCB's, cyanide, arsenic, barium, Chemical Oxygen Demand, Manganese, phosphorus, and total Kjeldahl nitrogen.

C107: If you summarized the levels of pollutants in the mid sixties and early seventies and equated them to what the loadings were, relative to the loadings that are listed now you will be able to tell what progress has been made. (Larry Moriarty)

A107: Persistent toxics were not routinely monitored in the 1960s and early 1970s, so there is little available information to compare. Overall, pollutant loadings from the mid 1960s and early 1970s as compared to the current situation show that BOD and phosphorus are lower than in the past. Better waste treatment is the reason why.

C108: It is very possible that in the not too distant future the Eastman Kodak Company may not be around. Before Kodak goes out of business, the County should make Kodak provide a fund to ensure studies can be done independently. (Dick Streeter)

A108: This comment will be considered in the Stage II RAP when we are investigating and recommending funding sources for remedial actions to address impaired uses where sources have been identified.

C109: Companies who have been discharging into the river may not have reached zero discharge, but you cannot go to zero discharge on everything. (Larry Moriarty)

A109: "Zero discharge" of all pollutants or all toxic pollutants is not currently a goal of this RAP nor would such a goal likely be attainable. However, one goal of the RAP is "Virtual elimination of the toxic substances which cause fish consumption advisories." An objective under that goal is "Scheduled elimination of the releases and runoff of persistent toxic substances that necessitate health advisories for the Rochester Embayment of Lake Ontario." It should be noted that the classification of "persistent toxic substances" is a relatively narrow classification. See further information on the 4 pollutants causing the advisory, in the first question and answer under the heading of "Use Impairments."

C.110: DEC has never brought any action against Kodak and some of their discharges are 100 times the New York State limit. DEC is next to a worthless organization. It does nothing to protect your interests. In fact the DEC is helping to write the new Permit with the Eastman Kodak Company on what they can or cannot discharge. (Dick Streeter)

A110. Since DEC is the agency that is responsible for the SPDES program in New York State, it is required to write the permit. The permittee is required to provide information to DEC regarding factors such as the level of contaminants in untreated wastewater and operational and waste treatment processes at the facility. It is not unreasonable that the operators of the regulated facility have input into the permit that they will be required to comply with.

C111: Have you been talking to any private industry about setting up a filtration system at any locations? (Peter Shortell)

A111: Monroe County has considered installing a "Swirl Concentrator" to concentrate pollutants from storm sewers that carry large amounts of stormwater. The concentrate would be diverted to a sanitary sewer where it would then be directed to treatment, and the remaining stormwater would be discharged to the waterway. We have sought grant funding to conduct such a project, but have not been successful in obtaining funds to date.

C112: What is needed are volunteer environmental police. (Diane Heminway)

A112. We will be investigating this idea as a possible remedial action in Stage II of the RAP Development.

C113. At the conclusion of Stage II RAP, how will recommendations be enforced? Will responsibilities be assigned to certain groups? How do we continue to drive it? Garry Schmitt.

A113. Part of our responsibility in preparing the Stage II RAP is to identify who will have responsibility for each recommended remedial measure. Another responsibility we have in preparing the Stage II RAP is to monitor the success of our implementation. In the Stage II RAP we will outline how the monitoring will occur and how the results will be publicized.

C114. Once we start getting into the analysis of remedial measures, we need to involve the Government Policy Group more. Many remaining problems are from non-point sources that need to be addressed by local governments. The Government Policy Group needs to insure that changes (for example a model local law on storm runoff) are made in a way that causes the least amount of pain. It would be advisable to create a subcommittee of the Government Policy Group who could then report back to the larger group. Such a subcommittee should have representatives of the County, towns, and Villages. (Martin Minchella)

A114. We agree and will work to insure this happens. Sandy Frankel and Jerry Brixner indicated an interest in getting involved in such an effort.

C115. For purposes of water quality and specific remedial measures implementation, the golf course industry should be considered separately from the agricultural industry because of the intensity of turf maintenance at a golf course. Finely maintained turf does not have the leaching effect of agriculture. The golf course industry would like to have a representative participate in the development of the Stage II RAP.

A115. In considering remedial measures, we will consider how remedial measures need to be implemented by different kinds of entities and we will insure that the involvement of golf course interests occurs.

C116. Please describe the method by which you intend to collect data through Phase II of this effort that might have an impact on remedial actions? For example, investigation of the current status of the seeps at the lower falls. What is the timing of the Stage II RAP? (Kevin Hylton).

A116. The Stage II RAP is scheduled to be complete in the summer of 1993. We will not be collecting new data on existing water quality conditions. However, if we are made aware of new information that will impact recommended remedial measures, we will consider the new information.

One recommendation of the Stage II RAP could be further investigation of the seeps at the lower falls. This will be considered by the Water Quality Coordinating Committee who will be coordinating the development of the Stage II RAP.

One thing we will be doing as part of the Stage II RAP development is the prioritization of pollutants of concern. This is being done by a Task Group, and will be reviewed by the Water Quality Management Advisory Committee.

C117. Is this RAP going to be more stringent than existing regulations of the USEPA, ? (Bill Stappenbeck).

A117. The Stage II RAP will make recommendations on what actions need to be taken to meet our goals and objectives. It is likely that the recommended actions made in the Stage II RAP will be consistent with existing regulations, but it is also possible that it might recommend additional regulations.

C118. In response to a request for more industry, business, agriculture involvement in the development of the Stage II RAP, Bob Ottley offered to represent the lawn care industry in developing remedial measures. Bob noted that phosphorus is not widely used by the professional lawn care industry because not much is needed.

A118. Representatives from the Lawn Care Industry and the Golf Courses have been added to the mailing list for the Water Quality Management Advisory Committee so that when these remedial measures are discussed, they can be involved.

C119. What will be the implementation roles of the major players (Ken Gordon).

A119. Those specific roles will be identified in the RAP Stage II.

C120. Will there be public meetings at the time of the Draft Stage II document? (Chris Rau)

A120. yes.

C121: One of the Stage II RAP's major objectives should be to prioritize environmental risk. USEPA believes that the success of the Lakewide Management Plans (LaMP) and RAP programs rests on their ability to prioritize documented ecosystem impairments and address the most pressing problems first. The Stage II RAP must select remedial measures to control the

loading of Priority Pollutants from all sources and not select the easy route of addressing known sources that are well documented and regulated. Following this strategy is particularly important since many of the chemicals which are linked to impairments appearing on Table 5-1 Priority Pollutants for the Rochester Embayment and Table 5-2 Highest Priority Pollutants, are no longer produced or used, but they continue to be introduced to the ecosystem through diffuse sources. (Industrial Mgt. Council)

A121: This comment will be considered in development of the Stage II RAP.

C122: An exhaustive, cost/benefit analysis should be prepared for each proposed remedial measure. In the present hard times for both the public and private sectors, resources should be devoted to only the most efficient and effective measures. (Tom Low, Town of Brighton)

A122: Initial cost/benefit analyses will be conducted as part of the Stage II RAP. Exhaustive cost/benefit analyses may not be feasible within the time frame and budget of the Stage II RAP. Policies to insure that public and private sector funds will be appropriately spent will be carefully considered in the development of the Stage II RAP.

APPENDIX B

WATER RESOURCE GOALS

WATER RESOURCE GOALS

GLWQA	U.S. CLEAN WATER	U.S. COASTAL ZONE	NEW YORK STATE WATER RESOURCES	NEW YORK STATE COASTAL RESOURCES	MONROE COUNTY WOMAC
Protection of Human Uses					
	Provide for recreation in and on the water.		Provide for public health and enjoyment of the waters of the state, and for the industrial development of the state.		Public beaches in the Rochester Embayment are open for swimming, based upon best available health and safety standards. Fish caught in the Rochester Embayment are safe to eat according to dietary standards which are generally accepted by the scientific community.
Make waters free from human-caused floating or immiscible materials that are unsightly or deleterious.			[Addressed in standards]		Shorelines and waterways are free of objectionable materials which degrade water quality and appearance.
Make waters free from human-caused conditions that interfere with beneficial uses (such as color, odor or taste).			[Addressed in standards]		Drinking water produced from Lake Ontario water has no unpleasant tastes or odors.
Make waters free from human-caused nutrients in amounts that create growths of aquatic life that interfere with beneficial uses.			[Addressed in standards]		The littoral zone of the Rochester Embayment is mesotrophic rather than eutrophic.

GLWQA	U.S. CLEAN WATER	U.S. COASTAL ZONE	NEW YORK STATE WATER RESOURCES	NEW YORK STATE COASTAL RESOURCES	MONROE COUNTY WQMAC
Protection of Humen Uses (cont.)					
		Achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic and esthetic values as well as to needs for economic development.		Achieve a balance between economic development and preservation that will permit the beneficial uses of coastal resources while preventing their loss or damage.	
		Provide for public access to the coasts for recreation purposes.		Encourage and facilitate public access for recreational purposes.	
		Manage coastal resources to minimize loss of life and property caused by improper development.		Minimize damage to natural resources and property from flooding and erosion, including protection of critical coastal features.	
Protection of Biological Uses					
Make waters free from human-caused conditions that are toxic or harmful to human, animal or aquatic life.	Provide for protection and propagation of fish, shellfish and wildlife.		Provide for the protection and propagation of fish and wildlife, including birds, mammals and other terrestrial and aquatic life.		Water and shoreline habitats within the Rochester Embayment support thriving fish and wildlife populations. Diversity of plant and animal communities within the Rochester Embayment are comparable in impacted and unimpacted habitats.

GLWQA	U.S. CLEAN WATER	U.S. COASTAL ZONE	NEW YORK STATE WATER RESOURCES	NEW YORK STATE COASTAL RESOURCES	MONROE COUNTY WQMAC
Protection of Biological Uses (cont.)					
Significant wetland areas within the Great Lakes System that are threatened by urban and agricultural development and waste disposal activities should be identified, preserved and, where necessary, rehabilitated.		Protect natural resources, including wetlands, flood plains, estuaries, beaches, ...and fish and wildlife and their habitat within the coastal zone.		Conserve, protect and where appropriate promote commercial and recreational use of fish and wildlife resources, and conserve and protect fish and wildlife habitats.	The benthic macroinvertebrate community in the Lower Genesee River is not degraded by pollution.
Water Pollution Control					
	Eliminate discharge of pollutants into navigable waters.		Prevent new pollution and abate existing pollution.		
Prohibit discharge of toxic substances in toxic amounts.	Prohibit discharge of toxic pollutants in toxic amounts.		[Addressed in standards]		Virtual elimination of discharges and runoff of persistent toxic substances that necessitate health advisories for the Rochester Embayment.
Virtually eliminate discharge of persistent toxic substances.					
Abate, control and prevent municipal discharges and urban drainage.	[Municipal discharges included in discharge elimination goal]		[Addressed in standards]		Virtual elimination of raw or untreated sewage discharges into the Embayment.
Provide assistance to construct publicly-owned waste treatment works.	Provide assistance to construct publicly-owned waste treatment works.				

GLWQA	U.S. CLEAN WATER	U.S. COASTAL ZONE	NEW YORK STATE WATER RESOURCES	NEW YORK STATE COASTAL RESOURCES	MONROE COUNTY WQMAC
Water Pollution Control (cont.)					
Abate, control and prevent pollution from industrial sources.	[Included in discharge elimination goal]		[Addressed in standards]		
Reduce and control inputs of phosphorus and other nutrients.	[Included in discharge elimination goal]				Scheduled elimnation of point and non-point discharges that impede survival of a healthy and diverse planktonic community.
Abate and control pollution from shipping sources.					
Abate and control pollution from agriculture, forestry and other land use activities.	Develop and implement programs for control of non-point sources of pollution.		Safeguard the waters of the state from non-point source pollution.		Virtual elimination of beach closures due to stormwater runoff.
Assess and control contaminated groundwater and subsurface sources entering the Great Lakes.					
Air Pollution Control					
Implement pollution control measures for the purpose of reducing atmospheric deposition of toxic substances to the Great Lakes Basin Ecosystem.	[U.S. 1990 CLEAN AIR ACT sets up a research program and authorizes the EPA to set emission standards for toxic air pollutants based on their effects on the Great Lakes.]				

