CHAPTER 6

RESPONSE TO COMMENTS ON THE DEIS

A. INTRODUCTION

This chapter summarizes and responds to all substantive verbal and written comments received during the public comment period on the Draft Environmental Impact Statement for NYCDOH's proposed *Adult Mosquito Control Programs*. Public review of the DEIS began on May 10, 2001, with the publication of the DEIS. NYCDOH held public hearings in each of the five New York City boroughs on May 29, 30, and 31 2001. The comment period remained open until June 11, 2001. Since the Final Environmental Impact Statement (FEIS) had not been completed, written comments on the DEIS which were received by NYCDOH after June 11, 2001 from NYSDOH, an involved agency, were also addressed in the FEIS.

Section B identifies the persons who testified at the public hearings or provided written comments on the DEIS. Comments (and corresponding responses) are presented in Section C. Since many of the comments were similar in subject matter, the comments were consolidated and categorized by topic. Where applicable, comments were addressed in the appropriate sections of the EIS and are included in these sections as double-underlined text.

In addition to the comments reproduced or summarized in this chapter, NYCDOH received other materials during the comment period that, after review, NYCDOH determined were not comments on the DEIS. These materials consist of non-specific statements of opposition to pesticide use, lists of references on pesticide use, and other documents not responding to the analysis set forth in the DEIS. These materials are on file at NYCDOH.

B. LIST OF GROUPS AND INDIVIDUALS WHO COMMENTED ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

COMMENTORS

1. Elaine Abse (Written Comments).
2. Stella Aleman de Gallardo (Statement presented at Brooklyn Hearing, May 31, 2001).
3. Katherine Barbera and Louis Blois, Staten Island Citizens for Healthy Alternatives (Statement presented at Staten Island Hearing, May 30, 2001).
4. Janness Bascom (Statement presented at Rockaways Hearing, May 31, 2001).
5. Stephanie Berghash-Snow, Sierra Club, Safe N.Y.C. (Statement presented at Manhattan Hearing, May 29, 200 and Staten Island Hearing, May 30, 2001 and Written Comments).
6. Bernard J. Blum (Statement presented at Rockaways Hearing, May 31, 2001).
7. Ronald Bourque, New York City Audubon Society (Written Comments)

8. Mary Buchwald, Audubon Society, Green Party (Statement presented at Manhattan Hearing, May 29, 2001 and Brooklyn Hearing, May 31, 2001 and Written Comments).
9. Elijah Burroughs (Statement presented at Rockaways Hearing, May 31, 2001).
10. Theodore E. Cobb (Statement presented at Rockaways Hearing, May 31, 2001).
11. Maxwell Mickey Cohen, N.Y.C. Audubon Society, American Littoral Society (Statement presented at Rockaways Hearing, May 31, 2001).
12. Mitchel Cohen, No Spray Coalition (Statement presented at Manhattan Hearing, May 29, 2001 and Staten Island Hearing, May 30, 2001).
13. Richard Colon, Representing the Office of Congressman Gregory W. Meeks (Statement presented at Rockaways Hearing, May 31, 2001).
14. Sarah Colson (Statement presented at Rockaways Hearing, May 31, 2001).
15. Raymond J. Culkin (Written comments)
16. Carol Cumberland, Sommerville Homeowners Association (Statement presented at Rockaways Hearing, May 31, 2001).
17. Leonard and Bernice Cutler (Statement presented at Rockaways Hearing, May 31, 2001).
18. Linda DeCarlo (Statement presented at Manhattan Hearing, May 29, 2001).
19. Pamela Del Vecchio (Written Comments).
20. David J. D'Ermilio, Assemblyman, Robert A. Straniere's Office (Statement presented at Staten Island Hearing, May 30, 2001).
21. Meagan Devereaux, Staten Island Borough President's Office (Statement presented at Staten Island Hearing, May 30, 2001).
22. Peter Dolack (Statement presented at Manhattan Hearing, May 29, 2001).
23. Roy Doremus (Written Comments).
24. Fran Ehrlich (Written Comments).
25. Stanley Ehrlich, Bayswater Civic Association (Statement presented at Rockaways Hearing, May 31, 2001).
26. Ross Elakman (Written Comments).
27. A. J. Elterman, No Spray Coalition (Statement presented at Manhattan Hearing, May 29, 2001).
28. Claire Feltham (Statement presented at Staten Island Hearing, May 30, 2001).
29. Kimberly Flynn (Statement presented at Manhattan Hearing, May 29, 2001and Written Comments).
30. Rebecca Foster (Statement presented at Brooklyn Hearing, May 31, 2001).
31. Emanuel Fox, Director of Bayswater Civic Association, Member of Community Board #14 (Statement presented at Rockaways Hearing, May 31, 2001).
32. Jody Friedman (Statement presented at Manhattan Hearing, May 29, 2001).

33. Jonathan Gaska, District Manager for Community Board #14 (Statement presented at Rockaways Hearing, May 31, 2001).
34. Thomas Wm. Hamilton, County Chair, Independence Party (Statement presented at Staten Island Hearing, May 30, 2001).
35. Diane Haavind (Statement presented at Brooklyn Hearing, May 31, 2001).
36. Anton Hok (Statement presented at Staten Island Hearing, May 30, 2001).
37. Dr. Pandora Hopkins, Green Party (Written Comments).
38. Joyce Hyon (Written Comments).
39. Lisa Jackson and Mary Meenan, No Spray Coalition (Statement presented at Rockaways Hearing, May 31, 2001).
40. Alison Kirshner, New York Environmental Law & Justice Project (Written Comments)
41. Cindy Klumb (Statement presented at Brooklyn Hearing, May 31, 2001).
42. Mera Krumholz (Written Comments).
43. Walter Krumholz (Written Comments).
44. Joel R. Kupferman, N.Y. Environmental Law and Justice Project (Statement presented at Manhattan Hearing, May 29, 2001 and Written Comments).
45. Anne Lazarus (Written Comments).
46. Anita Lerman, Ph.D., Representing City Council Candidate Libby Harkin (Statement presented at Staten Island Hearing, May 30, 2001 and Written Comments).
47. Ted M. Lewis, NYC Greens Pesticide Committee (Written Comments).
48. Dr. Jonothan Logan (Statement presented at Manhattan Hearing, May 29, 2001).
49. Larry Love, Respresenting Assemblywoman Audrey Pheffer (Statement presented at Rockaways Hearing, May 31, 2001).
50. Kevin Love (Written Comments).
51. Mae McKay, Arverne Civic Executive Board (Statement presented at Rockaways Hearing, May 31, 2001).
52. Mary Meenan, No Spray Coalition (Written Comments).
53. Sandra L. Miller (Statement presented at Manhattan Hearing, May 29, 2001 and Written Comments).
54. Pearl Novich (Written Comments).
55. New York State Department of Health (NYSDOH) (Written Comments).
56. Cynthia Obidienzo (Written Comments).
57. David Occhiuto, No Spray Coalition (Statement presented at Manhattan Hearing, May 29, 2001).
58. Ellen Osuna (Written Comments).

59. Catherine Paczkowski, Green Party (Statement presented at Brooklyn Hearing, May 31, 2001).
60. Zee Pacifici (Written Comments).
61. Patricia A. Pollock (Written Comments).
62. Tina Pico (Written Comments).
63. D. Dayneen Preston, Sommerville Homeowners Association (Statement presented at Rockaways Hearing, May 31, 2001).
64. Paul Priore, Local Activist (Statement presented at Queens Hearing, May 29, 2001).
65. Donna M. Reilly (Written Comments).
66. David Rosston (Statement presented at Manhattan Hearing May 29, 2001).
67. James Sanders, Jr., Vice President of School Board #27 (Statement presented at Rockaways Hearing, May 31, 2001).
68. Diane Santillo (Statement presented at Staten Island Hearing, May 30, 2001 and Written Comments).
69. Jim Scarcella (Statement presented at Staten Island Hearing, May 30, 2001 and Written Comments).
70. Eileen Seder (Written Comments).
71. Beverley Solomon (Statement presented at Rockaways Hearing, May 31, 2001).
72. Mary Ann Stiles, Staten Island Citizens for Healthy Alternatives, Protectors of Pine Oak Woods, Inc. (Statement presented at Staten Island Hearing, May 30, 2001 and Written Comments).
73. Cathryn Swan (Written Comments).
74. Elaine Taratunin, Staten Island Citizens for Healthy Alternatives (Statement presented at Staten Island Hearing, May 30, 2001).
75. Elyse Taylor (Written Comments).
76. Audrey Thier, Environmental Advocates (Written Comments)
77. Rachel Treichler, Green Party (Statement presented at Brooklyn Hearing, May 31, 2001 and Written Comments).
78. Richard L. Tschundy (Written Comments).
79. Taeko Tsujimoto (Written Comments).
80. Annie M. Warden, Rockaway Peninsula Civic Association (Statement presented at Rockaways Hearing, May 31, 2001).
81. Gloria Warshofsky, President of Bayswater Civic Association (Statement presented at Rockaways Hearing, May 31, 2001).
82. Valerie West, Representing the Office of Assemblywoman Pauline Rhodd-Cummings (Statement presented at Rockaways Hearing, May 31, 2001).
83. Donn Wiedershine, MD, Integrative Health System (Written Comments)

84. Heather Wrzesinski, Bronx Borough President's Office (Statement presented at Bronx Hearing, May 30, 2001).
85. Heather E. Yukon (Written Comments).
86. Concerned Queens Resident (Written Comments).
87. Anonymous (Written Comments).

C. COMMENTS AND RESPONSES

PUBLIC COMMENT PERIOD

Comment 1: The document itself is voluminous and has not been adequately circulated for public comment. I myself, an elected official of this State, did not receive a copy but had to download it from the Internet. Since the Executive Summary alone comprised a hundred and nine pages, to expect the general public to be able to download and read the entire document is impractical, thereby limiting the opportunity for public comment. **D'Ermilio**

I would like to register an objection to the process by which this EIS was issued with inadequate notification. I am one of the people who spoke at the last hearing and I have made numerous calls to the Department of Health. I have left my name and phone number. I wasn't given any notification that the Environmental Impact Statement had been issued. It's a very long document, there is a lot to read there. So I don't feel that I have had adequate time to study the impact statement before being given an opportunity to address it. **Treichler**

I would have liked to have had ample time to review this voluminous document with its extensive bibliography. **Flynn**

I object to the inadequate and insufficient notice of the public comment period and the public hearings on the Draft EIS. **Treichler**

We appreciate the magnitude of this undertaking, the value of placing this discussion in the public arena, and the difficulties inherent in trying to make these kinds of judgments in a grounded and defensible way. Unfortunately, the magnitude of the effort and the limited time frame available also mean that we were not able to complete the kind of detailed review or offer the kind of detailed comments we would have wished. **Thier**

Response: The DEIS was published on May 10, 2001. Notices informing the public of the upcoming public hearings on the report were posted in the newspaper on May 11, 2001, in the Environmental Notice Bulletin on May 16, 2001, in the City Record from May 11, 2001 through May 25, 2001, and on NYCDOH's website on May 13, 2001. The notices also included information on where the DEIS was available for review. Copies of the DEIS were sent to District Managers of the 59 Community

Boards, five Borough Presidents, New York City Mayor's Office of Environmental Coordination, New York City Department of Environmental Protection, New York State Department of Health, New York City Council Land Use division, New York City Department of Parks and Recreation, New York City Department of Sanitation, Mayor's Office of Emergency Management, a branch library in each of the five boroughs, New York State Department of Environmental Conservation (Albany and local region), New York State Office of Parks, Centers for Disease Control and Prevention, National Park Service - Gateway national recreation area, United States Army Corps. Of Engineers (New York District) and the United States Environmental Protection Agency. Copies of the executive summary were sent to New York State Department of State, United States Department of Interior Fish and Wildlife Service, 51 City Council Members, State Senators and Members of the State Assembly, New York State United States Senators, United States Members of Congress from Congressional Districts 5-17. The DEIS was also made available on the NYCDOH's web site. All of these noticing time periods complied with the requirements of the CEQR regulations and other applicable law.

Thirty days of review were provided for those wishing to comment on the DEIS. During this time period, many commentors reviewed and provided comments on multiple chapters of the DEIS.

Comment 2: NYCDOH was notified by this author that there were missing tables and the entire list of appendices two weeks before the end of the comment period. The appendices containing Ecological Risk and Assessment Tier I and Tier II was not made available until Friday June 8th. These Risk Assessment appendices are basic to the understanding of the Public Health and the Natural Resources Chapters of the DEIS. The often referred to *Hazard Quotient and Uncertainty Factors* are explained in the Tier I Assessment 3.D-1. **Bourque**

Several portions of the document refer to specific appendices. These appendices were provided late and there was not adequate time to review them fully. **NYSDOH**

Response: The DEIS fully explains the methodologies and results of the analyses. Since there are many detailed calculations that support these analyses, technical appendices were prepared. These appendices were not forwarded with copies of the DEIS, but were available to those interested at the offices of NYCDOH. After receipt of the first request for an examination of the appendices, NYCDOH also had copies forwarded to the main public libraries in each of the five boroughs of the City. The appendices are quite detailed, and while they include detailed calculations, they are not required to understand the methodology, key factors and results of the technical analyses, and are only useful to those parties interested in examining the technical calculations performed for the DEIS.

Comment 3: Table 3.A-3; *Environmental fate, physical and chemical properties of mosquito adulticides*, cannot be printed out in a readable form. **Bourque**

Response: The table referred to may be found in the DEIS in Chapter 3.A "Framework of the Analysis". Given the amount of information in the table, it was printed out on 11 x 17 (inches) format paper. This table, along with the rest of the DEIS, was provided

on the NYCDOH website in the original form as that found in the DEIS. While there may have been difficulties reading the information if printed on 8 ½ x 11 paper, the values can be read on the computer screen by zooming in. Also, original copies of the DEIS were publicly available for commentors to review this table, or any other part of the DEIS.

Comment 4: Tables and discussion are missing from the DEIS (Tables 7, 8, 9, 14), indicating the comment period on this Draft needs to be extended. **Haavind**

Response: The DEIS, in hardcopy form, was complete and included all Tables. The comment may refer to NYCDOH's website, on which separate links were provided directly below the Chapter link, in order to access particular Tables that were created independent of the main text of the Chapter. For example, in order to access Tables 3.C-7, 3.C-8, 3.C-9 and 3.C-14 in Chapter 3.C, the reviewer would click the link provided directly below the link to Chapter 3.C's main text.

GENERAL

Comment 5: The standards under SEQRA is that you have to take a hard look. You're basing your whole decision on an arbitrary and capricious decision and not a hard look at all. **Kupferman**

Response: NYCDOH disagrees with the comment that the completion of the EIS was arbitrary and capricious, and no hard look was undertaken. NYCDOH issued a draft Scope of Analysis in May 2000, which identified the Purpose and Need for the Proposed Action and provided a detailed proposed scope of work for the DEIS. Public meetings on the Draft Scope of Analysis were held in June 2000 in all five NYC boroughs in order to elicit oral and written comments on the draft scope. An extensive set of comments on the Draft Scope of Analysis were compiled and responded to in the Final Scope of Analysis, which was published in December 2000.

Over a one-year period, NYCDOH and its consultants (working in consultation with other City, State and Federal agencies) worked intensively on conducting literature and data searches along with performing detailed assessments of the potential environmental impacts from the Proposed Action. As a result of such efforts, NYCDOH considers the EIS to be a ground-breaking effort with an extensive hard look at the potential impacts of adulticides on the public and environment.

Potential adverse impacts from the Proposed Action were clearly identified and disclosed in the EIS. Alternatives to adulticiding were explored in great detail, and the limitations as to why such alternatives would not meet the goals and objectives of the Proposed Action were provided. NYCDOH undertook a hard look at all the significant environmental issues related to the Proposed Action. The results of the analyses and subsequent conclusions in the EIS were not determined in an arbitrary and capricious manner, and the EIS demonstrates the thoroughness of the assessment that was performed by NYCDOH.

Comment 6: The DEIS, with its biases, omissions and lack of data, does not assist NYCDOH in demonstrating the relative safety of adulticides. **Lewis**

The NYC Department of Health ("DOH") "*Adult Mosquito Control Programs* Draft Environmental Impact Statement" is an alarming compilation of omissions and faulty or baseless assumptions. **Lewis**

Response: NYCDOH disagrees that there are omissions and faulty assumptions in the EIS. The EIS explained the detailed research and original work performed. NYCDOH used the most reliable available data and peer-reviewed studies in conducting the analyses in the EIS. Many citations of the literature and data sources referred to or used to extract data for the analyses are provided in the EIS. Where uncertainties were identified in the technical analyses, conservative assumptions were applied in order to yield reasonable worst-case estimates of the potential adverse environmental impacts from the Proposed Action.

Comment 7: The members of No Spray Coalition want New York City to listen up –Your spraying such toxic chemicals in the wrong way is dangerous and toxic to humans, animals and the environment. There has to be a better way to deal with the threat of this (rarely dangerous to humans) virus that is currently very far from an epidemic. **Meenan**

Response: Under NYCDOH's *Comprehensive Plan*, the Proposed Action would only be implemented with further evidence of increasing West Nile viral activity at a level to be of significant human health risk, despite aggressive preventive measures under the *Routine Program*. In addition when adulticides are to be applied, they will be applied in compliance with all applicable environmental health and safety regulations.

Comment 8: We have given you:

- The Dr. Gilka medical document which has well renowned experts concerns, about adulticides and their health effects on NYC population.
- The report from William Sudd State of Maine's report which is a summation of all the environmental concerns of our city, NY State, and the impact of expanded sprayings in the context of what damages have already been observed in our area including the LI Sound Lobsters.
- The By-Laws of the Buffalo Pest Management Board.

Buffalo's Pest Management board and the head of Buffalo's common council of the City of Buffalo, NY sent a letter to Dr. Cohen from James Pitts head of the common council. This letter presented a unique opportunity for NYCDOH to meet with the Buffalo, Erie County pest management Board officials to create such a unique body in NYC, to oversee not only WNV but any other issues of pest management in the future. Groups like Sierra Club, S.A.F.E. NYC would be honored to sit together with NYCDOH, council reps and other environmental specialists, scientists, physicians, public and private, to seek both in emergency and with time to research, all the most effective, cost efficient, up to date, safest methods of pest control to fit into the context of each issue. That's how they do it in Buffalo and Erie Counties. This is a good solution and is being explored by some council members to do here, work with us, with them now. Please call Bill Nowak assistant to Councilman Pitts. They are long awaiting your reply. This is a year overdue and deserves exploration. The Buffalo Pest Management Board (716-851-4361) is one of our country's best, and it's in our state. **Snow**

Response: The EIS addressed the issues raised in context of the primary concerns related to adulticiding. In addition, even without undertaking the Proposed Action, NYCDOH will be 1) utilizing Integrated Pest Management practices to reduce and control the breeding of mosquitoes that may pose the greatest risk to amplifying or transmitting mosquito-borne viruses in New York City, 2) undertaking vertebrate, non-vertebrate and human surveillance to detect the potential threat of virus transmission to humans early, and 3) continuing to coordinate additional research and investigations with the Centers for Disease Control and Prevention, and NYSDOH to better understand the best integrated methods for detection and control of mosquito-borne viruses in New York City. Although the adoption of a Pest Management Committee for New York City is beyond the scope of the EIS, NYCDOH is working closely with other City agencies as part of a multi-agency Task Force charged with coordinating the pest control activities of all city agencies.

Comment 9: The Mayor is no expert on health or pesticides. He has no right to make decisions about pesticide spraying that is making me sick and ruining my health. **M. Krumholz**

Response: The EIS identified the potential consequences of the Proposed Action versus not spraying adulticides, and the potential impacts from mosquito-borne viruses such as the West Nile virus. NYCDOH is responsible for the decision making determining when adulticide spraying would occur in the future under the Proposed Action.

Comment 10: I request that the use of all pesticides be discontinued to protect our citizens who are seriously affected by those chemicals. Our children and the elderly are particularly vulnerable to their neurotoxic effects. In fact, I would like to see a national reporting system created for people afflicted by pesticides. This reporting would track their names, their complaints, the materials used and the outcome of the patients' health, as well as the action taken by the companies who created these materials and the organization that approved their use. **F. Ehrlich**

Response: The Proposed Action is intended to protect the overall public health of New York City. The program elements are intended to reduce public exposure to pesticides applied under the Proposed Action, while reducing the risk to the public health from West Nile virus and other mosquito-borne viruses.

Comment 11: I have read the DEIS and am writing to you to tell you to warn against its adoption. It is a dangerous document, replete with an alarming misrepresentation of facts: information that should caution against implementation is presented in such a way as to obscure its significance, while essential issues are ignored. **Hopkins**

Response: The EIS identified the major environmental and public health issues of concern related to the Proposed Action, and used standard scientific methods and models to obtain reasonably conservative estimates of the consequences associated with the application of adulticides under the Proposed Action.

Comment 12: The adulticide spraying proposed represents a commitment by NYCDOH, once again, to fail at controlling mosquitoes, and once again, to act in defiance of public safety, public health, and government responsibility. **Lerman**

Response: The components of the Proposed Action have been developed following consultation with the Centers for Disease Control and Prevention and the New York State Department of Health. The program is not intended to control all mosquitoes

throughout New York City, but will use surveillance data along with the latest research on the spread of mosquito-borne viruses to reduce mosquito populations when it is evident there is a risk to public health and/or welfare within the City.

Comment 13: This document has been produced to justify a spray program rather than independently assess the negative environmental and health impacts such a program might have on our residents. **D'Ermilio**

Response: NYCDOH, as lead agency, and its consultants, carefully examined the potential effects on the environment from the Proposed Action. The DEIS and FEIS represent an extensive and exhaustive study of the impacts of spraying adulticides on public health and natural resources to combat an outbreak of West Nile virus in New York City. The DEIS and FEIS also examine ways to mitigate adverse effects from the Proposed Action and alternatives to the Proposed Action. While some of these alternatives may be employed to reduce the risk of mosquito-borne viruses, none of the alternatives, either as stand-alone alternatives or in combination with one another, would achieve the expected results in reducing mosquito populations at potentially numerous and diverse locations throughout the City.

Comment 14: The Draft EIS contains a thorough bias towards "exoneration" of pesticides, which has led to incomplete analysis and illogical conclusions. **Lewis**

Response: The EIS provides a wealth of information based on literature research and new investigations on the identified potential adverse effects from adulticides. Potential adverse impacts from adulticides have been identified and disclosed in the EIS, and the Proposed Action has been developed with the intention of minimizing potential risks from adulticides to the public and the environment, while still protecting public health and welfare from mosquitoes and mosquito-borne viruses.