GLWQA	U.S. CLEAN WATER	U.S. COASTAL ZONE	NEW YORK STATE WATER RESOURCES	NEW YORK STATE COASTAL RESOURCES	MONROE COUNTY WQMAC
Sediment Pollution Control					
Make waters free from human-caused materials that will settle to form putrescent or otherwise objectionable sludge deposits or that will adversely affect aquatic life or waterfowl. Abate and control pollution from all contaminated sediments.			[Addressed in standards]		Contaminated sediments in the lower Genesee River have no negative impact upon water quality and biota in the Rochester Embayment; sediment quality is suitable for open lake disposal.

NOTES:

Goals are quoted or paraphrased from the Great Lakes Water Quality Agreement (GLWQA), the applicable legislation, and the goal statements of the Monroe County Water Quality Management Advisory Committee (WQMAC).

This table does not include the many dozens of goals embodied in the plans of administrative agencies.

WQMAC objectives (means of achieving goals or more detailed expression of goals) were only included when they particularly corresponded to other goals in the area of water pollution control.

The GLWQA and its annexes and the referenced legislation contain many more objectives and programs than could be shown here.

APPENDIX C

SEDIMENT QUALITY CRITERIA

TABLE 1

EPA SEDIMENT CLASSIFICATION CRITERIA OF 1977

PARAMETER	NONPOLLUTED	MODERATELY POLLUTED	HEAVILY POLLUTED
Volatile Solids	<5%	5% - 8%	>8%
COD	<40,000	40,000 - 80,000	>80,000
TKN	<1,000	1,000 - 2,000	>2,000
Oil & Grease (Hexane Solubles)	<1,000	1,000 - 2,000	>2,000
Lead	<40	40 - 60	>60
Zinc	<90	90 - 200	>200
Ammonia	<75	75 - 200	>200
Cyanide	<0.10	0.10 - 0.25	>0.25
Phosphorus	<420	420 - 650	>650
Iron	<17,000	17,000 - 25,000	>25,000
Nickel	<20	20 - 50	>50
Manganese	<300	300 - 500	>500
Arsenic	<3	3 - 8	>8
Cadmium	*	*	>6
Chromium	<25	25 - 75	>75
Barium	<20	20 - 60	>60
Copper	25	25 - 50	>50
Mercury			≥1
Total PCB			≥10

Note: All values in mg/kg dry weight unless otherwise noted.

*Pollutional classification of sediments with total [PCB] between 1.0 and 10.0 mg/kg dry weight determined on case-by-case basis.

Source: International Joint Commission, Dredging Subcommittee. 1982. Guidelines and Register for Evaluation of Great Lakes Dredging Projects.

TABLE 2

BACKGROUND SEDIMENT CONCENTRATIONS

Basin specific background levels of pollutants in sediments of the Great Lakes (mg/kg). Additional work is necessary to quantify background levels of pollutants in the basins where no data currently exists.

	LAKE SUPERIOR					LAKE HURON		LAKE MICHIGAN					LAKE ERIE		LAKE ONTARIO			Recommended Dredging Guideline[4]
	DSB	TBB	IRSB	MaB	KB	NoB	SaB	FB	MwB	WaB	SoB	GHB	WeB	CeB	NiB	MiB	RoB	
Total P	800	700	N/A	1200	1000	1000	700	N/A	N/A	N/A	N/A	N/A	700	1100	1000	700	1600	1000
Total N	3070	3000	N/A	3070	2670	3600	4270	N/A	N/A	N/A	N/A	N/A	1500	1500	2700	2300	2300	2000
Ammonia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100
Hg	0.08	0.08	N/A	0.08	0.07	0.04	0.08	N/A	N/A	N/A	0.03	N/A	0.1	0.1	0.08	0.03	0.09	0.3
Pb	18	23.2	N/A	24.6	20.4	16.2	14.4	N/A	N/A	N/A	27.5	N/A	28	28	32	32	30	50
Zn	117	108	N/A	105	118	88	60	N/A	N/A	N/A	120	N/A	70	110	121	101	108	105
Fe	59400	53700	N/A	56000	58800	51600	32200	N/A	N/A	N/A	22278	N/A	N/A	N/A	52500	46200	46200	45500
Cr	50.7	51.8	N/A	49.8	57.1	28.5	30.0	N/A	N/A	N/A	37.1	N/A	N/A	N/A	N/A	N/A	N/A	120
Cu	69	57	N/A	61	69	51	31	N/A	N/A	N/A	21	N/A	30	40	56	46	46	45
Cd	0.9	0.5	N/A	0.8	0.5	1.0	0.4	N/A	N/A	N/A	0.6	N/A	2.0	2.0	1.5	0.9	1.0	1.5
Ni	63.5	59.7	N/A	57.7	64.4	61.1	29.9	N/A	N/A	N/A	32.8	N/A	N/A	N/A	N/A	N/A		90
Mn	0	1000	N/A	1200	900	1100	400	N/A	N/A	N/A	446	N/A	600	600	2300	2300	1700	1625
As	N/A	N/A	N/A	N/A	5	6	3	N/A	N/A	N/A	1.1	N/A	N/A	N/A	N/A	N/A	N/A	8
Cyanide	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1
Volatile (LOI Solids (600°C	26300	22900	N/A	27300	24000	27800	35200	N/A	N/A	N/A	N/A	N/A	10000	20000	18400	19100	18400	60000
COD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50000
PCB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05
Oil & Grease	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1500
Other Organic Contaminants	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Below detection using best available technology. (GLWQA, 1978)

CEB - Central basin
DSB - Duluth sub basin
FB - Fox basin
GHB - Grand Haven basin
IRSB - Isle Royale sub basin
KeB - Keweenaw basin
MaB - Marathon basin
MwB - Milwaukee basin
MiB - Mississauga basin
NiB - Niagara basin
NoB - Nottawasaga basin
RoB - Rochester basin
SaB - Saginaw basin
SoB - Southern basin
TBB - Thunder Bay basin
WaB - Waukegan basin
WeB - Western basin

1 - Kemp and Thomas, 1976
2 - Kemp et al. 1978
3 - Robbins, J (pers. comm.)
4 - Thomas and Mudroch, 1979
N/A = not available

Source: Surveillance Work Group (1987). Guidance on Characterization of Toxic Substances Problems in the Great Lakes Basin. Report to the Great Lakes Water Quality Board. Windsor, Ontario: IJC

TABLE 3

SEDIMENT CRITERIA

Sediment Criteria, Derived for a Variety of Environmental Protection Objectives. (Sediment criteria are normalized to organic carbon (OC) content as ug/gOC; to obtain criteria for bulk sediments in ug/Kg multiply criteria by fraction OC;i.e. for 1% multiply by 10, for 2% OC by 20, etc.)

			Aquatic Toxicity Basis		Human Health Residue Basis		Wildlife Residue Basis	
Substance	Log K_{ow}	Freshwater or Marine F or M	AWQS/GV/C* ug/l	Sediment Criterion ug/gOC	AWQS/GV/C ug/l	Sediment Criterion ug/gOC	AWQS/GV/C ug/l	Sediment Criterion ug/gOC
Acenapthene	4.33	F		730**				
Anilene		F		0.0662**				
		M		0.248**				
Aldrin and Dieldrin	5.0	F&M			0.001++	0.1		
		F&M	0.084+	8.4	0.00001+	0.001	0.0077+	0.77
Azinphosmethyl	2.4	F	0.005++	0.001				
		M	0.01++	0.003				
Azobenzene	3.82	F&M			0.07+	0.5		
Benzene	2.0	F&M			6++	0.6		
Benzo(a)pyrene and some other PAHs♦	6.04	F			0.0012++	1.3		
		M			0.0006++	0.7		
Benzidene	1.4	F	0.1++	0.003				
Bis(2-chloro-ethyl) ether	1.73	F&M			0.2+	0.01		
Bis(2-ethylhexyl) phthalate	5.3	F	0.6++	119.7				
Carbofuran	2.26	F	1++	0.2				

Source: NYSDEC (1989). Clean-Up Criteria for Aquatic Sediments.

TABLE 3 (continued)

Substance	Log K_{OW}	Freshwater or Marine F or M	Aquatic Toxicity Basis AWQS/GV/C* ug/l	Aquatic Toxicity Basis Sediment Criterion ug/gOC	Human Health Residue Basis AWQS/GV/C ug/l	Human Health Residue Basis Sediment Criterion ug/gOC	Wildlife Residue Basis AWQS/GV/C ug/l	Wildlife Residue Basis Sediment Criterion ug/gOC
Carbon tetrachloride	2.64	F&M			1.3+	0.6		
Chlordane	2.78	F&M			0.002++	0.001		
		F&M	0.01+	0.006	0.00008+	$8X10^{-8}$	0.01+	0.006
Chlorobenzene	2.84	F&M	5++	3.5				
Chloro-o-toluidine	about 2.0	F&M			6.5+	0.65		
Chlorpyrifos	5.11	F		3.22**				
		M		0.44**				
DDT, DDD & DDE	6.0	F&M					0.001++	1
		F&M						0.828**
		F&M	≤0.05+	≤50	0.00001+	0.01		
Dieldrin	5.0	F		19.5**		0.13**		
		M		5.77**		0.13**		
Diazinon	1.92	F	0.08++	0.007				
Dichlorobenzenes	3.38	F&M	5++	12				
1,2-Dichloroethane	1.48	F&M			24+	0.7		
1,1-Dichloroethylene	1.48	F&M			0.8+	0.02		
2,6-Dinitrotoluene	2.05	F&M			1+	0.1		
Diphenylhydrazine	3.03	F&M			0.1+	0.1		

TABLE 3 (continued)

Substance	Log K_{ow}	Freshwater or Marine F or M	Aquatic Toxicity Basis AWQS/GV/C* ug/l	Aquatic Toxicity Basis Sediment Criterion ug/gOC	Human Health Residue Basis AWQS/GV/C ug/l	Human Health Residue Basis Sediment Criterion ug/gOC	Wildlife Residue Basis AWQS/GV/C ug/l	Wildlife Residue Basis Sediment Criterion ug/gOC
Endosulfan	3.55	F	0.009++	0.03				
		M	0.001++	0.004				
Endrin	5.6	F&M	0.002++	0.8			0.0019+	0.8
		F		1.04**		0.0532**		
		M		0.215**		0.0532**		
Ethyl Parathion	2.1	F		0.081**				
Heptachlor & Heptachlor epoxide	4.4	F&M	0.001++	0.03	0.00003+	0.0008	0.0038+	0.1
		F				0.11**		
		M				0.104**		
Hexachlorobenzene	6.18	F&M	<5+	<7568	0.0001+	0.15	0.008+	12
Hexachloro-butadiene	3.74	F&M			0.06+	0.3	0.07+	0.4
		F	1++	5.4				
		M	0.3++	1.6				
Hexachloro-cyclohexanes	3.8	F		0.157**				
		F	0.01++	0.06				
		M	0.004++	0.03				
		F&M			0.009+	0.05	0.23+	1.5
Hexachlorocyclo-pentadiene	3.99	F	0.45++	4.4				
		M	0.07++	0.7				
Isodecyldiphenyl phosphate	5.4	F	1.73++	434				

TABLE 3 (continued)

Substance	Log K_{ow}	Freshwater or Marine F or M	Aquatic Toxicity Basis AWQS/GV/C* ug/l	Aquatic Toxicity Basis Sediment Criterion ug/gOC	Human Health Residue Basis AWQS/GV/C ug/l	Human Health Residue Basis Sediment Criterion ug/gOC	Wildlife Residue Basis AWQS/GV/C ug/l	Wildlife Residue Basis Sediment Criterion ug/gOC
Linear alkyl-benzene sulfonates	3.97 (Sodium dodecyl-benzene sulfonate)	F	40++	373				
Malathion	2.2	F&M	0.1++	0.02				
Methoxychlor	4.3	F&M	0.03++	0.6				
Mirex	5.83	F&M F&M			0.001++ 0.0001+	0.7 0.07	0.0055+	3.7
Octachloro-styrene	About 6.0						0.0005+	0.5
Parathion & methyl parathion	2.5	F	0.008++	0.003				
Pentachlorophenol	5.0	F	0.4++	40				
Phenanthrene	4.45	F M		139** 102**				
Phenols, total	2.75	F	1++	0.6				
Phenols, total unchlorinated	2.0	F	5++	0.5				
PCB	6.14	F&M F&M F M	<0.2+	<276	0.000006+	0.008	0.001++ 0.0004+	1.4 0.6 19.5** 41.8**