Comment 15: The adverse effects of pesticides have been minimized, while those of the WNV have generally been exaggerated. **Lewis**

Response: The EIS has identified reasonable worst-case impacts associated with the use of adulticides under the Proposed Action. The EIS has also provided the latest information on the reported cases of human sickness and death resulting from West Nile virus in the United States and worldwide. This information was used as the foundation for the assessment of the potential risk to public health from West Nile virus in New York City.

Comment 16: The DEIS consistently assumes safety in the absence of definitive data and information. **Lewis**

Response: The EIS presented reasonable worst-case analyses and presented balanced views of the potential benefits and adverse impacts for the No Action (the *Routine Program* without the application of adulticides) and Proposed Action scenarios. In the technical analyses, which were performed to assess the potential environmental consequences from the application of adulticides, conservative projections and assumptions were employed in order to project reasonable conservative estimates of the projected adverse impacts from the application of adulticides under the Proposed Action. In addition, many of the analyses included safety factors recommended by USEPA to account for potential uncertainties associated with the constituents of the adulticides.

Comment 17: Why isn't the Board of Health releasing information about those six people who supposedly died the first time around, these elderly people? Because they were sprayed on. They didn't get bitten by a mosquito. The City hasn't released those reports. **Santillo**

I would like to register my dismay that the City continues to withhold information about those who have been afflicted with West Nile virus, because without an adequate understanding of the real threat to public health of West Nile virus, neither the benefit nor the ineffectiveness nor the dangers can be weighed one against the other. **Foster**

Response: Because of privacy protections, NYCDOH cannot release the individual names of those who have been made severely ill or died from West Nile virus in past years without consent from family or next of kin. However, the New England Journal of Medicine (Volume 344, Number 24) provides pertinent information on the cases of those individuals who died from West Nile virus in 1999.

Comment 18: Has the State declared West Nile Virus an emergency health situation? **Scarcella**

Response: NYSDOH declared a public health threat in 1999 after the outbreak of cases of encephalitis in New York City (which was later identified as diseases resulting from West Nile virus), and again in 2000, when it became apparent that mosquitoes carrying the virus survived the winter of 1999-2000 and once again there was evidence of viral activity.

Comment 19: Clarke used the depot in the Bronx, that basically sent fifty trucks around in a circle spraying every morning and afternoon to test their nozzles. Your EIS states that it's safe, that people can face ten spray events in one season. These people were sprayed every day; this definitely exceeds the ten spray events per season. **Kupferman**

Response: Whether City of New York staff or contractors are employed to apply adulticides in the future under the Proposed Action, truck equipment calibration would be done several times during the mosquito season. Calibration requires spraying for 1 - 2 minutes as part of the process to ensure that equipment is functioning properly. Such calibration would be conducted in a suitable location.

Comment 20: I'm just wondering if the Department of Buildings or the Zoning Commission ought to say something restricting where the builders build so you don't have this problem (residents living in areas in the Rockaways where there is mosquito infestation). **S. Ehrlich**

Response: New York City's primary means of guiding development is the Zoning Resolution. One of the many factors that the Zoning Resolution considers when determining the appropriateness of development is the suitability of such development to the natural landscape, including natural resources. However, since mosquito infestations can vary from year to year, and the suitability of an area for development is determined by a wide range of factors, such as availability of basic infrastructure and compatibility with nearby land uses, the city does not consider mosquito infestation to be a critical factor in making its zoning decisions.

Comment 21: Repeatedly throughout the Draft EIS, the refrain that there is insufficient data to draw conclusions appears. In the absence of such data, the DOH cannot meet its burden. **Lewis**

The DEIS should not be pushed to draw conclusions where they are not possible, but instead be straightforward about the inherent ambiguities so that the complex choices about how to address the risk of West Nile virus are laid bare for public debate. Definitive statements about opaque issues will only engender skepticism that will impede the kind of open discussion this document could spark. **Thier**

Response: The research and analyses presented in the EIS are balanced in presenting the level of information known and not known, with respect to the potential effects and consequences from adulticides and mosquito-borne viruses. However, while there may be particular unknowns with respect to an individual study item, there was still much data available. The conclusions reported in the EIS are based on the weight of evidence from literature research, risk assessment studies, and epidemiologic and attributable risk studies.

As discussed in other responses to comments, the uncertainties related to the potential of an uncontrolled outbreak of West Nile virus in New York City were acknowledged in the EIS, and a weight of evidence approach was used to draw conclusions with respect to the potential effects from adulticides.

Comment 22: The Draft EIS is premised on the unproven assumption that adulticide use will diminish the spread of WNV. **Lewis**

Response: The Proposed Action has been developed following consultation with the Centers for Disease Control and Prevention, which is a federal agency that has had extensive experience in the control of mosquito-borne viruses throughout the nation. Based on surveillance and research, a large part of which is performed by NYCDOH (in cooperation with the CDC and NYSDOH), NYCDOH is gathering data on the spread of West Nile virus. Adulticide use is only part of New York City's *Comprehensive Plan.* CDC regards adulticiding as an "extremely important part" of a comprehensive program.

Comment 23: If you are truly a Department of Health concerned with the health both short and long term of the citizens of this city, you'll take a look at the workers made sick by their exposure to the pesticides and reconsider that repeated sprayings of the population, their land, their parks and playgrounds, their ventilation systems, their waters and wetlands, their pets and playthings is dangerous, highly ineffective and will probably be remembered historically as a man made disaster first time ever seen in the western hemisphere. There are experts with safe effective solutions for now and perhaps future illnesses more devastating than WNV. Let's set the example now. **Snow**

Response: The EIS addresses all of the pathways identified for potential exposure raised in the comment. NYCDOH is concerned with the health of the public, including those at highest risk for mosquito-borne viruses and those individuals sensitive to pesticides. As part of the Proposed Action, NYCDOH will continue to monitor for the potential adverse health effects from adulticide application, while taking appropriate action to protect the public health from uncontrolled outbreaks of mosquito-borne viruses.

Comment 24: An accurate environmental impact evaluation must be determined prior to the continuance of mass poisoning of the citizens of our great city for a vector that has not been properly identified and of minimal problem to us. **Reilly**

Response: The EIS provides the most recent compilation of data on West Nile virus-related illness and death resulting from West Nile virus. The threat to public health from this mosquito-borne virus (and other future potential mosquito-borne viruses which may be introduced to the region) is clear, and NYCDOH issued the EIS when it was considered complete and accurate with respect to the potential impacts from mosquito-borne viruses and adulticide applications that may be made under the Proposed Action.

Comment 25: Why did Mayor Giuliani violate the Clean Air and Water Act set by the EPA? **Pico**

Mayor Giuliani violated the Clean Water Act by the spraying of these pesticides. **Tsujimoto.**

Spraying of these chemicals violates the Clean Air Act. **Pollock**

Response: The City has not been found to be in violation of either the Clean Air Act or the Clean Water Act.

Comment 26: I would like to register my opinion against the use of pesticides for this purpose. I believe the potential harm is much greater than any benefit. I don't believe there will be any benefit, at all. All pesticides are dangerous. West Nile Virus is miniscule among public health problems. Spreading poison around is irresponsible, short-sighted and politically motivated. **Hyon**

I strongly object to the spraying of malathion, resmethrin, sumithrin, pyrethrum, or any other organophosphate insecticide and pesticide. These are highly toxic substances that have both immediate and long-term effects on the environment and all life forms including you and me. **Pico**

I ask that you immediately stop any plans to spray for mosquitoes in NYC and protect your citizens from the potentially serious consequences of pesticide use. **F. Ehrlich**

I urge that indiscriminate spraying of pesticides be dropped. It is wasteful, ineffective, and dangerous. The spraying must stop. It is a needless addition to the cumulative toxic burden on each New Yorker. It is not acceptable to risk the health of NYC's people in an attempt to eradicate a disease that mostly affects wild birds. **Yukon**

I urge you not expose millions of people to toxic chemicals for the ridiculous purpose of eradicating a virus which is far less dangerous than the chemicals. **Osuna**

Please do not spray our neighborhood with that deadly poison. It is only hurting the people more. **Love**

I am opposed to the spraying of mosquitoes which the City is again planning. The repeated chemical sprays are affecting the health of our residents of all ages. **Novich**

Please do not spray with malathion, malaoxon, naled. These are deadly poisons- they can cause cancer and other terrible diseases. **Abse**

Stop further polluting our state and city. If it kills bugs it will affect us. **Anonymous**

Response: The Purpose and Need, and Public Health Impact components of the EIS identified the potential benefits and adverse effects from the application of adulticides under the Proposed Action.

The NYCDOH is charged with protecting the public health, which includes the threats from mosquito-borne viruses. The program elements under the Proposed Action have been developed to reduce the risk of the population to the exposure of adulticides.

The weight of evidence from the public health analyses performed for the EIS indicates the risk of any potential effects from the use of pesticides is outweighed by the potential benefits of protecting the public health from illness from West Nile virus.

The EIS identified the potential environmental consequences of the Proposed Action, and identified potential adverse impacts on humans and the environment from the Proposed Action, along with the measures that NYCDOH will employ to reduce such exposures and impacts.

Comment 27: I would like that all three jurisdictions – New York City, New York State, and Federal – get together because I find in the business that I have, in interface, no one talks to each other. So you are doing something here in the City, the State is doing something here and the Feds, because of the wildlife, and they don't work together. I would ask you to get together and come up with a unified plan. **S. Ehrlich**

Response: The Proposed Action has been developed in consultation with the Federal Centers for Disease Control and Prevention and the New York State Department of Health. Representatives from these organizations are in contact with each other on a regular basis, and remain informed on the latest approaches and methodologies for controlling mosquito-borne viruses.

Comment 28: I urge NYCDOH to implement their *Comprehensive Plan* in order to prepare for and take preventive measures to reduce the potential for a renewed outbreak of the West Nile Virus and also control adult mosquito populations in the Rockaways. **Colon**

I call upon the New York State and the New York City Department of Health to immediately undertake spraying in these Queens communities in order to improve the quality of life for the residents and to prevent additional tragedies. We must not have a repeat of the summer of 2000. **West**

Response: As part of the *Routine Program* to control the potential threat to the public welfare in the Rockaways, NYCDOH intends to increase preventive measures to reduce the breeding mosquitoes through non-chemical methods. NYCDOH will also reduce breeding through the application of larvicides, and may carry out strategic application of adulticides in this section of Queens, should mosquito populations become unbearable in the Rockaways.

Comment 29: Why were the birds not tested by independent toxicologists for pesticide poisoning? **Lazarus**

Response: Birds submitted by New York City to New York State Department of Environmental Conservation are often tested for the presence of pesticides.

DESCRIPTION OF THE PROPOSED ACTION

Project Purpose and Need

Comment 30: The DEIS overlooks that legislation (INT 915) has been introduced in the City Council (Pesticide Application Act), a bill calling for a phase out of the use of pesticide in municipal controlled areas. Health emergencies would be exempt. However, West Nile Virus has shown itself not to be a health emergency. There are more deaths per day from asthma than the single digit deaths in 1999 and 2000 when WNV was detected (but not the cause of death). **Buchwald**

The West Nile virus is not the threat it has been painted. The general population should be encouraged by our NYCDOH to try to improve their overall health. The number of deaths due to West Nile virus is not statistically significant. **Elakman**

Perhaps two years ago it could be believed that West Nile is extremely serious, and that the pesticides haven't been shown to be unsafe. Now, more is known about the virus. It is considered "a mild illness" by NYCDOH, and most people exposed to it don't even get sick. **Osuna**

NYSDOH officials have stressed WNV is a flu-like alert, not an emergency. **Scarcella**

Response: Although many persons exposed to West Nile virus may experience relatively mild or no symptoms at all, others may experience serious illness and/or die. NYCDOH considers West Nile virus to be a potential health threat, warranting the use of adulticides should the comprehensive preventive measures under the *Routine Program* fail to limit viral activity.

Comment 31: Whether or not the mosquitoes contain viruses, the Rockaway mosquitoes still pose a danger to the health and safety of the area's residents.

Countless children have been seen in the emergency rooms of our hospitals for multiple bites from mosquitoes. Children, who play in their backyards with siblings and friends, often wind up in emergency rooms because of these bites.

Countless efforts have been made to educate the residents of how to reduce the mosquito population. We've done it all already. We have removed the stagnant water, we've cleaned up the vacant lots; we've larvicided when needed; and still we are plagued by mosquitoes. We need to continue these measures along with adulticiding. **Love**

In the event that natural and non-toxic means fail, I too call for targeted spraying of the affected area and I urge that the New York City Department of Health and the New York State Department of Health consider the call and the plight of my neighbors. **Sanders**

The problem in the communities of Edgemere, Bayswater, Arverne and Sommerville is a twenty-four hour a day/seven day a week/four month a year health problem. You cannot go outside to play, barbecue, garden or talk to your neighbor from June to mid-September. Children cannot play outside all summer. Daycare centers must keep their children indoors. Residents run from the front door of their house to their car in the morning and back in when they come home from work.

The first time they had to cancel a family barbecue or party or had to take their child to a local hospital with dozens of bites might convince them that our problem is unlike the problem anywhere else in the City.

Two years ago when the City did an aerial spraying of these communities, residents for the first time in almost a decade had a two-week window to go outside. They barbecued, their children played. It was wonderful. But they only sprayed once and it only lasted two weeks. But it shows what can happen if the City makes an effort. The Board believes that if larviciding, clean-ups and other measures are not successful, the careful application of adulticide is warranted and, more importantly, the affected communities support it. **Gaska**

My constituents residing in the Arverne Community on the Rockaway Peninsula were frustrated because they felt that the City had failed to adequately combat the dreadful mosquito conditions that they experienced throughout the past four summers. They called my office seeking to obtain relief from the unbearable mosquito infestation. Simply put, my Rockaway constituents were plagued with mosquitoes breeding throughout the Rockaway Peninsula.

Even the children, to whom summer belongs, cannot enjoy their summer break from school. Many of them have been hospitalized because of the numerous mosquito bites they have received. **R. Colon**

The mosquito problem in Rockaway has reached a crisis level. **Love**

I really struggled with trying to understand how is it that you can tell me that you are concerned with wildlife or plants that only grow in four other places in the whole world, and that is why this is a protected spot, Dubos Point – I can't seem to make sense of at what point as humans are we putting a value on plants and wildlife over human beings. **Preston**

We are in the midst of a full-blown public health crisis which must be addressed immediately. **West**

Response: In recognition of the unique conditions of the Rockaways and the unbearable levels of aggressive biting mosquitoes in the area, NYCDOH has proposed the *Mosquito Population Control Program in the Rockaways*. While NYCDOH is working on reducing the breeding of mosquitoes in the area and is working with other governmental agencies on long-term solutions to reduce breeding sites not under the control of New York City, NYCDOH, under the Proposed Action would apply targeted applications of adulticides when adult mosquito populations reach levels that significantly impact the public welfare in the Rockaways.

Mosquito Facts

Comment 32: The DEIS says the marshlands are not conducive to breeding mosquitoes. **Cutler**

Response: No such statement was made in the EIS. It is recognized that certain species may breed in marshlands.

Comment 33: Repeated pesticide spraying is creating a mosquito that is resistant to pesticide. **Barbera**

Insects become resistant making them more dangerous. **Abse**

According to J. Wargo, *Our Children's Toxic Legacy*, not only do mosquitoes develop resistances to specific chemicals, they often also develop cross resistances to other chemicals. **Lewis**

A person using minimal bug repellant can enjoy very good results, provided the pests have not been inoculated by spraying. This will encourage people to use stronger and more toxic chemicals directly on their clothing and skin. Respiratory, reproductive, and endocrine illness will rise as a result. The policy of the past two years, and this neglectful DEIS, are robbing us of the choice of milder repellants by breeding tougher bugs.

Resistant pests are a fact. It is impossible to eliminate each and every mosquito and cockroach in the city, yet the people of the city are loading up with toxins in our efforts to spray these pests away. **Yukon**

Response: NYCDOH has considered the potential for mosquitoes to become resistant to pesticides. Many of the registered adulticide products available to NYCDOH have been in use for several years. Resistance related to control of virus outbreaks is not expected in the near future, based on NYCDOH actions alone. NYCDOH is not intending to attempt complete control of mosquitoes throughout New York City all summer long and will only spray when the threat for an outbreak among humans becomes apparent, which should reduce the potential for mosquitoes building resistance to adulticides. However, NYCDOH is working with the Center for Disease Control (CDC) to monitor the potential for resistance of mosquitoes in the future.

Resistance of mosquitoes to pesticides has been found to increase with the number of applications and size of area sprayed, as well as the repeated use of the same pesticide to control both larvae and adults (Florida Coordinating Council on Mosquito Control. 1998. *Florida Mosquito Control*). NYCDOH will not be using the same pesticides for larval and adult mosquito control. Should resistance to a particular adulticide be detected, an alternative adulticide would be selected.

Routine Program

Comment 34: When it comes to the science of control, all the literature I have read that has any integrity clearly states that only site specific, breeding site management is how you control mosquitoes. **Enterman**

Please focus on long standing water that does not dry up over time. **Concerned Queens Resident**

Prevention at the breeding source should be the mode of mosquito control NYC should vigorously be pursuing. **Buchwald**

Let those who wish to use repellants do so. The MTA, Port Authority, and other city and state agencies must also clean up any potential mosquito breeding sites. **Yukon**

Response: Under the *Routine Program*, NYCDOH is actively working with the public, community boards, and other City agencies to reduce standing water and potential breeding areas.

Comment 35: The document does not discuss the efficacy of adulticiding activities conducted in New York City or elsewhere. Such data are important for characterizing the benefit end of the risk benefit analysis, including providing support for statements about the extent of the WNV outbreaks in 1999 and 2000 without adulticiding and about the public-health benefits of adulticiding outweighing their public health risks. Without information about efficacy, the uncertainties in these types of statements should be acknowledged. **NYSDOH**

The Proposed Action should not ever occur because it is both dangerous and ineffective. Even public health experts who are relatively uninformed about the risks posed by spraying people, hold that the full public health impact of WNV will be determined overwhelmingly by how thorough the prevention efforts are. Cornell Cooperative Extension entomologist David Pimentel, a scientist with more than 25 years of experience in mosquito control estimates that less than 0.001% of the pesticide reaches the intended targets. Instead it's reaching every other living thing unlucky enough to be in its path. If prevention fails, should highly targeted spraying be considered as a last resort? **Flynn**

Response: It is NYCDOH's intent to carry out strategic applications of adulticide in targeted areas where viral activity has been documented or where it has been determined that unacceptably high levels of mosquito biting activity exist. The products that would be used are registered with the USEPA and must clearly state on the label the species controlled. As described in Chapter 1, "Description of the Proposed Action," NYCDOH conducted preliminary studies to assess the efficacy of adult mosquito control. Preliminary results from examination of mosquito traps in the treated areas indicated an effectiveness of 82 percent (mean control) 24 hours after a spray event with Anvil 10+10, and 47 percent after 48 hours. Chapters 3C and 4C address the public health impacts from the Proposed Action.

Comment 36: Effective mosquito control eliminates mosquitoes before they are born, by:

- Sanitation clears all trash
- Public works upgrades our sewer systems, particularly Staten Island where many residential areas have no sewers at all and flood after every rainfall.
- Public education to inform widely re:
  - how to distinguish a mosquito from other bugs
  - where they may be breeding in your community
  - what mosquito larvae look like and where to look for them
  - how to larvicide neighborhood water, where the water cannot be drained, if that water is breeding mosquitoes, with safe microbial larvicide.

The EPA and the American Mosquito Control Assn. issued a joint strategy paper. They stated repeatedly that the kind of mosquito control program that you are proposing is, "the least efficient means of mosquito control." They recommended eliminating breeding sites and public education as the most effective. Ideally, water is checked for larvae development frequently and only larvicided where larvae are found. You could get a lot of volunteers to help.

NYCDOH must larvicide properly. Something should be done for public health and spraying with poison should be stopped. Microbial and some other larvicides are virtually completely non-poisonous to people and we don't have to go near them in briquette form. **Lerman**

Response: Many of these activities and suggestions are included under NYCDOH's *Routine Program*, which was determined not to have significant adverse environmental impacts. Education and Outreach, Surveillance, and Mosquito Prevention and Larval Control are major components of the No Action scenario (the *Routine Program* without the application of adulticides), which the City is undertaking in order to reduce the potential outbreak of mosquito-borne viruses.

In the Future No Action scenario (future with the *Routine Program*, but without the adulticiding programs), NYCDOH would be committed to the surveillance of mosquito breeding and reduction of breeding sites. Costs and investments in these programs are much greater and the efforts required are much greater in magnitude than the Proposed Action. However, these surveillance and breeding/larval control programs may not eliminate the risk to public health from an outbreak of mosquito-borne viruses, or significantly reduce adult mosquito populations in the Rockaways, which is why NYCDOH has developed the Proposed Action to target areas of the City where these conditions may exist, and breeding/larval control are not enough to reduce the propagation of the virus and risk to public health and welfare.

NYCDOH recognizes the benefits of larval control, and has adopted an extensive *Routine Program* as part of the *Comprehensive Plan*, which is discussed in detail under the No Action scenario in the EIS.

Comment 37: Spot spraying at specific breeding sites. This is effective. Using manpower, place the most effective larvicides at specific breeding sites, eliminate the spray of larvicides in a broadcast manner which should be site specific to be effective. **Snow**

You must utilize effective, controlled use of larvicides, if any action is required in the matter of WNV. **Scarcella**

Response: NYCDOH intends to use larvicides in areas where mosquito-breeding sites have been identified. Surveillance of larval activity will be used to determine the location and the required frequency of re-application. Larvicides have not been broadcast sprayed over the City. The larvicides are applied in solid form (either briquettes or granules). When applied aerially, the granule larvicide is dropped in targeted bodies of water where access by ground is limited.

Comment 38: Judging from published statements credited to a NYCDOH spokesperson in the North Shore Reporter (Staten Island) and the Daily News (last August by another DOH spokesperson), the DOH version of larviciding is to do it once, in the spring. Could it be that NYCDOH has not been reading what is printed on the labels? The larvicides that get sprayed onto water should be reapplied about once a week until October. Within two days sprayed larvicide falls to the bottom of the water column where it is no longer effective against the larvae. The larvae breathe and live at the surface of the water. In moving water, larvicides wash away just as quickly when they are spray applied. Time released briquettes only have to be replaced once a month. Between April and September, which means five replacements minimum, for briquette larvicides. **Lerman**

Response: Larvicides are re-applied as needed, based upon surveillance for mosquito breeding. The larvicides in briquet form remain in place at the bottom of the catch basin, below

the level of the discharge pipe, and slowly release product over a long period, which controls the breeding of mosquitoes during this time period. Surveillance of larval activity will be used to determine the location and the required frequency of re-application. Repeat larviciding will be conducted as necessary.