TABLE 3 (continued)

Substance	Log K_{ow}	Freshwater or Marine F or M	Aquatic Toxicity Basis AWQS/GV/C* ug/l	Aquatic Toxicity Basis Sediment Criterion ug/gOC	Human Health Residue Basis AWQS/GV/C ug/l	Human Health Residue Basis Sediment Criterion ug/gOC	Wildlife Residue Basis AWQS/GV/C ug/l	Wildlife Residue Basis Sediment Criterion ug/gOC
2,3,7,8-Tetrachlorodibenzo-dioxin	7.0	F&M F&M	<0.001+	<10	$1X10^{-6}$++ $2X10^{-10}$+	0.01 $2X10^{-6}$	$2X10^{-8}$+	0.0002
1,1,22-Tetrachloroethane	2.56	F&M			0.7+	0.3		
Tetrachloroethylene	2.88	F&M			1++	0.8		
O-Toluidine	1.4	F&M			18+	0.45		
Toxaphene	3.3	F&M	0.005	0.01	0.009+	0.02		
Trichlorobenzenes	4.26	F&M	5++	91				
1,1,2-Trichloroethane	2.17	F&M			4+	0.59		
Trichloroethylene	2.29	F&M			11++	2		
Triphenyl phosphate	4.59	F	4++	156				
Vinyl chloride	0.6	F&M			18+	0.07		

* AWQS/GV/C = Ambient water quality standard or guidance value in TOGS 1.1.1 or other water quality criterion.
\+ AWQGV proposed by Division of Fish and Wildlife.
++ Current NYS AWQS or GV in TOGS 1.1.1.
** EPA proposed interim sediment criteria; taken from an EPA briefing document for the EPA Science Advisory Board.
♦ The sediment criterion for benzo(a)pyrene also applies to benz(a)anthracene, benzo(b)fluoranthene, benzo-(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and, methylbenz(a)anthracenes. These PAH have the same TOGS 1.1.1. guidance value as benzo(a)pyrene.

TABLE 3 (continued)

Sediment Criteria for Five Non-polar Substances in 1% and 3% Organic Carbon Content Sediment

Substance	F or M	Sediment Criteria, ug/kg Aquatic Toxicity Basis	Human Health Residue Basis	Wildlife Residue Basis
Benzo(a)pyrene				
1% OC	F		13*	
	M		7*	
3% OC	F		39*	
	M		21*	
Dichlorobenzenes				
1% OC	F&M	120*		
3% OC	F&M	360*		
Mirex				
1% OC	F&M		7*	37
	F&M		0.7+	
3% OC	F&M		21*	111
	F&M		2.1+	
PCB				
1% OC	F&M		0.08+	14*
	F&M			6+
	F,M			195,418#
3% OC	F&M		0.24+	42*
	F&M			18+
	F,M			585,1254#
2,3,7,8-TCDD				
1% OC	F&M	100+	0.1*	0.002+
	F&M		2×10^{-5}+	
3% OC	F&M	300+	0.3*	0.006+
	F&M		6×10^{-5}+	

* Based on current NYS AWQS or GV in TOGS 1.1.1.
+ Based on AWQGV proposed by Division of Fish and Wildlife; human health based criteria relate to 1×10^{-6} cancer risk from fish consumption and wildlife based criteria are derived from wildlife fish flesh criteria.
# EPA proposed interim sediment criteria.

TABLE 3 (continued)

Sediment criteria for metals, ug/g (ppm) except iron which is in percent.

	Background*	Criteria**	Limit of Tolerance***
Arsenic	12	5 (4.0- 5.5)	33
Cadmium	2.5	0.8(0.6- 1.0)	10
Chromium	75	26 (22 - 31)	111
Copper	65	19 (15 - 25)	114
Iron (%)	5.9	2.4 (2 - 3)	4
Lead	55	27 (23 - 31)	250
Manganese	1200	428 (400 -457)	1100
Mercury	0.6	0.11(0.1- 0.12)	2
Nickel	75	22 (15 - 31)	90
Zinc	145	85 (65 -110)	800

* From MOE (1988); upper 95% confidence limit of pre-industrial concentrations in Great Lakes sediments.

** Values in parentheses are "no-effect" and "lowest-effect" levels, respectively, from Persaud (1989).

*** Concentration which would be detrimental to the majority of species, potentially eliminating most. (Persaud 1989)

TABLE 3 (continued)

Sediment Criteria Derived by the Sediment-to-fish Bioaccumulation Method

	PCB		2,3,7,8-TCDD	
	Fish Residue ug/kg	Sediment Criterion*, ug/kg	Fish Residue ug/kg	Sediment Criterion,* ug/kg
Tolerance or Advisory	2000	2000-200	0.01	0.1-0.01
10^{-6} Cancer Risk @ ½ lb/week fish consumption	0.6	0.6-0.06	$1.4X10^{-5}$	$1.4X10^{-4}$-$1.4X10^{-5}$
Wildlife Fish Flesh Criterion	100	100-10	0.003	0.03-0.003

* For PCB and 2,3,7,8-TCDD, the ranges result from dividing the Fish Residue by a fish to sediment accumulation factor of 1-10 and 0.1-1, respectively.

References

EPA. 1989. Briefing report to the EPA Science Advisory Board on the equilibrium partitioning approach to generating sediment quantity criteria. U.S. EPA. Office of Water Regulations and Standards. EPA 440/5-89-002.

Newell, A.J., D.W. Johnson and L.K. Allen. 1987. Niagara River Biota Contamination Project: Fish flesh criteria for piscivorous wildlife. NYSDEC, Bur. Env. Prot., Technical Report 87-3. 182 pp.

Ontario Ministry of the Environment (MOE). 1988. Development of Sediment quality Guidelines. Phase II - Guideline Development. Prepared by Beak Consultants.

Morse, J.W., F.J. Millero, J.C. Cornwell and D. Rickard. 1987. The chemistry of the hydrogen sulfide and iron sulfide systems in natural waters. Earth Science Reviews 24:1-42.

Persaud, D. 1989. Personal communication - Development of Provincial Sediment Quality Guidelines. Ontario Ministry of the Environment.

APPENDIX D
Background on Rationale for Selecting Priority Pollutants for the Rochester Embayment
(Table 5-1)

MONROE COUNTY HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH LABORATORY

435 EAST HENRIETTA ROAD
ROCHESTER, NEW YORK 14620

MEMORANDUM

DATE: 13 April 1993

TO: Margy Peet - Department of Planning & Development

FROM: Richard S. Burton - Department of Health

SUBJECT: **15 April 1992 Memo From R.S. Burton To The RAP Loadings Committee**

At the last meeting of the Water Quality Coordinating Committee you gave me an annotated listing of the chemicals that made up the eighty pollutants we had previously identified as being of concern in the Rochester Embayment. You asked that I fill in the source of some of those listed chemicals. I have attached previous communications on this subject that I believe were distributed to the members of the Technical Group that discussed this issue last fall. As you can see some of the chemicals are on several lists and a few are on only one. Many of the ones that have no source on your list were derived from the Niagara River list of evaluated chemicals; others were added by the Loadings Group at the 6 November 1991 meeting; Cyanide and Total Suspended Solids by Dave Persson and Trichloroethylene by Rick Elliott. This information also includes earlier lists and shows the sequence of a list being built to the 15 April 1992 communication.

The questions that had been raised about the list reflect the variety perspectives that had been brought to this discussion both in the Pollutant Loadings Committee and the Technical Task Group. As we have previously discussed it is not so important what is on the list or not on the list now, but that there is an initial list and a procedure for delisting and adding chemicals so that the list can be dynamic and responsive to new information.

I hope this answers the questions you had regarding the source of listed pollutants, if you need more information give me a call at 274-6820.

RSB/sh

cc: R. Elliott
M. Ballerstein

NROE COUNTY HEALTH DEPARTMENT
VIRONMENTAL HEALTH LABORATORY

435 EAST HENRIETTA ROAD
ROCHESTER, NEW YORK 14620

we need to indicate the source of these parameters w/o a letter following.

MEMORANDUM

DATE: 15 April 1992

TO: RAP Loadings Committee

FROM: Richard S Burton, Monroe County Environmental Health Laboratory

SUBJECT: Updated Pollutant Load Assessment List (80 pollutants)

Aluminum (D,
Arsenic (A,
Barium (E,
Cadmium (A,D
Chromium (A,D
Cobalt
Copper (A,D
Iron (A,
Lead (A,D
Manganese (D
Mercury (A,
Molybdenum (E
Nickel (A,D
Selenium (A,
Silver (E,
Strontium (E
Vanadium
Zinc (A,D

Alkylated lead (E,

Phosphorus (A,

Cyanide (E

Total Suspended Solids (C

Aldrin (A,
Chlordane (A,
Dieldrin (A,D,
DDT and metabolites (A,
Endosulfan, Total (F
Endrin (A,D,
Heptachlor and Heptachlor epoxide (A,D
Hexachlorocyclohexane (BHC), Total (D,
Methoxychlor (A,
Mirex (Mirex and Photomirex) (A,
Toxaphene (A,D,

large quantity - Acetone
Benzene (E,
Benz(a)anthracene (E,
Benzo(a)pyrene (E,
Benzo(b)fluoranthene (E,
Benzo(k)fluoranthene (E,
Bis(2-ethylhexyl) phthalate (E,
Carbon tetrachloride
Chloroform (F,
Chlorinated dibenzofurans (D
2-Chlorotrifluorotoluene
4-Chlorotrifluorotoluene
Chrysene (E,
1,2-Dichlorobenzene (D
1,3-Dichlorobenzene (D
1,4-Dichlorobenzene (D
Dichlorobromomethane (E
2,4-Dichlorotrifluorotoluene
3,4-Dichlorotrifluorotoluene
Di-n-octyl phthalate (E)
Dioxin (2,3,7,8-TCDD) (D
Fluoranthene (E,
Furan (2,3,7,8-TCDF)
Heptanone
Hexachlorobenzene (D,
Hexachlorobutadiene (E,
Hexane
Methylene chloride (E,
Methyl ethyl ketone
Octochlorostyrene (D,
Pentachlorobenzene (D,
Pentachlorophenol (E,
Phenol (E,
Polychlorinated biphenyls (PCBs), Total (A
Pyrene (E,
1,2,3,4-Tetrachlorobenzene (D,
1,2,4,5-Tetrachlorobenzene
Tetrachloroethylene (E)
2,3,4,5-Tetrachlorophenol
2,3,5,6-Tetrachlorophenol
Tetrahydrofuran
Toluene (E,
1,2,3-Trichlorobenzene (D,
1,2,4-Trichlorobenzene (D
1,3,5-Trichlorobenzene (D
1,1,1-Trichloroethane — typo should have been 1,1,1-Trichloroethylene
2,4,5-Trichlorophenol (E
2,4,6-Trichlorophenol (E)
2,3,6-Trichlorotoluene
2,4,5-Trichlorotoluene

(A) = GLWQA objectives set
(B) = Exceeds std or criteria
(C) = Possible or known link to impairment
(D) = Toxic as listed in LOTMP
(E) = LOTMP evidence of presence in the lake, toxic with (Category II A ...)
F = GLWQA ...

ROE COUNTY HEALTH DEPARTMENT
VIRONMENTAL HEALTH LABORATORY

435 EAST HENRIETTA ROAD
ROCHESTER, NEW YORK 14620

MEMORANDUM

DATE: 2 October 1992

TO: Priority Pollutants Task Group

FROM: Richard S Burton, Health Department

SUBJECT: **RAP Pollutant Loadings Committee Load Assessment List: Prioritization**

Derivation of the list.

As detailed in the attached 1 October 1992 memorandum, the Pollutant Load Assessment List used by the RAP Technical Group Pollutant Loadings Committee was derived from several lists of pollutants of concern. The majority of substances on the final list are in the Niagara River Toxics Management Plan, to which were added other pollutants of local concern. Attached is a re-sorted list which shows which substances were from which references.

It should be noted that 2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF) and Chlorinated dibenzofurans, which include 2,3,7,8-TCDF, are separately listed (2,3,7,8-TCDF is considered the most toxic of the chlorinated furans). However, only 2,3,7,8-Tetrachlorodibenzodioxin (2,3,7,8-TCDD), the most toxic of the chlorinated dioxins, is listed, although other dioxins are considered toxic; the assumption is made that all dioxins are reported as their 2,3,7,8-TCDD equivalent.