Comment 39: Is the entire Bluebelt being treated with larvicides? Is New York City going to cite homeowners for water standing on a pool cover but allow thousands of gallons of water to lie untreated on City property? Why has this issue not been addressed specifically either by address or location? **D'Ermilio**

Response: All large bodies of standing water, including the Bluebelt on Staten Island, are checked for the presence of mosquito larvae. Larvicide is applied as needed.

Comment 40: There is nothing in this document that talks about the dangers of larviciding at all. It's just assumed that it's safe to do.

Remember bacteria (Vectolex CG, bacteriological larvicide) double at room temperature in one hour and mass applications of Altosid, acute oral toxicity, growth hormone disruptor agents can cause major absorption into the lungs of the population affected. **Reilly**

Response: As noted in the EIS, NYCDOH addressed the potential impacts of larviciding under the negative declaration issued in April 2000. A notice of the negative declaration was published in the Environmental Notice Bulletin, as well as on NYCDOH's website. The evaluation of the potential environmental impacts from larvicides can still be found on the NYCDOH website (www.nyc.gov/health).

The application of larvicides under the *Routine Program* will be performed by licensed applicators and in conformance with the restrictions listed on the permits issued by New York State Department of Environmental Conservation.

Comment 41: Who are the workers that are going to be used to do the larviciding? Are they legitimate City workers who are trained? Are they trained pesticide applicators?

Response: All applicators of larvicides are required to satisfy NYSDEC requirements pertaining to the application of pesticides (e.g., certification, training or supervision) consistent with NYSDEC regulations. In the Future No Action scenario (the *Routine Program* without adulticiding), either trained City workers or contractors will apply these products.

Comment 42: There's nothing about the effects of what happens when bugs grow resistant to the BT, the Bacillus thuringiensis, or the other, the VectoLex, that they are using. What happens when they grow resistant or what happens to the organic farms where BT is only one of the only chemicals that's allowed to be used on organic farms, which is relatively safe when used properly? **Mitchel Cohen**

Response: Under the *Routine Program*, NYCDOH will continue to review the latest information reported on resistance of species to larvicides.

Comment 43: All that Dubos Point needs is to deal with the standing water. This diagram, which I have shown on Q TV, simply shows that by cutting through the bulkheads, some of the bulkhead and some of the built-up sand and cutting through some of the creeks

that are blocked, that the standing water will be relieved, and the huge swarms of mosquitoes will be diminished. **Blum**

It's standing water that is acting as the breeding places for these mosquitoes. There are quite a number of boats along the shore of Jamaica Bay that have been discarded and that are just staying out there on the shore collecting rainwater. That's freshwater. Agreed that there are certain times of high winds when a little bit of salt water splashes up. But that's a perfect breeding place for the culex pipiens. The culex pipiens mosquito is the one that we are most familiar with. **Maxwell Cohen**

Remove all that horrible garbage in streets, clear away standing water, etc. **Abse**

Response: Open Marsh Water Management is one of the alternatives to the Proposed Action that could reduce mosquito breeding in the Rockaways. Such work involve approvals from the Army Corps of Engineers (ACOE), and the City is working with the ACOE to move forward with programs in the area that reduce standing water for breeding areas, but do not result in adverse environmental impacts on natural resources.

Comment 44: The area has been larvicided repeatedly. They are only in puddles that you find. They don't go into backyards. And I found that they are quite ineffective. **Fox**

Response: NYCDOH recognizes the limitations on locations where larvicides may be applied by the City, and the importance of individual citizens in reducing breeding areas on their own properties. Therefore, NYCDOH has produced significant literature and advertising to make the public more aware of mosquito breeding areas, and actions each resident can undertake to reduce breeding on their own properties. In addition, the Board of Health recently republished the Resolution it adopted on April 18, 2000. Such Resolution declared all accumulations of water to be a public health nuisance, ordered every person owning or in control of premises with water accumulation to immediately eliminate the accumulation, and authorized the City to eliminate the danger without further notice.

Education and Outreach

Comment 45: The DOH should work to control West Nile, and the unfounded hysteria around it, by educational outreach to inform people how to naturally protect ourselves from mosquitoes. And by educational outreach to inform everyone that the virus is not a serious problem for most people, although it is wise to take precautions. **Osuna**

Educate the public about the “mildness” of West Nile Virus and about the pesticides. Make an initiated effort to inform the public and reverse the hype that was created over the last two years. Thorough responsible thought should be put into the health of our city and the environment and the alternative – a natural, thoughtful approach – is considered. Then, we will all be working together to have a truly responsible Mosquito Control program for a mild illness. If we can bolster the health of New York City residents and our environment, we will only be able to resist illnesses and diseases and be a better place for it. **Swan**

Response: NYCDOH is committed to providing the latest information in an understandable format to the general public, and to provide advice on how to reduce mosquito breeding and reduce mosquito bites, especially for those most at risk to mosquito-borne viruses. The serious public threat from West Nile (and other mosquito-borne) viruses is discussed in detail in the EIS.

Comment 46: I'm happy to see in your public education documents that you downplay the children's chances of being made sick. All the medical descriptions in the medical books list West Nile virus as making children sick as a very unlikely issue. The use of DEET for children should be eliminated for safer and effective products. This is not an issue of exposing children to an uneducated chance of applying too much DEET, too many times. DEET under the likelihood of children getting ill from WNV is an unnecessary suggested product. **Snow**

Response: The literature provided to the public in the future will account for the latest known information on the risk from mosquito-borne viruses. NYCDOH's recommendations for formulations that can be applied to the skin will be developed in consultation with the CDC and NYSDOH.

Adult Mosquito Control Programs

Comment 47: I include four important things cited by Dr. Philip Landrigan, Chairman, Department of Community Medicine, Mount Sinai Medical Center on Bill Moyer's program TRADE SECRETS (www.pbs.org):

1. Thorough independent testing of chemicals, including testing that looks at pediatric effects-independent of chemical industry;

2. Need to continue the nationwide testing of chemicals in the bloodstream of Americans that CDC has started

3. We need to work together: chemical industry, environmental community and academic community work to support a national right-to-know initiative. For the nation, we ought to have the national equivalent of the proposition 65 law that they have in California. Everybody in this country ought to be able to get good, accurate, unbiased information on every product they buy in the stores

4. We need to have a more efficient, more effective process than we do today to get toxic chemicals off the market and to replace them with safer chemicals **Buchwald**

Response: Comment noted. This is beyond the scope of the EIS.

Comment 48: We hope revisions to the DEIS will frame the bigger question: given the unknowns all around, what should be the considerations for determining when and if the risk of a large human outbreak exists such that pesticides, even with their inherent hazards, are warranted? And working with the data that exist, which of the pesticide choices has the least overall risk (e.g., reversible versus permanent adverse health effects; least persistence) given our current state of knowledge. **Thier**

Response: As described in Chapter 1, "Description of the Proposed Action," NYCDOH is conducting citywide enhanced surveillance, public education, and mosquito breeding prevention activities. Sporadic West Nile virus findings will trigger more intensive community-specific surveillance, public education, source reduction and larviciding.

Close tracking of dead bird reports will help the NYCDOH to select areas of the City for enhanced control activity where there is early evidence of recurrence of the virus. Evidence of dead bird clusters will prompt increased testing of birds and additional mosquito pool collections and testing in conjunction with intensive preventive control measures (e.g., larval source reduction and larval control). Further evidence of increasing West Nile viral activity to a level of significant human health risk, will trigger the consideration of adult mosquito control.

Based on the specific conditions (which may vary from year to year), and the information and analyses provided in the EIS, NYCDOH will make the decision on which adulticide product to use, should adulticiding be deemed necessary despite aggressive preventive measures under the *Routine Program.*

Comment 49: If it is found that control of mosquito-borne diseases, particularly the West Nile virus, requires spraying, all appropriate procedures must be taken to inform the public and limit human exposure to the spraying to the greatest extent possible. Of course, the City's first step must be to explain to the public why the spraying will take place and the general methods that will be employed in doing so. **Wrzesinski**

Response: The Proposed Action includes notification of the public before any application of adulticides. NYCDOH will continue to educate the public about the need for the control of mosquito-borne viruses and to inform the public when targeted applications of adulticides are required.

Comment 50: The principle of vaccine somehow seems to be that if you have - to put it in military terms - you know, an army of billions of microbes coming in, you send them into rout by making, killing a few thousand or a few million. And then if you did do some program like this, with all these canyons about us, you might pick a few spots where there is vegetation and maybe do it there. **Rosston-Manhattan**

Response: While mosquitoes may breed in limited areas, adult mosquitoes that are airborne may fly into wider areas. Therefore, the application of adulticides cannot be focused on individual breeding locations. In addition, when attempting to control the outbreak of mosquito-borne viruses, NYCDOH intends to reduce the threat to public health in a localized area by significantly reducing the adult mosquito population in the region in order to reduce the transmission of the virus among the wildlife hosts and the risk of direct transmission to humans.

Comment 51: Before spraying actually does take place, it is vital that adequate and timely advance warnings be given to each community affected. Many neighborhoods and their residents were not given warnings in the past, causing a great deal of distress that clearly could have been avoided.

In response to problems that arose in the past, and to ensure that the requirement of public notice is carefully adhered to, I fully support legislation mandating advance notice of pesticide spraying.

In addition to engaging both print and electronic media to inform the public, borough presidents, local elected officials, community and neighborhood organizations should be timely notified as well, and they should be given the appropriate time and information to reach out to their constituencies. Multi-language materials should be

available. Area medical facilities should be alerted and given reasonable time to prepare responses to related emergencies such as asthma attacks. **Wrzesinski**

The City has to come through with something. Personally I'm not adverse to spraying in the area if people were told when the spraying might be done in order for them to stay in the house for an hour or so after it's done. That would certainly help the whole situation. **Warshofsky**

When they did the spraying, I was working in the park and I didn't even get any notice as to them spraying. They need to take that into consideration for the near future to make people aware of what's going on.

They said they notified people by television and newspapers, but not everybody has a chance to read the newspaper or watch TV. So a lot of people were not aware of it, like myself. **Priore**

The City of New York is indifferent to the fact that children played in Central Park after every spraying last year, at least eight sprayings. Their parents were never warned. **DeCarlo**

I was trying to get homeless people off the streets the night of the spraying. Nobody warned them. They got sprayed. **Miller**

The DEIS makes no plan for warning and notification of citizens in areas to be sprayed. **Yukon**

Your notification system is extremely deficient. **Scarcella**

Many constituents complained that they were not reasonably informed with respect to the schedule for applying pesticides so that sensitive persons and the general public could take appropriate precautions to prevent exposure. **Colon**

Without any basis for such assertions, the Draft EIS states that the City will follow regulations, people will be notified of spray schedules, and advance warning will be given as spray vehicles approach. Based on the past two years, we have every reason to believe that regulations will be flouted, and that people will again be directly sprayed upon without warning.

The draft EIS assumes good faith on the part of the City in applying pesticides, despite consistent and repeated failure on the part of the City to follow regulations and properly notify the public during past spray campaigns. **Lewis**

Why is the public not informed about the decision making process to go ahead with pesticide application? It is very difficult to get information, even a schedule of when spraying was taking place so as to prepare and protect ourselves. **Pico**

The City's WNV Hotline is the only official notification of spray schedules available to the public. **Stiles.**

Response: As NYCDOH had to undertake immediate actions in 2000 in order to control the outbreak of West Nile virus, the methods for informing the public and local organizations has been under development and refinement. Under the Proposed Action, NYCDOH would employ an extensive system of public notification to inform the public of when and where adulticide applications would occur. NYCDOH will disseminate information about the dates, time and location of future spray activities to the public through the print and electronic media, and through NYCDOH's web site and West Nile Virus Information Line. In addition, information about spraying will also be made available to City agencies, community boards, borough officials and other community organizations. The EIS acknowledges that despite a system of comprehensive notice of spray events, some residents may be directly exposed during the application of adulticides and the Public Health assessment took these exposure pathways into account.

Education and Outreach

Comment 52: Widespread public education of the long-term adverse effects of the pesticides should be immediately implemented. **Barbera**

Why were we not informed that the chemicals in Anvil are synthetic and not natural, and that Piperonyl Butoxide makes it difficult for us to break down and eliminate pesticides? Why were we not informed that these pesticides adversely affect our immune systems making us more vulnerable to pathogens? Why were we not informed that these pesticides are carcinogenic, damage liver and kidney, cause nerve damage, asthma are hormone disruptors, remain in the estrogen receptor sites of breast tissue and are strongly associated with breast cancer? **Lazarus**

NYC needs to address a list of pesticide poisoning problems to the public, not just West Nile, because it's amazing that the symptoms for severe West Nile and just general pesticide poisoning are absolutely the same. I would like to see more information put out on the adverse effects and as equally publicized as the West Nile Virus. So the hospitals need to be advised better.

You need to tell the public the long-term symptoms listed in the public health chapter of your EIS document. You did not include these symptoms in the packet pamphlets regarding symptoms of pesticide poisonings. The only problem is that more people are ill with asthma and flu-like symptoms that won't leave so quickly if at all. This is the short-term effect only. **Snow**

There is various literature outside about the West Nile Virus. However, there is nothing about what happens when we get sick from the pesticide spray, where to go, what to do, no doctors or hospitals are prepared. **Taratunio**

NYCDOH has not had a Hotline for people suffering from the effects of spraying. **Elakman**

Energy and time should be spent on educating doctors about pesticides. **Swan**

Emergency rooms are not notified of protocols in case of poisoning by the agents being sprayed. Would you like to speak to someone who was directly sprayed with malathion, who had to be admitted to the emergency room? It is even written in her ER chart, but no toxicological testing was ever done. **Reilly**

Why are these publications, such as EPA's Manual for Recognition and Management of Pesticide Poisonings, not readily available in every emergency room and doctor's office? **Reilly**

Response: In 2000, information on the pesticides that were applied was provided to the public, to physicians and other health-care providers. Fact sheets developed for the general public were available at NYCDOH's office of Public Affairs, and were distributed to each Borough President's Office, all 59 Community Boards, and were available on NYCDOH's website at www.nyc.gov/health. NYCDOH developed and distributed a special issue of its Citywide Health Information (CHI) newsletter for health-care providers on West Nile virus and potential health effects from exposure to these adulticide products. The CHI included information on where EPA's Manual for Recognition and Management could be accessed. This issue was distributed to over 47,000 NYC health-care providers as well as every hospital in New York City. A packet of information on mosquito-control pesticides was also prepared and distributed to every emergency room in New York City prior to adulticide spraying activities in 2000. This information included copies of the product labels, Material Safety Data Sheets, fact sheets and the CHI mentioned above. NYCDOH will continue to provide the public, physicians and health-care providers with information on the pesticide products and their potential effects under the Proposed Action. The EIS will also be accessible to the public on NYCDOH's website, which includes analyses detailing the potential adverse public health effects related to adulticiding activities.

Comment 53: I've not heard over the three years how pesticide-poisoning problems have been addressed in a very powerful way over the news, with the air conditioner filter concerns.

Never addressed in your chapter on Public Health or your new citizen health sheets, is the need that every residence, hospital, school, office, every building, synagogue,

church, store change air conditioner filters after each "adulticiding episode" in the past and with your department still considering broadcast spraying, each episode in the future. We (Sierra Club) asked that this important issue be broadcast to the public through literature and over the news. As, to this date, this issue of turning on an air conditioner and blowing in toxins and, residues that do not dissipate from sunlight but remain trapped in the dark recedes of its mechanism, blown in its interior by spraying or wind. Please let us work together to get this information clear, so the public in general can take a safety measure of large importance (residues) and changing of air filters each time an area is sprayed. **Snow**

Response: NYCDOH has provided and will continue to provide guidance on the most practical measures the public should undertake to reduce their exposure to mosquito-borne viruses and pesticides applied to reduce adult mosquito populations. The EIS findings suggest the general public would not need to wash air conditioner filters after adulticide applications. In addition, typical air conditioner filters would only capture larger size particles, and most of the adulticide applications that could drift to the intake of air conditioners would be of finer size, and have a greater likelihood for entering into an apartment or household. Therefore, NYCDOH recommends that the public put air conditioners in the re-circulate mode at times when trucks or aircraft apply adulticides in their area. Nevertheless, as part of general good housekeeping practices unrelated to adulticide spraying, residents may wish to wash the filters of air conditioners at least once a year. Residents are encouraged to consult NYCDOH's website or future notices for the most current recommendations on this issue.

Monitoring Exposures to Mosquito Control Products

Comment 54: Why was there no system set up to register complaints of pesticide poisoning in past years of spraying? People sickened by the pesticide, especially asthmatics, were ignored and dismissed by the health department. **Pico**

Where is the biological follow-up on my poisonings? Where are the factual and actual real working monitoring systems? I do not need someone's opinion on whether they think I was poisoned or not. I know I was. Especially an opinion of an operator at poison control or vector control with no experience in poisonings, reciting some rote statement or coaching given to him to cover the City's ass. Accurate and precise biological monitoring must be made available for the New York residents who have been poisoned and continue to suffer reactions from these pyrethroid formulations by the misapplications of the unmonitored spray applicators? **Reilly**

You have failed to properly document the damaging effects of your proposed actions, you failed to properly account for poisoning of humans, fish, birds, shellfish and other life forms from your previous actions. **Scarcella**

There is no real plan to prevent or treat those suffering from the pesticide spraying because New York City is too busy forcing us to believe that there is no danger whatsoever. **Meenan**

Response: As described in Chapter 1, "Description of the Proposed Action," prior to conducting adult mosquito control activities, product information on the adulticides being used was provided to the public and to physicians and other health-care providers. This information included Material Safety Data Sheets, and other information relevant to identifying the possible effects from exposures to pesticides. In addition, New York City Poison Control Center (PCC) calls were monitored during times of pesticide spraying. During the summer of 2000, NYCDOH recommended that all persons who experienced adverse reactions to pesticides should call their doctors or the PCC. Doctors were advised to call the PCC for consultation and to report if a patient presented any suspected or confirmed pesticide-related illness. Doctors were also reminded of their obligation to report suspected and confirmed cases to the New York State Department of Health Pesticide Poisoning Registry for additional review and follow-up.

Comment 55: This starkly contrasts the City's failure to monitor pesticide-induced illnesses. Did any agencies take blood samples from individuals to detect traces of the adulticides used? Did the City or DEIS committee interview those who succumbed to pesticide illnesses in the past two years? Not only did the City fail to take measures to detect pesticide illness, it actively impeded efforts to evaluate pesticide dangers. Many persons who called a "hotline" and complained of symptoms after spraying were told that the pesticides presented no dangers.

The Commissioner has stated that the Department of Health would release its collected data on persons who complained of pesticide effects "at an appropriate time." Apparently, the appropriate time still has not arrived, even as the City contemplates subjecting New Yorkers to a variety of toxic substances once again. **Lewis**

Response: Under NYCDOH's program for monitoring exposure to mosquito-control products, NYCDOH attempted to interview patients or physicians who had reported symptoms of pesticide-related illness to the PCC. See Chapter 1, "Description of the Proposed Action," for the number of reports to the PCC related to adulticide exposures in 2000, and of these, the number of reports that the New York State Department of Health Pesticide Poisoning Registry preliminarily determined as possible or probable cases to be included in their registry.

Comment 56: There are no readily available testing facilities where residents can have blood and urine analyzed for the metabolites of exposure, or poisoning to these pyrethroid formulations (that includes the PBO metabolites and multiple benzene derivatives used in these formulations to enhance the toxicity of these systemic CNS unhooker, mutagenic, cancer-causing poisons). Now you're adding permethrin to the new toxic cocktail protocols. **Reilly**

Cholinesterase testing is listed in the State Sanitary Code under non-occupational poisonings. Why was this not being monitored during mass aerial applications of enzyme inhibiting-poisons? **Reilly**

Response: While a clinical laboratory test (cholinesterase level) is available to measure organophosphate poisoning, such a test is not currently available for pyrethroid

poisoning. Because cholinesterase levels vary widely even among healthy individuals, post exposure testing for suspected toxicity is considered useful when baseline levels are available. The determination of pyrethroid-related illness depends on the patient's exposure history and their clinical signs and symptoms.

Comment 57: Once sprayed, when sick residents call the City's WNV hotline they are told to call Poison Contro1, who told them to call the City's WNV hotline. There needs to be more care and a better plan for people who have allergic reactions to the pesticides. **Meenan**

Response: Over the past two years, in response to the emergency outbreaks of West Nile virus that have occurred in the City, NYCDOH has adopted mechanisms to provide comprehensive information about the virus to the public, including the establishment of a toll-free West Nile Virus Information Line.

During the summer of 2000, NYCDOH recommended that all persons who experience adverse reactions to pesticides should call their doctor or the New York City Poison Control Center (PCC). Doctors were also advised to call the PCC to report if a patient presented any suspected or confirmed pesticide-related illness. The procedures for internal notification between the Information Line and PCC have been refined during this period, and NYCDOH will continue to monitor for reported pesticide-related illnesses.

Comment 58: For two years we have had an actual laboratory of an urban population subjected to aerial and ground pesticide sprays. For two years the DOH has had time to take information, monitor effects, and draw conclusions based on this data. And for two years, the DOH has failed to gauge the effects of adulticide sprays on New Yorkers.

Great resources have been devoted to tracking the effects of West Nile Virus. At the same time, the City actively impeded efforts to account for the effects of pesticides. The Draft EIS nonetheless draws conclusions about the effects of pesticide use, when information concerning the dangers to New Yorkers has been suppressed. **Lewis**

Response: DOH is monitoring calls received to the Poison Control Center. This was widely publicized in the 2000 season. Also, as part of the preparation of the public health analyses for the EIS, NYCDOH investigated potential adverse effects from adulticiding actions through an extensive literature review, public health risk assessment and epidemiology studies. The EIS reflects the most current information on the potential health effects and projections of the impacts from exposure to adulticides. NYCDOH is committed to monitoring potential public health effects from exposure to adulticides as part of the Proposed Action.