Prioritization and planning.

The entire list should be considered the long-term list around which strategic planning should focus. To set short term tactical plans, the list should be prioritized into groups of ten substances of greatest concern.

The top ten items needing local remediation should be identified, and a three-year plan should be developed to address those pollutants, establishing goals and remedial action plans for each.

A second group of ten should be identified to look ahead to the next three years and begin obtaining the data which will be needed to determine whether local remediation is needed.

This task group might meet every three years to review status of the previous three year plan, and to set new action items for the next three-year plan.

Our recommendation would be to select the IJC's "Eleven Pollutants of Greatest Concern", with the exception of Dieldrin, as our top ten. Dieldrin could be deferred to the second group. Thus, the top ten list would be as follows:

Polychlorinated biphenyls (PCBs)
DDT and metabolites
Toxaphene
Dioxin (2,3,7,8-TCDD)
Furan (2,3,7,8-TCDF)
Mirex
Mercury
Benzo(a)pyrene
Hexachlorobenzene
Alkylated Lead

Our recommendation for the second group of ten pollutants to be addressed includes the following:

Dieldrin
Chlordane
Octochlorostyrene
BTX (Benzene,Toluene,Xylene)
Phenols
Cadmium
Silver
Zinc
Phosphorus
Cyanide

RAP Technical Group Pollutant Loadings Committee Pollutant Load Assessment List

Seven Critical Pollutants identified by the IJC Water Quality Board

- ** Polychlorinated biphenyls (PCBs),Tot
- ** DDT and metabolites
- ** Dieldrin
- * Toxaphene
- ** Dioxin (2,3,7,8-TCDD)
- * Furan (2,3,7,8-TCDF)
- ** Mirex (Mirex and Photomirex)
- ¤** Mercury
- * Benzo(a)pyrene
- ** Hexachlorobenzene
- * Alkylated lead

+ Substances which exceed LOTMP standards: 2 October 1990 memo from G.Mikol to B.Butler

- + Aluminum
- + Chlordane
- ** Dioxin (2,3,7,8-TCDD)
- + Iron
- ** Mirex (Mirex and Photomirex)
- ¤** Mercury
- ** Polychlorinated biphenyls (PCBs), Total
- ** DDT and metabolites
- ** Dieldrin
- ** Hexachlorobenzene
- + Octochlorostyrene
- ¤+ Phosphorus

¤ Summary of needs for SPDES permit data: 5 March 1990 letter from S.Sherwood to B.Butler

- ¤+ Phosphorus
- ¤ Silver
- ¤ Zinc
- ¤ Cadmium
- ¤ Lead
- ¤ Chromium
- ¤** Mercury
- ¤ Benzene
- ¤ Toluene

¥ Added at 6 November 1991 meeting of RAP Technical Group Pollutant Loadings Committee

- ¥ Cyanide
- ¥ Total Suspended Solids
- ¥ 1,1,1-Trichloroethylene

• Toxic substances evaluated in the Niagara River Toxics Management Plan

- Arsenic
- Benz(a)anthracene
- * Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- + Chlordane
- Chrysene
- ** DDT and metabolites
- ** Dieldrin
- ** Dioxin (2,3,7,8-TCDD)
- ** Hexachlorobenzene
- ¤ Lead
- ¤** Mercury
- ** Mirex (Mirex and Photomirex)
- + Octochlorostyrene
- ** Polychlorinated biphenyls (PCBs),Tot
- Tetrachloroethylene
- * Toxaphene
- Aldrin
- Barium
- Hexachlorocyclohexane (BHC), Total
- ¤ Benzene
- Bis(2-ethylhexyl) phthalate
- ¤ Cadmium
- Carbon tetrachloride
- ¤ Chromium
- Cobalt
- ¤ Copper
- 1,2-Dichlorobenzene
- 1,3-Dichlorobenzene
- 1,4-Dichlorobenzene
- Di-n-octyl phthalate
- Endosulfan, Total
- Endrin
- Fluoranthene
- Heptachlor and Heptachlor epoxide
- Hexachlorobutadiene
- Manganese
- Methoxychlor
- Methylene chloride
- Nickel
- Pentachlorobenzene
- Pentachlorophenol
- Phenol
- Pyrene
- Selenium
- 1,2,3,4-Tetrachlorobenzene
- 1,2,4,5-Tetrachlorobenzene
- 2,3,4,5-Tetrachlorophenol
- 2,3,5,6-Tetrachlorophenol
- Tetrahydrofuran
- ¤ Toluene
- 1,2,3-Trichlorobenzene
- 1,2,4-Trichlorobenzene
- 1,3,5-Trichlorobenzene
- 2,4,5-Trichlorophenol
- 2,4,6-Trichlorophenol
- Vanadium
- ¤ Zinc
- Chloroform
- Acetone
- Chlorinated dibenzofurans
- 2-Chlorotrifluorotoluene
- 4-Chlorotrifluorotoluene
- Dichlorobromomethane
- 2,4-Dichlorotrifluorotoluene
- 3,4-Dichlorotrifluorotoluene
- Heptanone
- Hexane
- Methyl ethyl ketone
- Molybdenum
- Strontium
- 2,3,6-Trichlorotoluene
- 2,4,5-Trichlorotoluene

COUNTY HEALTH DEPARTMENT
ENMENTAL HEALTH LABORATORY

435 EAST HENRIETTA ROAD
ROCHESTER, NEW YORK 14620

MEMORANDUM

DATE: 1 October 1992

TO: Richard S Burton, Laboratory Administrator

FROM: Lisa P Spittal, Senior Chemist

SUBJECT: **Pollutants on the Loadings Committee List of 80**

Per your request, the Pollutant Load Assessment List used by the RAP Technical Group Pollutant Loadings Committee has been reviewed to determine information sources which resulted in each analyte's inclusion on the list.

The initial list, distributed on 18 October 1991, was generated from the following:

> Eleven Critical Pollutants Identified by the Water Quality Board, as listed in the IJC Virtual Elimination Task Force publication: Persistent Toxic Substances: Virtually Eliminating Inputs to the Great Lakes. Interim report, July 1991. ISBN 1-895085-27-0.
>
> Seven substances that exceed enforceable standards in the Lake Ontario Toxics Management Plan, and four substances the exceed unenforceable criteria, as listed in the 2 October 1990 memorandum from G.Mikol to B.Butler.
>
> Summary of needs for SPDES permit data, as listed in the 5 March 1990 letter from S.Sherwood to B.Butler.
>
> Toxic substances evaluated in the Niagara River Toxics Management Plan.

Three additional substances were added at the 6 November 1991 meeting of the Pollutant Loadings Committee, as documented in minutes dated 26 November 1991, revised 31 December 1991. (NB. Those minutes also indicate addition of Phosphorus, which was already on the original list.)

Attached is a copy of the final list, annotated to illustrate which analytes were indicated by which references; copies of the references are also attached.

RAP Technical Group Pollutant Loadings Committee
Pollutant Load Assessment List

+ Aluminum
• Arsenic
• Barium
•¤ Cadmium
•¤ Chromium
• Cobalt
•¤ Copper
+ Iron
•¤ Lead
• Manganese
•¤+* Mercury
• Molybdenum
• Nickel
• Selenium
¤ Silver
• Strontium
• Vanadium
•¤ Zinc

* Alkylated lead

¤+ Phosphorus

¥ Cyanide

¥ Total Suspended Solids

• Aldrin
• + Chlordane
• ++ Dieldrin
• ++ DDT and metabolites
• Endosulfan, Total
• Endrin
• Heptachlor and Heptachlor epoxide
• Hexachlorocyclohexane (BHC), Total
• Methoxychlor
• ++ Mirex (Mirex and Photomirex)
• * Toxaphene

• Acetone
•¤ Benzene
• Benz(a)anthracene
• * Benzo(a)pyrene
• Benzo(b)fluoranthene
• Benzo(k)fluoranthene
• Bis(2-ethylhexyl) phthalate
• Carbon tetrachloride
• Chloroform
• Chlorinated dibenzofurans
• 2-Chlorotrifluorotoluene
• 4-Chlorotrifluorotoluene
• Chrysene
• 1,2-Dichlorobenzene
• 1,3-Dichlorobenzene
• 1,4-Dichlorobenzene
• Dichlorobromomethane
• 2,4-Dichlorotrifluorotoluene
• 3,4-Dichlorotrifluorotoluene
• Di-n-octyl phthalate
• ++ Dioxin (2,3,7,8-TCDD)
• Fluoranthene
* Furan (2,3,7,8-TCDF)
• Heptanone
• ++ Hexachlorobenzene
• Hexachlorobutadiene
• Hexane
• Methylene chloride
• Methyl ethyl ketone
• + Octochlorostyrene
• Pentachlorobenzene
• Pentachlorophenol
• Phenol
• ++ Polychlorinated biphenyls (PCBs), Total
• Pyrene
• 1,2,3,4-Tetrachlorobenzene
• 1,2,4,5-Tetrachlorobenzene
• Tetrachloroethylene
• 2,3,4,5-Tetrachlorophenol
• 2,3,5,6-Tetrachlorophenol
• Tetrahydrofuran
•¤ Toluene
• 1,2,3-Trichlorobenzene
• 1,2,4-Trichlorobenzene
• 1,3,5-Trichlorobenzene
¥ 1,1,1-Trichloroethylene
• 2,4,5-Trichlorophenol
• 2,4,6-Trichlorophenol
• 2,3,6-Trichlorotoluene
• 2,4,5-Trichlorotoluene

* Eleven Critical Pollutants identified by the IJC Water Quality Board
+ Substances which exceed LOTMP standards: 2 October 1990 memo from G.Mikol to B.Butler
¤ Summary of needs for SPDES permit data: 5 March 1990 letter from S.Sherwood to B.Butler
• Toxic substances evaluated in the Niagara River Toxics Management Plan
¥ Added at 6 November 1991 meeting of RAP Technical Group Pollutant Loadings Committee

ROE COUNTY HEALTH DEPARTMENT
NVIRONMENTAL HEALTH LABORATORY

435 EAST HENRIETTA ROAD
ROCHESTER, NEW YORK 14620

MEMORANDUM

DATE: 15 April 1992

TO: RAP Loadings Committee

FROM: Richard S Burton, Monroe County Environmental Health Laboratory

SUBJECT: **Updated Pollutant Load Assessment List (80 pollutants)**

Aluminum
Arsenic
Barium
Cadmium
Chromium
Cobalt
Copper
Iron
Lead
Manganese
Mercury
Molybdenum
Nickel
Selenium
Silver
Strontium
Vanadium
Zinc

Alkylated lead

Phosphorus

Cyanide

Total Suspended Solids

Aldrin
Chlordane
Dieldrin
DDT and metabolites
Endosulfan, Total
Endrin
Heptachlor and Heptachlor epoxide
Hexachlorocyclohexane (BHC), Total
Methoxychlor
Mirex (Mirex and Photomirex)
Toxaphene

Acetone
Benzene
Benz(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Bis(2-ethylhexyl) phthalate
Carbon tetrachloride
Chloroform
Chlorinated dibenzofurans
2-Chlorotrifluorotoluene
4-Chlorotrifluorotoluene
Chrysene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Dichlorobromomethane
2,4-Dichlorotrifluorotoluene
3,4-Dichlorotrifluorotoluene
Di-n-octyl phthalate
Dioxin (2,3,7,8-TCDD)
Fluoranthene
Furan (2,3,7,8-TCDF)
Heptanone
Hexachlorobenzene
Hexachlorobutadiene
Hexane
Methylene chloride
Methyl ethyl ketone
Octochlorostyrene
Pentachlorobenzene
Pentachlorophenol
Phenol
Polychlorinated biphenyls (PCBs), Total
Pyrene
1,2,3,4-Tetrachlorobenzene
1,2,4,5-Tetrachlorobenzene
Tetrachloroethylene
2,3,4,5-Tetrachlorophenol
2,3,5,6-Tetrachlorophenol
Tetrahydrofuran
Toluene
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
1,3,5-Trichlorobenzene
1,1,1-Trichloroethylene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,3,6-Trichlorotoluene
2,4,5-Trichlorotoluene