Comment 59: Cholinesterase lab normal ranges, used to monitor exposure to malathion (Fyfanon ULV) or any other organophosphate for that matter, are set up on persons who have not been properly evaluated for previous exposure to cholinesterase-inhibiting agents. Hence, inaccurate monitoring ranges. Normal ranges are reestablished regularly and based on populations previously exposed to these inhibiting agents, yielding inaccurate monitoring ranges. This entire inaccurate lab test system needs to be restructured, nationwide. **Reilly**

Response: The evaluation of standard procedures for testing cholinesterase for organophosphate exposure is beyond the scope of this EIS. However, should future recommendations

be adopted nationwide for such testing, NYCDOH's programs will account for such latest information.

Oversight

Comment 60: What we want is to have the pesticides applied properly. There is absolutely no reason why we can't have a watchdog to control how these pesticides are being sprayed so that people aren't harmed in the process, because the statistics will show that more people are actually harmed by the spraying than are helped. **Jackson & Meenan**

Response: All applications of adulticides under the Proposed Action will be performed by individuals satisfying NYSDEC requirements (e.g., in areas such as certification, training or supervision). NYCDOH will monitor for potential illnesses from adulticiding actions, and NYCDOH intends to contract with an independent quality assurance monitor to ensure that adulticide applications are performed properly by the licensed applicators.

Comment 61: I would like to know why these trucks have to come down the same block three times at night spraying Anvil. It's supposed to be once. Why three times? **Santillo**

Response: Under the Proposed Action, adulticide applications by truck on an individual street would be limited to once per night. Trucks may traverse a street to gain access to a region or a series of dead end streets, but the equipment should only be running once on each individual street.

Comment 62: The people who were hired to do the spraying apparently had no way of learning what the newspaper said or what the Borough President's Office said, so they would not spray during the hours that were announced. **Hamilton**

Response: Under the Proposed Action, NYCDOH is primarily responsible for the coordination and oversight of the noticing to the public and communities of when adulticides will be applied in their areas. In addition to the noticing, NYCDOH will make final decisions regarding when applicators start and end their operations.

Comment 63: The DEIS fails to mention that NYSDEC and Occupational Safety and Health Administration (OSHA) found serious violation by the Clarke Mosquito Control, the city's main contractor in 1999 and 2000. These infractions took place under the supervision and control of the NYC Health Department. OSHA found that Clarke provided inadequate training and improper safety measures to the workers. The NYSDEC found that the workers employed by Clarke were not provided with supervision, instruction and training. Furthermore, the DEC notice of violation noted that Clarke failed to evaluate the workers' competency in pesticide application and maintain records. (OSHA Citation and Notification of Penalty and DEC Notice of Violation attached.)

Such history of violation and lack of proper training and record-keeping raises legitimate concern about the adequacy of the training the new workers are going to get this year, yet the DEIS neither discusses the history of violations nor the proper training and supervision for the workers in the 2001 spray program. **Kupferman**

Why were the employees of Clarke (who are now suffering from pesticide poisoning confirmed by Mt. Sinai) not given protective clothing? **Lazarus**

To the best of my knowledge, all the insecticide spraying that was carried out in New York City during 1999 and 2000 was not within the law. Spray materials state on their package that they are not to be sprayed by helicopter or from that height. They are not to be sprayed over or around water. **Miller**

The company you hired to do your spraying is about to be hit with fines from the State DEC for flagrantly breaking environmental laws, and you've watched it happen on videotape. This EIS fails to acknowledge the existence of actual public record on the environmental impact of West Nile campaign 2000. **Flynn**

Quite the contrary to what is averred in the DEIS, pesticides probably will not be applied in compliance with the law. For the past two years pesticides have not been applied in compliance with City, State and Federal laws and regulations. For example, OSHA and the DEC recently penalized Clarke, NYC's main aerial spray contractor, with a 1 million dollar fine, for violating pesticide application procedures that caused Clarke employees as well as citizens to get sick. This draft EIS does not even address that issue. Such damage control for the City's image is dangerous to its people. New York City seems to have looked the other way and such a failure to supervise will likely continue. NYC's bid criteria for the 2001 season was so extensive and sophisticated, it could only be met by Clarke, the biggest pesticide applicator around. So it appears that NYC is gearing up to hire Clarke as its contractor again. The contract is an estimated $277 million over the next three years. Such a polluter should not be rewarded for egregious violations. In fact, Clarke made statements to the Associated Press on June 5, 2001 minimizing the culpability and stating that they intend to fight for lower penalties. Yet the fines were imposed because pesticides are dangerous chemicals – misuse can easily cause short and long-term damage to humans, animals and the environment. **Meenan**

You will have heard, I am sure, of cases of ignorant, badly trained, unprotected truck spraying crews flagrantly disobeying instructions not to spray people. You may have seen Mr. Roy Doremus' videotape of this on television. (This was, by the way, very common. A teenaged boy behind an ice cream counter last summer saw my "no spray" button and told me how he was chased by a spray truck for half of a block. (He told me the truck crew was laughing as they did this.) At home, he followed the widely publicized instructions to shower, rest, and flush with water, but he was miserably ill for an entire day. (Teenagers, being at a vulnerable stage in hormone and endocrine development, may be especially likely to suffer long-term consequences from exposure to hormone mimicking pesticides. I hope that young man does not someday become another in the growing group of men experiencing high concentrations of estrogen mimicking chemicals in the body, and even poor reproductive function.)

The DEIS makes no provisions to halt incompetent, malicious applicators. **Yukon**

Response: The City will only use appropriately certified applicators for adulticide spraying, should spraying become necessary. It is intended under the Proposed Action beginning in 2001, for quality assurance purposes a quality assurance contractor, independent of the vendor applying pesticide, will assist NYCDOH in assuring that the applicators have the appropriate training and certification. Among other things, the quality assurance contractor will ensure the technical elements of pesticide application are conducted according to plan and pursuant to applicable regulations.

Comment 64: The recent one million dollar fine levied against a City pesticide contractor is evidence of the City's negligence in adhering to proper procedure. **Lewis**

The City Health Department's 2001 West Nile plan looks much like last year's. There is nothing to indicate that it will be carried out any differently than what transpired in 1999 and 2000 - untrained employees overdosing cancer-causing pesticides in highly populated areas and water bodies, without giving citizens correct warning about when this will occur. **Meenan**

Response: Under the Proposed Action, the City (whether using NYCDOH staff or contractors) will be required to apply the products within the restrictions required by the registered product labels. NYCDOH also intends to contract with an independent quality assurance monitor to ensure that future adulticide applications will be applied properly and within the constraints required by law.

Comment 65: The purpose for Anvil 10+10 is for use in vegetated areas. When the City sprayed this pesticide on the streets of Manhattan, which have no vegetation nearby, they misused the product. That makes it a violation of City, State and Federal law. **Meenan**

Response: Under the Proposed Action, the use of adulticides will be applied within the restrictions of the registered labels. Use of Anvil or other products referred to in the EIS is not limited to locations where vegetation is present, and thus, similar applications which may be necessary in the future under the Proposed Action would be in compliance with applicable laws.

Comment 66: The time schedules were never honored properly. **Miller**

Response: Under the Proposed Action, NYCDOH would attempt to apply adulticides within the time periods announced prior to the application. However, weather conditions or other factors may force an application to be rescheduled, and some citizens may not be aware of the rescheduling. NYCDOH will take all reasonable actions to notify communities when adulticiding actions would occur in their locales, in order to give individuals the best opportunities to reduce the risk of direct exposure to adulticides.

Comment 67: The history of the spraying was one of lack of notice and inappropriate scheduling. And what's missing in this EIS looking forward is inspection review procedures, which was sorely lacking in 1999 and the year 2000. **Kupferman**

Response: As part of the Proposed Action, the City intends to contract with an independent quality assurance monitor to ensure that applications of adulticides are applied within

the constraints of the label applications. The procedures to notify the public and communities with respect to applications of adulticides are undergoing continuing refinement and are described in responses to other comments.

Comment 68: The police and the firemen and the policewomen and the firewomen who rode behind the trucks, who continue to ride behind the trucks, don't have a single clue how sick they can get. This is not an unavoidable risk. **Snow**

Response: City employees were advised to ride in front of the applicator trucks, and NYPD cars provided announcements that the spray trucks will begin spraying in that area. NYCDOH worked closely with the Citywide Office of Safety and Health to develop information for the workers with regard to occupational risk from the spraying of adulticides.

Comment 69: The program for the Rockaways, which really concerns us, is only to be implemented when the mosquito traps show that we are inundated. In other words, there is nothing in here about controlling them gradually, the draining that I heard about, all of these wonderful different ideas that came about. The only time we get any action, according to this book here, is when they have an alarm here, some type of an alarm, I guess these different magnets and things which trigger and say there are too many mosquitoes here.

On page S-8, it describes the program. And as far as the Rockaways is concerned, if someone gets bitten, if somebody dies, a kid gets sick and there's a lot of mosquitoes around, you get bit up, they're going to take some action. **Warshofsky & Cutler**

Response: The overall control program for mosquitoes in the Rockaways will include surveillance of adult mosquitoes, but also will reduce the breeding of such mosquitoes by increased surveillance and larval control of breeding areas. Since some breeding areas are predictable and outside the City's control, the City will also try non-chemical methods for controlling mosquitoes, such as Mosquito Magnets? , to reduce adult population levels before the use of adulticides. NYCDOH will carry out strategic applications of adulticides when necessitated by high numbers of mosquitoes in traps placed throughout the Rockaways Peninsula and/or on receipt of a pattern of complaints from the public that indicates unacceptably high levels of biting activity, that are subsequently documented by NYCDOH staff.

Research and Evaluation

Comment 70: Spraying is the least effective method of controlling mosquitoes. **Hamilton**

Response: There are several methods of controlling mosquitoes, including the elements under NYCDOH's Routing Program, which includes conducting citywide enhanced surveillance, public education, and mosquito breeding prevention activities. Further evidence of increasing West Nile viral activity at a level to be of significant human health risk, despite these aggressive preventive measures, will trigger the consideration of targeted adult mosquito control.

Comment 71: The City claims it will follow revised CDC recommendations to spray a 1- rather than 2-mile radius around a density of dead infected birds of infected mosquito pools. This type of spraying can in no sense of the word be considered "targeted." The City

has presented no data to demonstrate the efficacy of such massive broadcast spraying. **Meenan**

Blanket pesticide spraying is totally unnecessary, and ineffective. **Barbera**

Response: Under the Proposed Action NYCDOH will apply adulticides in areas of the City where the greatest threat to public health is evident (as demonstrated by surveillance data and the latest information on transmission of the virus). These targeted actions are much different from actions undertaken in 1999, when the extent of the outbreak was wide-spread. Such actions would not be "blanket" spraying of the City, but targeted to regions where the threat of an outbreak of human illness from mosquito-borne viruses has been identified.

Comment 72: Larviciding has not been effective in preventing mosquito bites and neither has adulticide spraying in preventing bites. **Mitchel Cohen**

Response: The larviciding program under the No Action scenario (the *Routine Program* without the application of adulticides) reduces breeding of mosquitoes, which is intended to lessen the need for adulticiding. NYCDOH does not intend to apply adulticides throughout the City all summer long to prevent mosquito bites, but only to reduce mosquito populations in targeted areas for periods of time when surveillance data indicates a threat to public health in the affected area or there is a need for adult mosquito control in the Rockaways.