,ROE COUNTY HEALTH DEPARTMENT
JVIRONMENTAL HEALTH LABORATORY

435 EAST HENRIETTA ROAD
ROCHESTER, NEW YORK 14620

MEMORANDUM

DATE: 18 October 1991

TO: Paul Schmied, New York State Department of Environmental Conservation

FROM: Richard S Burton, Monroe County Environmental Health Laboratory

SUBJECT: **Pollutant Load Assessment List to be Searched (80 pollutants)**

Aluminum
Arsenic
Barium
Cadmium
Chromium
Cobalt
Copper
Iron
Lead
Manganese
Mercury
Molybdenum
Nickel
Selenium
Silver
Strontium
Vanadium
Zinc

Alkylated lead

Phosphorus

Aldrin
Chlordane
Dieldrin
DDT and metabolites
Endosulfan, Total
Endrin
Heptachlor and Heptachlor epoxide
Hexachlorocyclohexane (BHC), Total
Methoxychlor
Mirex (Mirex and Photomirex)
Toxaphene

Acetone
Benzene
Benz(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Bis(2-ethylhexyl) phthalate
Carbon tetrachloride
Chloroform
Chlorinated dibenzofurans
2-Chlorotrifluorotoluene
4-Chlorotrifluorotoluene
Chrysene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Dichlorobromomethane
2,4-Dichlorotrifluorotoluene
3,4-Dichlorotrifluorotoluene
Di-n-octyl phthalate
Dioxin (2,3,7,8-TCDD)
Fluoranthene
Furan (2,3,7,8-TCDF)
Heptanone
Hexachlorobenzene
Hexachlorobutadiene
Hexane
Methylene chloride
Methyl ethyl ketone
Octochlorostyrene
Pentachlorobenzene
Pentachlorophenol
Phenol
Polychlorinated biphenyls (PCBs), Total
Pyrene
1,2,3,4-Tetrachlorobenzene
1,2,4,5-Tetrachlorobenzene
Tetrachloroethylene
2,3,4,5-Tetrachlorophenol
2,3,5,6-Tetrachlorophenol
Tetrahydrofuran
Toluene
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
1,3,5-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,3,6-Trichlorotoluene

APPENDIX E
Background and Loading Estimate Calculations used in Chapter 5

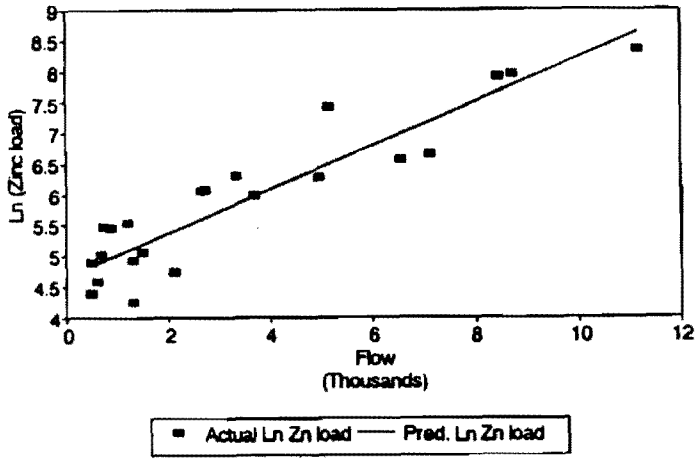
a. Total Loadings from the Genesee River (Table 5-11)

In order to determine annual loadings of the water quality parameters in question, daily loadings on the sampling dates were correlated with the river flow on those dates. (Method suggested by Don Sherwood, USGS Ithaca). Whenever possible, "total recoverable" values were used for metals. The tests for this began in 1988, so the data used for the correlation was from 1988-1990. Some metals continue to be measured as "dissolved." Data used for these metals was from 1986-1990. For Total Suspended Solids and Total Phosphorus calculations, the data used went back to 1980. The regression equations thus generated were then applied to the flow on each day of the water year 1990. The daily loadings were added to arrive at an annual loading figure.

Correlations of pollutant loadings with flow were generally good, particularly at Geneseo. Each was plotted in three different ways to see which yielded the closest fit: Flow vs. Load, Natural Log (Ln) (flow) vs. Load, and Ln (flow) vs. Ln(load). Different pollutants may behave differently due to their sources and the way in which they are carried by the river (dissolved or suspended, etc.) In deciding which regression equation to use, it was necessary to look at which was the best straight-line fit (had the highest correlation coefficient) and which gave the best estimate of the high values, since those high values will make the greatest contribution to the annual loading. When two equations had similar correlation coefficients, the one that estimated the high values better was used. As an example, look at the plots of zinc loading for the Genesee River at Charlotte Docks. The regression plots for Flow vs. Ln(load) and Ln(flow) vs. Ln(load) both approximate straight lines, or at least do not show an obvious curvature. Correlation coefficients are .85 and .79, respectively. But by plotting these graphs without the log transformations, it is possible to see the difference in the way that the regression equations predict the higher loadings. The Flow vs. Ln(load) equation appears to be a better predictor of high values than the Ln(flow) vs. Ln(load) equation. The total annual loading computed using the Flow vs. Ln(load) equation is 111 tons. Using the other equation, the annual load computed is 89 tons.

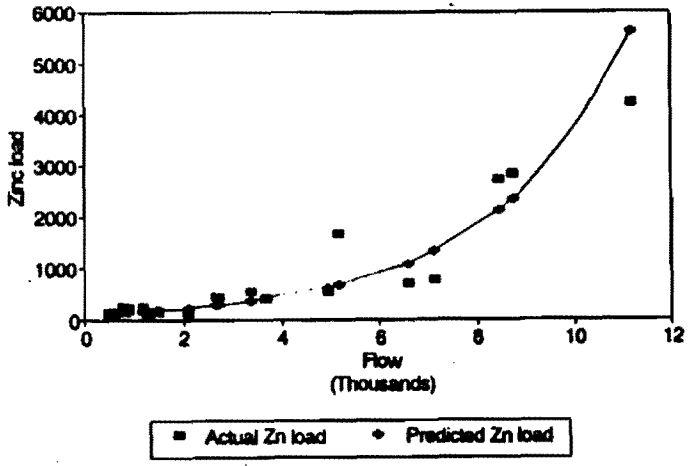
Genesee R. Zn Loading

Regression: Flow vs. Ln(load)



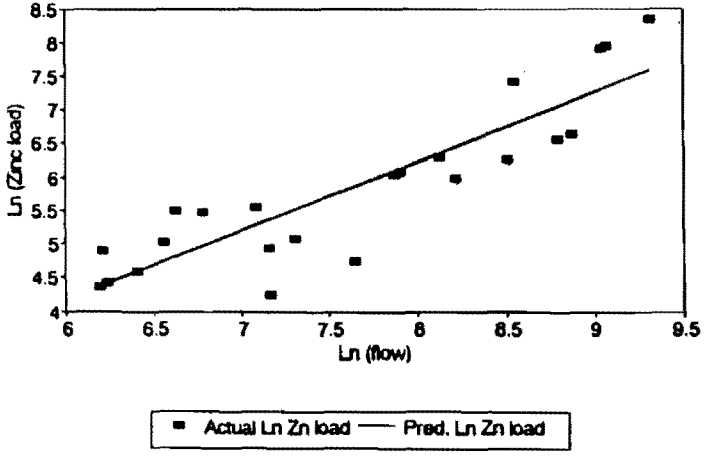
Genesee R. Zn Loading

Regression: Flow vs. Ln(load)



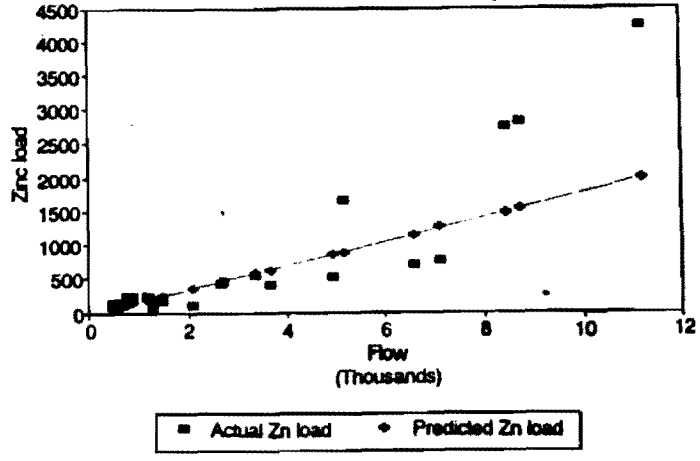
Genesee R. Zn Loading

Regression: Ln(flow) vs. Ln(load)



Genesee R. Zn Loading

Regression: Ln(flow) vs. Ln(load)



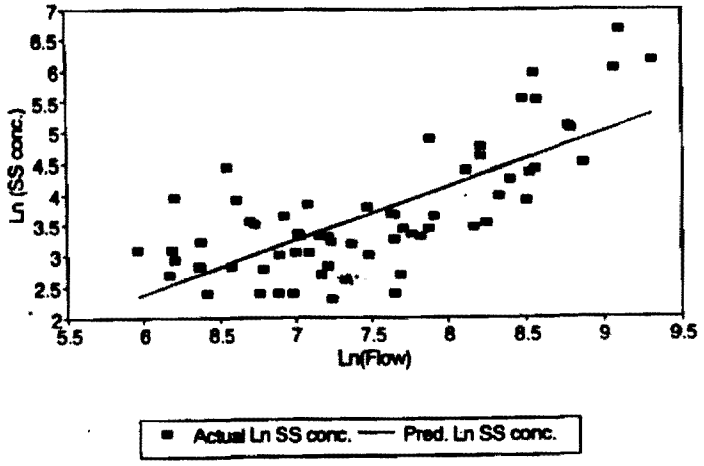
Total suspended solids presented a problem because the regression lines calculated to predict suspended solids from actual data either underestimated or overestimated the two highest values by a large amount. The problem was addressed by using concentration instead of loading to correlate with flow. The high values were less exaggerated this way, and the predicted loadings better approximated them. After the regression was run, the concentrations were converted into loadings. The second highest loading occurred in April, 1990 during spring runoff when the river flow was at its greatest. But the highest loading occurred in June, 1982 at a considerably lower river flow. (In early June many farm fields are bare and particularly susceptible to erosion.) More sampling during spring runoff and storm events will be needed to improve on loading estimates for all parameters.

Note: multiple regression may be able to generate better estimates using the data available.

The following graphs show the different ways in which suspended solids regressions were run. The graphs on the left show the log-transformed data and the regression line (predicted values). The graphs on the right show how the predicted values compare with actual values without the log transformation. The last graph is the one that was considered the best.

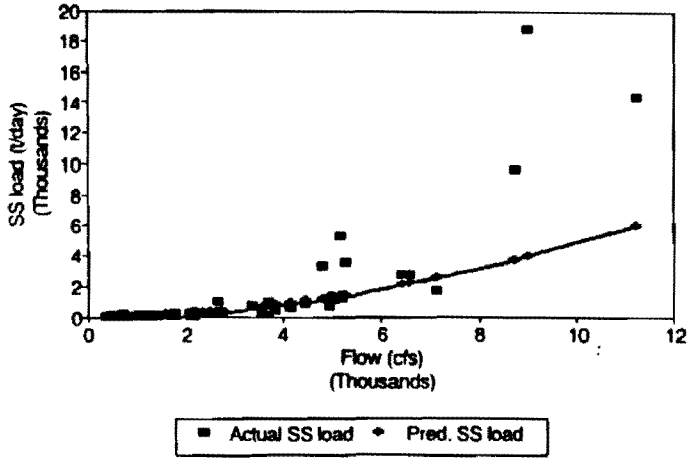
Genesee R. SS Concentration

Regr.: Ln(Flow) vs. Ln(conc.)



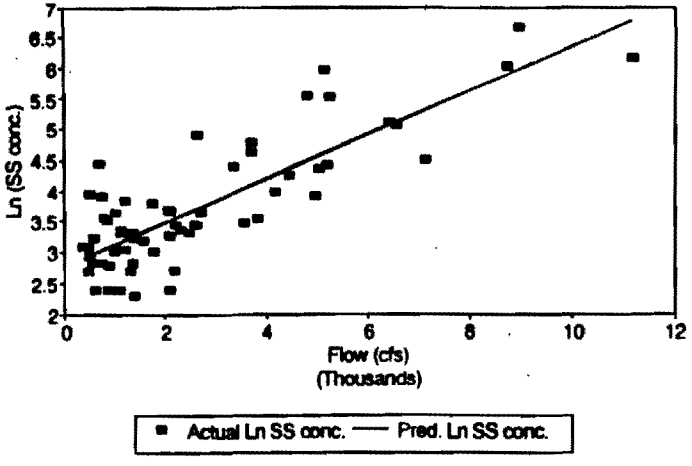
Genesee R. SS Concentration

Regr.: Ln(Flow) vs. Ln(conc.)



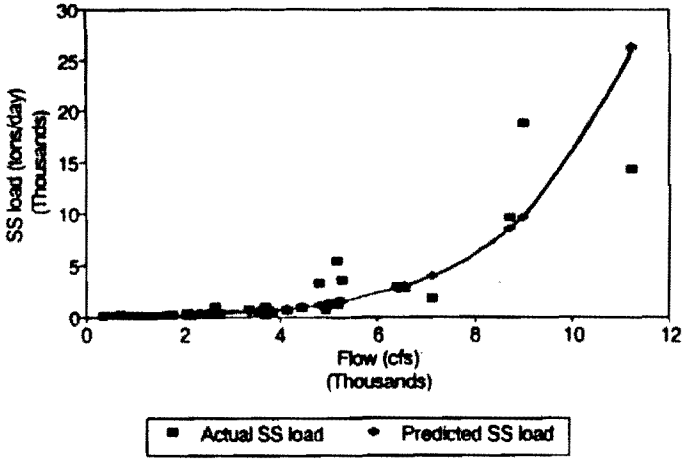
Genesee R. SS Concentration

Regression: Flow vs. Ln(conc.)

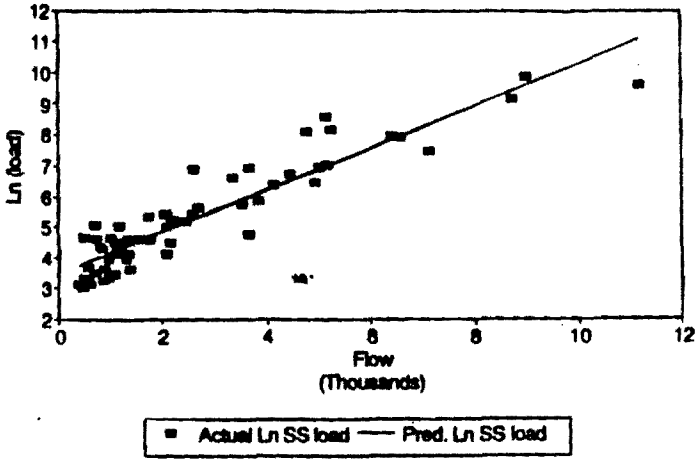


Genesee R. SS Loading

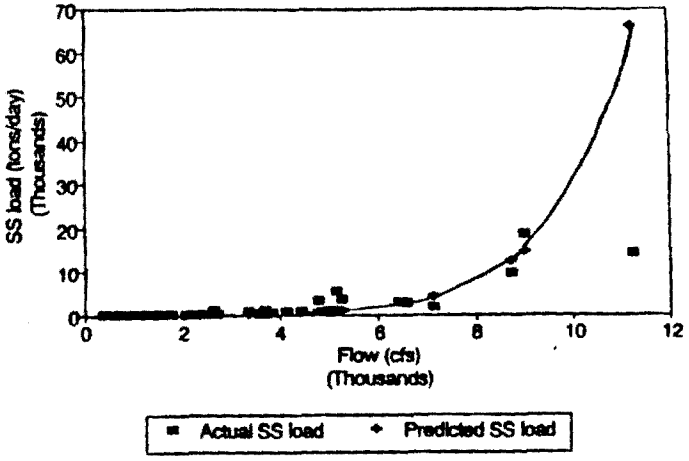
Regression: Flow vs. Ln(conc.)



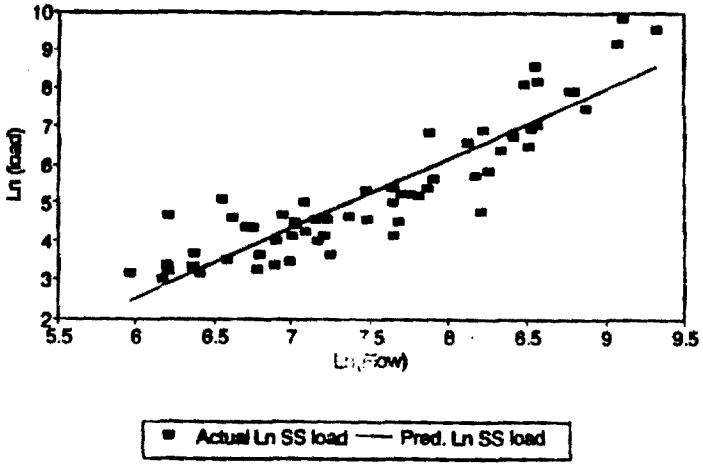
Genesee R. SS Loading
Regression: Flow vs. Ln(load)



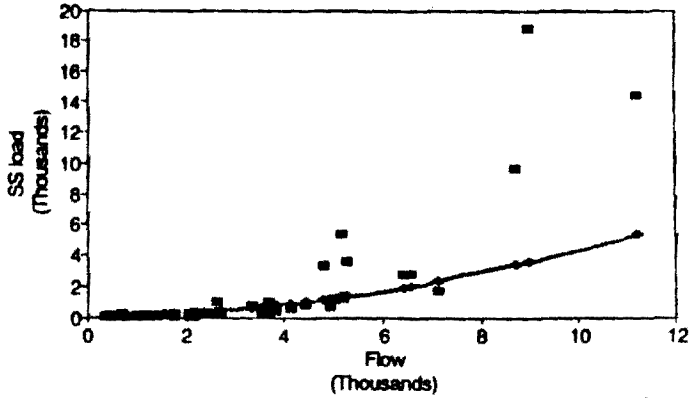
Genesee R. SS Loading
Regression: Flow vs. Ln(load)



Genesee R. SS Loading
Regression: Ln(flow) vs. Ln(load)



Genesee R. SS Loading
Regression: Ln(flow) vs. Ln(load)



Regression equations used for all parameters at Charlotte Docks are shown below. Graphs of these equations follow. (Whether calculations are done in tons or pounds is arbitrary.)

Total Suspended Solids:

No. of observations: 34

$Y = .000357X + 2.766$ $R^2 = .69$
Std. error of Y = 0.57

Where:
Y = Ln(conc. in mg/L)
X = flow in cfs
R^2 = correlation coefficient

TSS load (tons/day) = $e^{(.000357X + 2.766)}X \times .00277$

Where:
X = flow in cfs
.00277 = conversion factor

Total Phosphorus:

No. of observations: 44 (10/80 - 8/90)

$Y = .000405X - 2.077$ $R^2 = .52$
Std. error of Y = 0.74

Where:
Y = Ln(load in tons/day)
X = flow in cfs
R^2 = correlation coefficient

P load (tons/day) = $e^{(.000405X - 2.077)}$

Where X = flow in cfs

Arsenic (dissolved):

No. of observations: 16

$Y = 0.00455X + 0.665$ $R^2 = .86$
Std. error of Y = 3.175

Where:
Y = As load in lbs/day
X = flow in cfs
R^2 = correlation coefficient

Barium (dissolved):

No. of observations: 16

$Y = 0.861X - 0.406$ $R^2 = .96$
Std. error of Y = 0.150

Where:
Y = Ln(load in lbs/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Ba load (lbs/day) = $e^{(0.861X - 0.406)}$

Where X = Ln(flow in cfs)

Cadmium (total recoverable):

No. of observations: 24

$Y = .903X - 4.52$ $R^2 = .69$
Std. error of Y = 0.631

Where:
Y = Ln(load in lbs/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Cd load (lbs/day) = $e^{(.903X - 4.52)}$

Where X = Ln(flow in cfs)

Copper (total recoverable):

No. of observations: 24

$Y = 1.077X - 3.556$ $R^2 = .87$
Std. error of Y = 0.432

Where:
Y = Ln(load in lbs/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Cu load (lbs/day) = $e^{(1.077X - 3.556)}$

Where X = Ln(flow in cfs)

Iron (total recoverable):

No. of observations: 24

$Y = 1.984X - 12.56$ $R^2 = .91$

Std. error of Y = 0.669

Where:
Y = Ln(load in tons/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Fe load (tons/day) = $e^{(1.984X - 12.56)}$

Where X = Ln(flow in cfs)

Lead (total recoverable):

No. of observations: 24

$Y = 0.000422X + 2.450$ $R^2 = .74$

Std. error of Y = 0.789

Where:
Y = Ln(load in lbs/day)
X = Flow in cfs
R^2 = correlation coefficient

Pb load (lbs/day) = $e^{(0.000422X + 2.450)}$

Where X = Flow in cfs

Manganese (total recoverable):

No. of observations: 24

$Y = 1.188X - 9.475$ $R^2 = .82$

Std. error of Y = 0.532

Where:
Y = Ln(load in tons/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Mn load (tons/day) = $e^{(1.188X - 9.475)}$

Where X = Ln(flow in cfs)

Mercury (total recoverable):

No. of observations: 23

$Y = 1.094X - 8.474$ $R^2 = .72$

Std. error of Y = 0.721

Where:
Y = Ln(load in tons/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Hg load (tons/day) = $e^{(1.094X - 8.474)}$

Where X = Ln(flow in cfs)

Nickel (total recoverable):

No. of observations: 24

$Y = 1.392X - 6.452$ $R^2 = .90$

Std. error of Y = 0.471

Where:
Y = Ln(load in lbs/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Ni load (lbs/day) = $e^{(1.392X - 6.452)}$

Where X = Ln(flow in cfs)

Zinc (total recoverable):

No. of observations: 24

$Y = 0.000354X + 4.666$ $R^2 = .85$

Std. error of Y = 0.462

Where:
Y = Ln(load in lbs/day)
X = flow in cfs
R^2 = correlation coefficient

Zn load (lbs/day) = $e^{(0.000354X + 4.666)}$

Where X = flow in cfs

Regression equations at Geneseo are:

Total Suspended Solids:

No. of observations: 19

$Y = .811X - 1.37$ $R^2 = .84$
Std. error of Y = 0.473

Where:
Y = Ln(conc. in mg/L)
X = Ln(flow in cfs)
R^2 = correlation coefficient

TSS load (tons/day) = $e^{(0.811X - 1.37)}X \times .00277$

Where:
X = Ln(flow in cfs)
.00277 = conversion factor

Total Phosphorus: Not measured at Geneseo

Arsenic: Not measured at Geneseo

Cadmium (total recoverable): Most values below detection limit.

Copper (total recoverable):

No. of observations: 23

$Y = 1.273X - 5.035$ $R^2 = .96$
Std. error of Y = 0.352

Where:
Y = Ln(load in lbs/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Cu load (lbs/day) = $e^{(1.273X - 5.035)}$

Where X = Ln(flow in cfs)

Iron (total recoverable):

No. of observations: 23

$Y = 1.795X - 10.43$ $R^2 = .96$
Std. error of Y = 0.459

Where:
Y = Ln(load in tons/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Fe load (tons/day) = $e^{(1.795X - 10.43)}$

Where X = Ln(flow in cfs)

Lead (total recoverable):

No. of observations: 23

$Y = 1.491X - 7.313$ $R^2 = .92$

Std. error of Y = 0.588

Where:
Y = Ln(load in lbs/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Pb load (lbs/day) = $e^{(1.491X - 7.313)}$

Where X = Ln(flow in cfs)

Manganese (total recoverable):

No. of observations: 23

$Y = 1.386X - 10.82$ $R^2 = .98$

Std. error of Y = 0.288

Where:
Y = Ln(load in tons/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Mn load (tons/day) = $e^{(1.386X - 10.82)}$

Where X = Ln(flow in cfs)

Mercury (total recoverable): Most values below detection limit.

Nickel (total recoverable):

No. of observations: 23

$Y = 1.631X - 8.262$ $R^2 = .94$

Std. error of Y = 0.530

Where:
Y = Ln(load in lbs/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Ni load (lbs/day) = $e^{(1.631X - 8.262)}$

Where X = Ln(flow in cfs)

Zinc (total recoverable):

No. of observations: 23

$Y = 1.543X - 6.220$ $R^2 = .91$

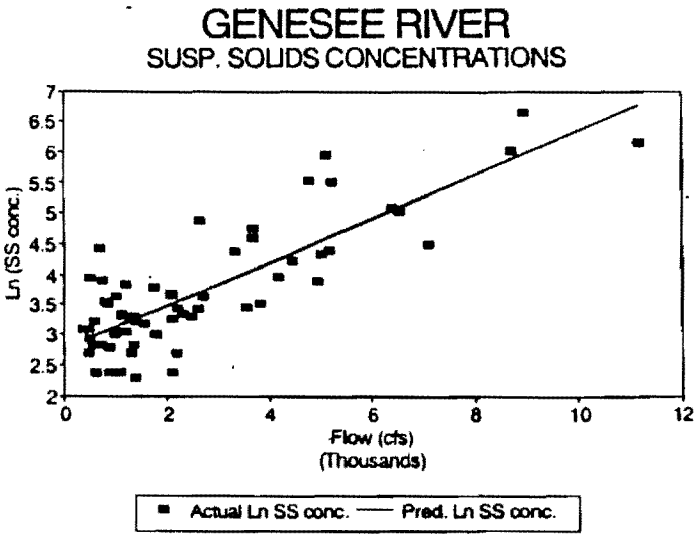
Std. error of Y = 0.648

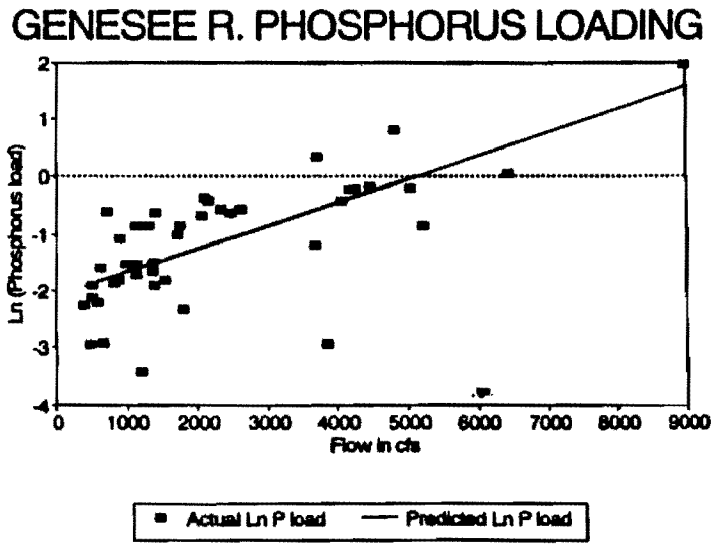
Where:
Y = Ln(load in lbs/day)
X = Ln(flow in cfs)
R^2 = correlation coefficient

Zn load (lbs/day) = $e^{(1.543X - 6.220)}$

Where X = Ln(flow in cfs)

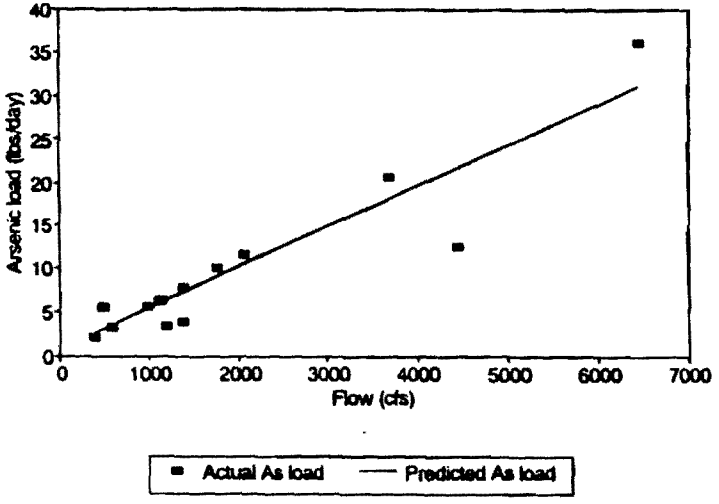
REGRESSION GRAPHS



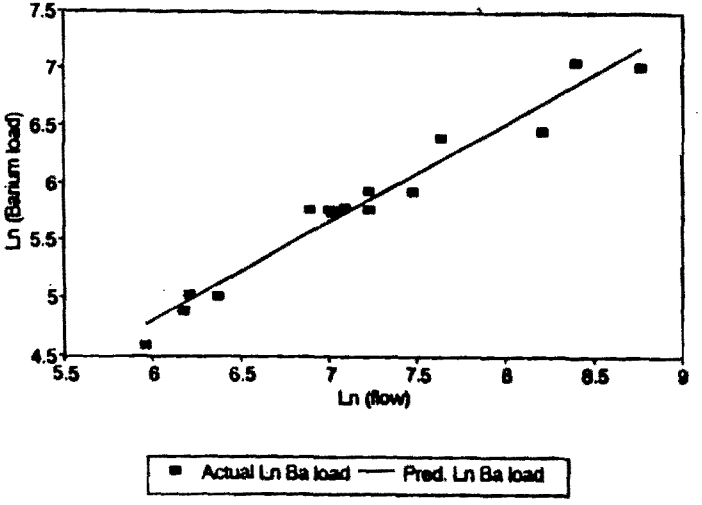


REGRESSION GRAPHS

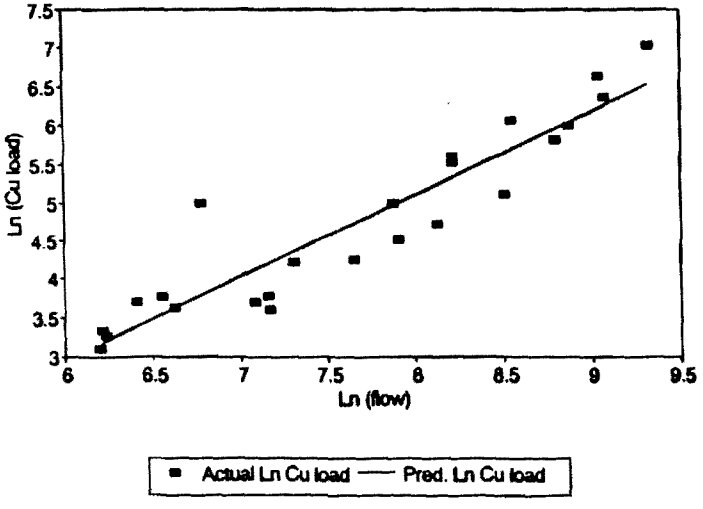
GENESEE R. ARSENIC LOADING



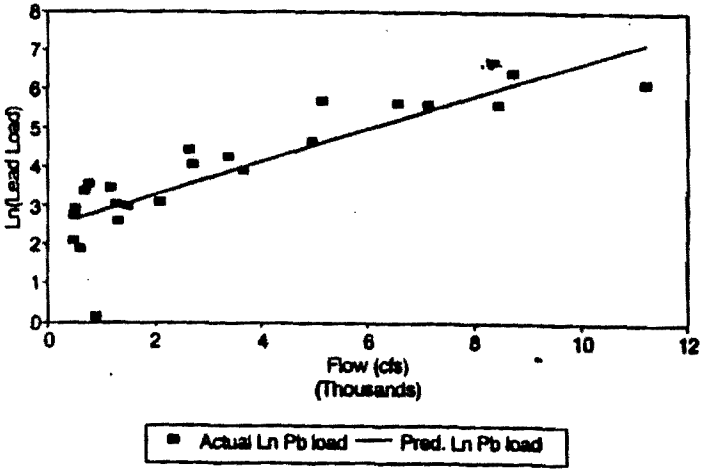
GENESEE R. BARIUM LOADING



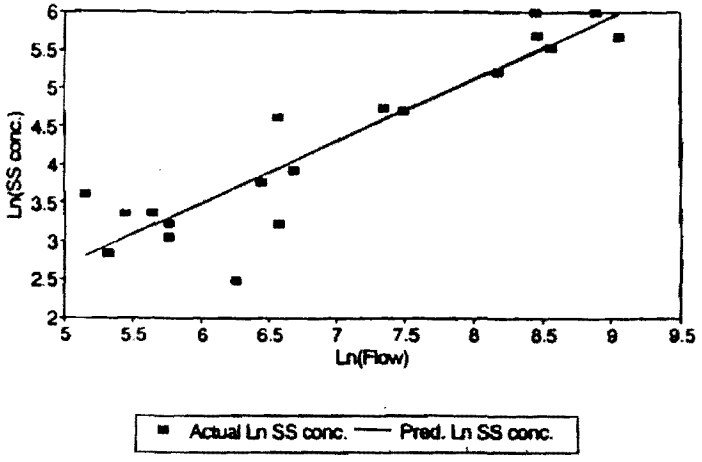
GENESEE R. COPPER LOADING



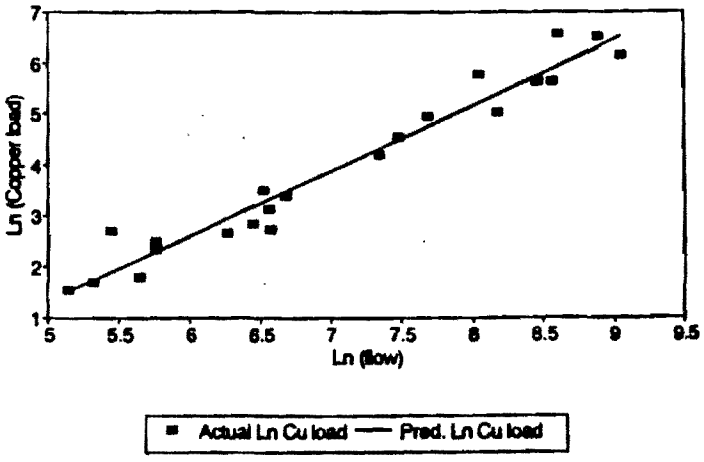
GENESEE RIVER
LEAD LOADING



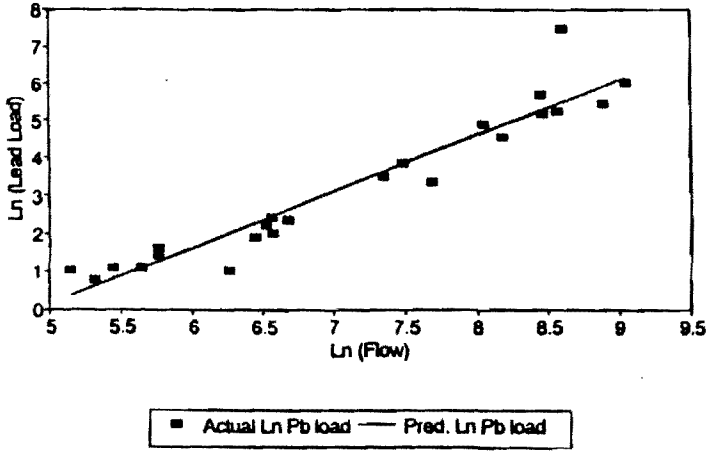
Upper Genesee R. SS Conc.



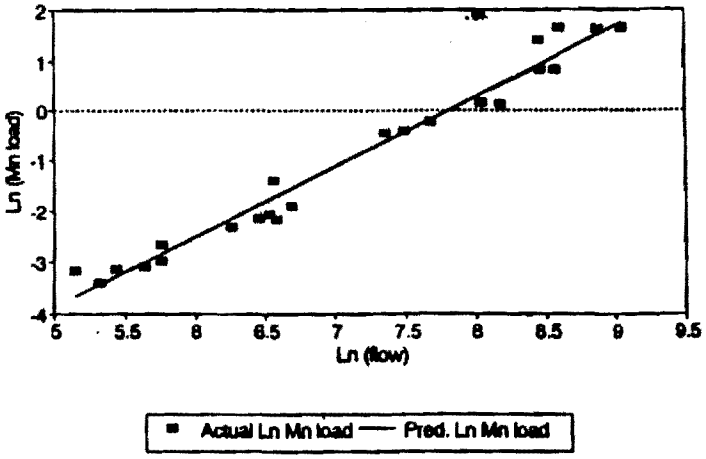
UPPER GENESEE RIVER
COPPER LOADINGS



UPPER GENESEE RIVER
LEAD LOADING

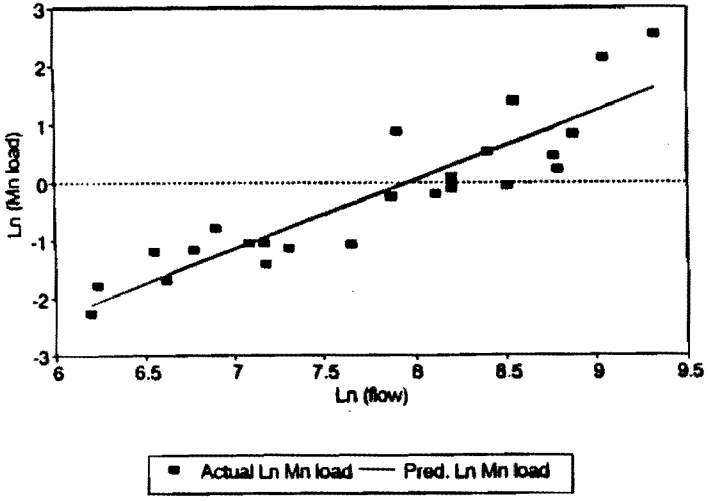


UPPER GENESEE RIVER
MANGANESE LOADING

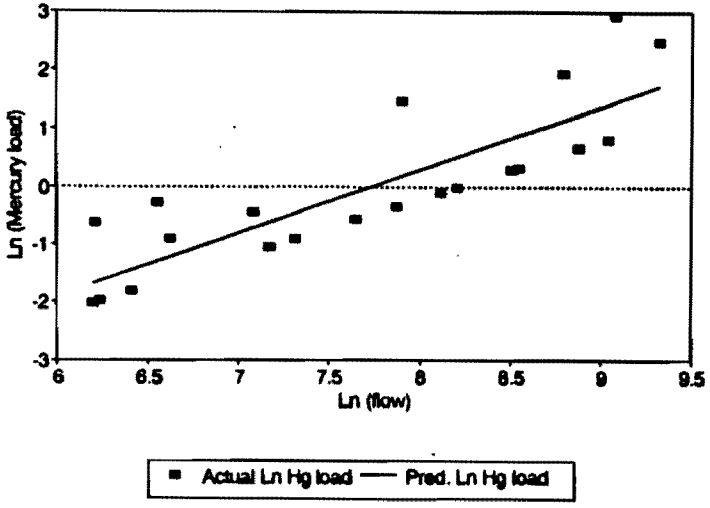


REGRESSION GRAPHS

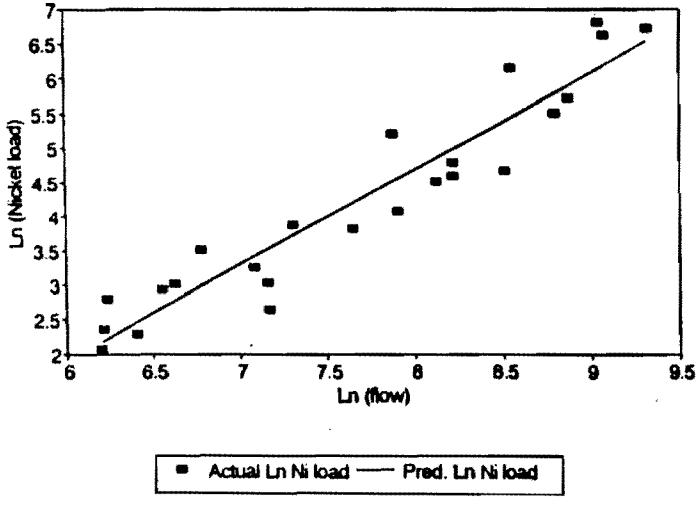
GENESEE R. MANGANESE LOADING



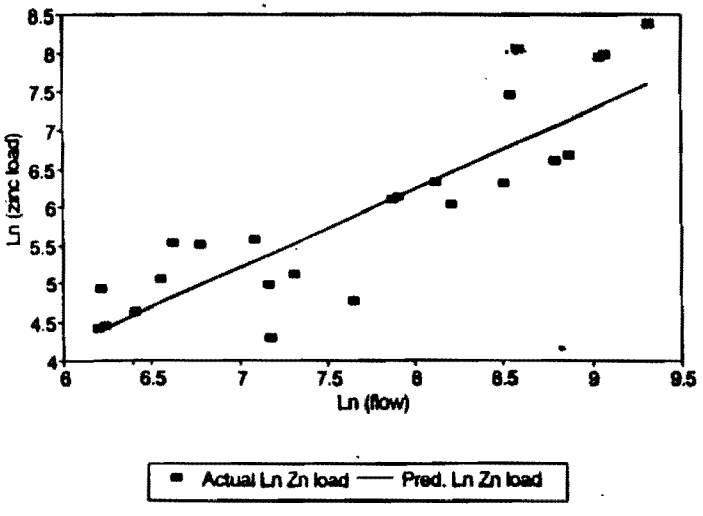
GENESEE R. MERCURY LOADING



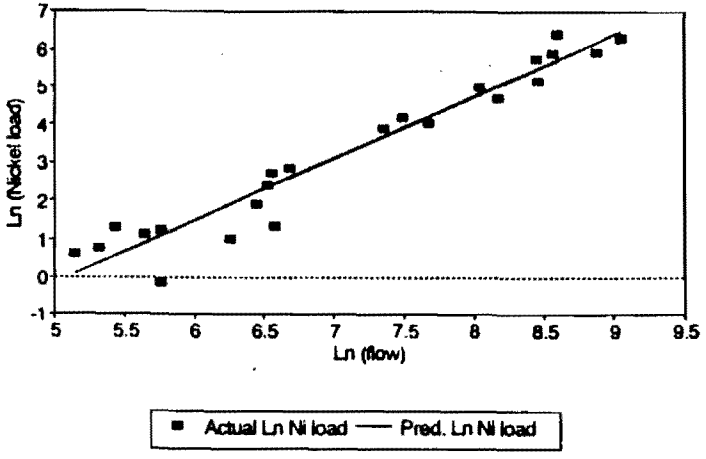
GENESEE RIVER NICKEL LOADING



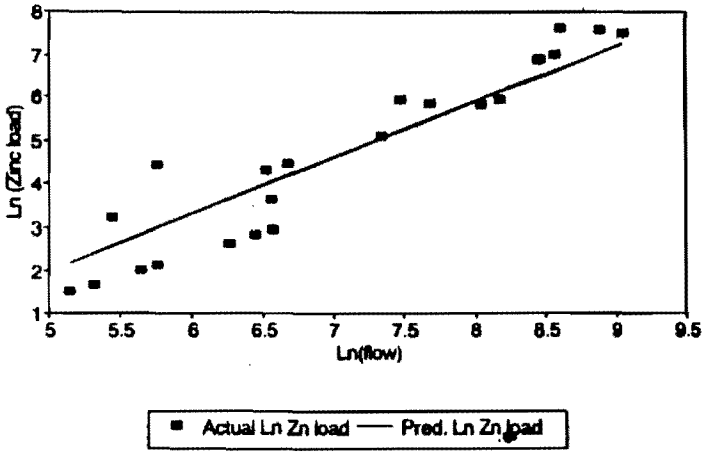
GENESEE RIVER ZINC LOADING



UPPER GENESEE RIVER
NICKEL LOADING



Upper Genesee R. Zn Loading



b. Dredge Loadings (Table 5-12)

The annual or biennial dredging of Rochester Harbor deposits sediments and their associated pollutants from the Genesee River into Lake Ontario. Loadings of these sediment-associated pollutants were calculated using Corps of Engineers data on total volume dredged in 1990 and the chemical analyses of the sediment samples (Aqua Tech, 1990). The Aqua Tech data is shown in chapter 4, Table 4-5. Pollutant concentrations from 11 sample sites were averaged and then multiplied by the total amount of sediment dredged. The Corps expresses sediment volumes in cubic yards; pollutant concentrations are measured in mg/kg. Thus it is necessary to know the density and the % solids of each sample in order to calculate the loadings. This information is provided in the Aqua Tech data.

When comparing loadings from the river to loadings from dredging, it is important to note that river samples are taken at Charlotte Docks, which is near the upper limit of dredging. Most of the dredged material is taken from areas downstream of that sample point.

c. Nonpoint Source Estimates (Table 5-23)

Data derived from Nationwide Urban Runoff (NURP) studies of the Irondequoit Basin (Kappel *et al*, 1986) were used to determine runoff loadings to the embayment from its watershed. Only the Western, Central, and lower Genesee Basins were deemed similar enough to the Irondequoit Basin to utilize extrapolated NURP results; Allegany County has a very different type of landscape, with wooded hills and narrow valleys, as opposed to the more gently rolling agricultural landscape of the rest of the study area. Therefore runoff calculations were not performed for the Genesee Basin upstream of Geneseo.

NURP studies were carried out between July, 1980 and August, 1981. Average monthly rainfall at Rochester during that time was 2.78 inches. During the water year October, 1989-September, 1990 the average monthly rainfall was 3.00 inches, 7.9% greater.

The methods used to estimate nonpoint source runoff were as follows:

(1) Urban and Suburban Watersheds

In the Irondequoit Basin, the export of several pollutants of interest to this study was shown to bear an exponential relationship to the percent of impervious area in the watershed. Plotting the percent imperviousness vs. the log of the annual load per unit area appears as a straight line. Figures 5-2 through 5-5 show this relationship for suspended sediments, total phosphorus, lead, and zinc.

The regression lines for these curves were determined to be the following:

Total Suspended Solids (TSS):

$Y = .137X + .671 \quad R^2 = .79$

Where:
X = % impervious
Y = Ln(TSS yield) in mg/km^2-yr
R^2 = correlation coefficient

TSS load (tons/yr) = $e^{(.137X + .671)}a \times 2.77$

Where:
X = % impervious
a = land area
2.77 = conversion factor (to convert metric to english units)

Total Phosphorus

$Y = .119X + 1.844 \quad R^2 = .89$

Where:
X = % impervious
Y = Ln(P yield) in kg/km^2-yr
R^2 = correlation coefficient

P load (tons/yr) = $e^{(.119X + 1.844)}a \times .00277$

Where:
X = % impervious
a = land area
.00277 = conversion factor

Total Lead:

$Y = .166X - .409 \quad R^2 = .94$

Where:
X = % impervious
Y = Ln(Pb yield) in kg/km^2-yr
R^2 = correlation coefficient

Pb load (tons/yr) = $e^{(.166X - .409)}a \times .00277$

Where:
X = % impervious
a = land area
.00277 = conversion factor

Total Zinc:

$Y = .035X + 4.88$ $\quad R^2 = .87$

Where:
X = % impervious
Y = Ln(Zn yield) in kg/km^2-yr
R^2 = correlation coefficient

Zn load (tons/yr) = $e^{(.035X + 4.88)}a \times .00277$

Where:
X = % impervious
a = land area
.00277 = conversion factor

The watersheds in the Irondequoit Basin for which these relationships held true had impervious areas ranging from 8 to 32%. The regression equations were used to predict pollutant runoff from other watersheds with percentages of impervious surface within that range. Since these watersheds were mostly located in Monroe County, a 1988 Monroe County land-use map was used to estimate imperviousness. Land areas were placed in four categories with the following imperviousness ratings:

Land Use	Percent Impervious
Low density/rural	6%
Medium density residential	25%
High density residential	31%
Commercial/industrial/ multifamily	40%

These percentages, when applied to test watersheds in the Irondequoit Basin that were surveyed in person as part of the NURP study, yielded the same total percentages of impervious surface as the surveys showed.

(2) Rural Watersheds

The NURP study surveyed a rural watershed (Thornell Road) in Monroe and Ontario Counties. The pollutant yields per unit area for this watershed were used to predict pollutant yields from rural watersheds in the study area. Loadings per unit area were assumed to be the same as in the Thornell study:

Total suspended solids: 29.1 mg/km^2 = 81 tons/mi^2

Total phosphorus: 28.5 kg/km^2 = 0.079 tons/mi^2

Total lead: 2.19 kg/km^2 = 0.006 tons/mi^2

Total zinc: 129 kg/km^2 = 0.36 tons/mi^2

(3) Results

Table 5-23 shows results of the calculations described above. Loadings from urbanized areas are calculated using measured areas of the four different land use types, which allows the percentage of imperviousness for the entire watershed to be estimated. Loadings for rural areas are calculated using the Thornell figures described above. Areas of watersheds were estimated by a GIS program based on tracings from a county land use map. They may not be exactly equal to areas listed for these watersheds or basins in other parts of this report.