Comment 73: I would like to know where it proves the efficacy of the spraying itself. Has there been any testing as to how many mosquitoes are killed in a given area, either by helicopter spraying or truck spraying? **Paczkowski**

I read from respectable epidemiologists that they felt that the spraying was ineffectual. Even if you did want to kill all the mosquitoes, that the spraying, the way it's done, is only getting about 10 percent. **Foster**

There is little guarantee that you are even affecting the mosquito population (which by nature's law just becomes resistant) but you are certainly affecting the human population. **Swan**

Not a scintilla of evidence has been presented to validate the efficacy of pesticide use to address an arthropod borne virus. In fact, much evidence indicates that pesticide use undermines efforts to reduce the spread of such viruses. Nonetheless, the DEIS is built upon the faulty assumption of pesticide efficacy. **Lewis**

Response: Each of the adulticides analyzed in the EIS have been documented to reduce adult mosquito population levels as part of the USEPA registration process. The Proposed Action has also been developed in coordination with CDC, which has had extensive experience in assisting localities in reducing public health threats from mosquito-borne viruses. During the summer of 2000, NYCDOH collected pre- and post-adulticide application mosquito counts at selected traps throughout Staten Island. Preliminary results from examination of mosquito traps in the treated areas indicated

an effectiveness of 82 percent (mean control) 24 hours after a spray event with Anvil 10+10, and 47 percent after 48 hours. NYCDOH is continuing to investigate the overall effectiveness of the *Routine Program* and will also do so for the Proposed Action. Chapters 3.C and 4.C address the public health impacts from the Proposed Action.

Comment 74: In order to establish the efficacy of preventive measures (*Routine Program*) as opposed to the efficacy of spraying adulticides (proposed *Mosquito-Borne Disease Control Program*), it would be necessary to have a sufficient number of mosquito-monitoring traps to establish statistically significant changes in the numbers of infected pools before and after spraying of adulticides. 90 mosquito-monitoring traps among the 5 boroughs of the city are not sufficient to produce meaningful data. The use of caged mosquitoes to establish the efficacy of the broadcast spraying cannot accurately model the effects of the adulticide upon the free-flying mosquitoes in various habitats unless there are enough cages to simulate all the possible site conditions that could reduce mosquito exposure to the adulticides. **Bourque**

Response: The EIS reflects the most up-to-date information on the efficacy of adulticides.

Comment 75: Many trees, in some areas, act as Nature's Umbrella – shielding the mosquitoes (ground inhabitants) from aerial spraying: possibly even from ground spraying. **Culkin**

Response: In areas where there are physical obstructions, such as trees, these obstructions are expected to reduce the efficacy of spraying. Aerial applications have the advantage of increased distribution of the adulticides to control mosquitoes over a larger region in a much shorter period of time than is possible with truck spraying. Aerial applications would also allow for applications in areas with limited trucks access.

Comment 76: Even if NYCDOH were to collect enough data to measure the effects of larviciding and/or spraying adulticides on mosquito populations, it is not necessarily predictive of the rate of human West Nile virus infections. There does not appear to be any direct correlation between infected mosquito pools, West Nile-positive dead birds, West Nile-positive captured wild birds and the number clinically-established infections. (See CDC interactive maps on West Nile virus). Although it is an intuitive assumption that broadcast spraying adulticides will reduce the West Nile virus infection rate, the many uncertainties about its efficacy and the environmental effects militate for the more precisely targeted methods of mosquito control. **Bourque**

Response: As described in Chapter 1, "Description of the Proposed Action," as part of the *Routine Program* NYCDOH will utilize isolated findings of West Nile virus to initiate more intensive community-specific surveillance, public education, source reduction and larviciding. Close tracking of dead bird reports will allow the City to further prioritize enhanced control activity in those areas of the City where there is early evidence of recurrence of the virus. Evidence of dead bird clusters will prompt increased testing of birds and additional mosquito pool collections and testing in conjunction with intensive preventive control measures (e.g., larval source reduction and larval control). Further evidence of increasing West Nile virus activity at a level to be of significant human health risk, despite aggressive preventive measures, will trigger the consideration of targeted adult mosquito control. New York State and

New York City have reported how dead bird and mosquito data may be used to recognize times when human infections are more likely to occur.

Mosquito Population Control Program in the Rockaways

Comment 77: The comments raised at the Far Rockaway public meeting held Thursday, May 31. 2001 are skewed by misinformation and I want this clearly expressed. Residents were mistaking the saltwater non-WNV carrying bugs for the WNV freshwater mosquitoes when they commented about their fears of catching encephalitis. (It is only the fresh water mosquitoes that carry WNV.) The Department of Health did not take the time to make the distinction clear to the area residents during the meeting, which could have put their minds to rest and clarified the record for EIS reviewers to get the accurate representation of Far Rockaway's concerns.

By merging the two kinds of mosquitoes into one plan of action, NYC can no longer assert that their mission is to abate a WNV health emergency in order to justify emergency aerial spraying which is done without warning. The draft EIS lays out a plan to implement the same measures towards the saltwater mosquitoes in the Rockaways that are yes, annoying, but do not carry WNV. That is overkill using a very toxic substance. **Meenan**

Response: During the EIS public hearing session held in the Rockaways, numerous commentors came forth to reaffirm the unbearable conditions encountered by many Rockaways residents from aggressive mosquitoes. While some commentors did acknowledge concern with West Nile virus (or other mosquito-borne viruses), the majority were overwhelmingly concerned with the unbearable mosquito-biting conditions which they have encountered. In response to comments received in the past from the public, community groups and elected officials representing the Rockaways, NYCDOH has developed and proposed the *Mosquito Population Control Program in the Rockaways*, which is intended to relieve the intense discomfort of and enhance the quality of life for Rockaway residents besieged by aggressive biting mosquitoes. The decision to undertake adulticiding in the Rockaways will be based on evidence that the *Routine Program* has not successfully decreased the number of aggressive biting mosquitoes to an acceptable level.

PESTICIDE REGULATIONS AND USAGE

Comment 78: It is interesting that the DEIS comments on the pesticide use in general used in the five boroughs of New York City. It is not, in my view, your job to evaluate every toxin that is in the environment already in New York City although, clearly that is a concern. However, if you are using that to downplay the effect of the pesticides being used to "combat" "West Nile Virus" then the argument fails. First of all, the Department of Health might look into why New York City has such a high level of pesticide over-use and start to educate New Yorkers on the dangers of this usage. It is no wonder there is such a high incidence of asthma and cancers, to single out two illnesses, in this area. However, this only further illustrates the negligence of the mayor and the City in its complicity – to characterize the pesticides continuously as "safe". Secondly, to add this mix of chemicals into an urban environment that is already so toxic can only be characterized as an abuse of authority from NYCDOH,

Mayor's Office, and the CDC. All this for a disease that is continually classified as typically "mild". **Swan**

The high cancer rates on Staten Island correlate with the high level of air-pollution both from traffic exhaust, the Fresh Kills landfill, as well as the by-products from the petrochemical industries in New Jersey. The safety of these pesticides, even if applied according to the manufacturer's directions, has never been tested in the presence of the hundreds of chemical compounds usually present in our air. **Elakman**

Why is the city allowing cosmetic application of pesticides which further adds to our body burden of toxicity. Central Park uses a variety of pesticides. **Lazarus**

Two summers ago, we were hardly pesticide "virgins". Most of the pesticides used statewide are used in the city. **Yukon**

The Draft EIS discusses the heavy level of background toxins to which New Yorkers already exposed, as if to say, "Well, you already have these toxins in your environment- what harm will a few more do?" However, the current high level of toxicity in New York City indicates that we need to reduce any further poisoning of our environment. The DEIS has not addressed the issue of the synergistic effect among the pesticide ingredients and already existing background toxins. **Lewis**

Response: The EIS documented the best estimates of overall reported pesticide usage in New York City, and additional over-the-counter pesticide products which are not accounted for in these estimates. The EIS also identified the relatively small amounts of adulticides used in past emergency control actions when compared to the baseline levels of overall pesticide usage. The overall approach in the analysis was to prepare high-end estimates of the potential exposure of the public and wildlife in the environment. These exposure estimates were compared to conservative estimates on the toxicity of such products to the public and the environment (which also included safety factors to address potential unknowns). These procedures were employed in order to address potential unknowns, such as synergistic effects between active ingredients and synergists, from the test data compiled for these analyses.

Comment 79: Page S-9 and S-10: The DEIS states that "in order for a pesticide to be distributed, sold, or used in the United States, it must first undergo rigorous registration processes at the Federal and State levels…At each level throughout the process, the potential adverse impacts from pesticides are examined, and in the end, a series of restrictions are applied to the products to make sure potential adverse effects are minimized. Registration assures that pesticides will be properly labeled and that, if used in accordance with EPA specifications, will not have any unreasonable adverse effects on humans, the environment and non-target species." On page 3.C-7, the DEIS also states that "the types and amounts of inerts are taken into consideration," during the registration process.

If this were an accurate description of how the EPA registration process actually functions, there would never be cases where the EPA has banned a once-registered pesticide. In fact, the process of pesticide registration is a fluid and evolving one. Risks may not be understood at registration time, not tested for, or too poorly quantified to withstand industry pressure to register.

The most pointed illustration of the historical lack of rigor in the registration process comes from current EPA activities. As the DEIS chapter, Pesticide Regulation and Usage, describes, in 1996, Congress passed the Food Quality Protection Act in response to a National Academy of Sciences report that found pesticide regulation failed to address risks, especially for children. As a result, EPA is now reviewing all pesticide active ingredients.

The process has just begun and only a fraction of the hundreds of pesticide active ingredients slated for review have been examined to date. But already, several pesticides that have been on the market for decades and sprayed on food, yards, homes, and gardens have been banned (on a phased basis)?declared unsafe for many of their current uses. Two of these, Dursban® (chlorpyrifos) and diazinon are among the most heavily used pesticides in New York State and have been in heavy use for decades. For the entire time that they have been on the market, however, regulators and industry alike offered bromides about their safety when used according to label instructions, as they had done for the previously banned DDT, chlordane, and others. Not all synthetic pesticides pose the same level or type of hazard, but the fact that similar assurances are made for every available pesticide, until such time as they are demonstrated to be false and the product banned, does not inspire confidence in any such statement.

The DEIS should refrain from making these kinds of general statements about pesticides, which imply a level of scrutiny and knowledge not supported by the record and instead focus on what is known or not known about each individual pesticide, as it does later. **Thier**

Response: Chapter 2, "Pesticide Regulations and Usage," of the EIS provided a broad overview of the process of registration and re-registration of pesticides at the Federal and State levels. It is not the intention of NYCDOH to suggest that the review, under the registration process, of the potential effects from pesticides considered under the Proposed Action are finished. In addition, in deciding to prepare the EIS and in conducting the extensive studies associated with it, NYCDOH did not rely on the pesticide registration process for determining the potential impacts of the Proposed Action. As part of any review process at the Federal and State levels, it is expected that additional information will be collected, and any new scientifically reliable and peer-reviewed sources of information that may change conclusions reached in the EIS or operational decisions with respect to making adulticide applications, will be considered by NYCDOH in the future. While it discussed materials and data obtained from test data supplied under the registration process, the EIS also provided information from literature searches. This included data from numerous sources besides those compiled for the federal registration process. The technical analyses utilized such information, along with data compiled and projected on likely

exposures (and durations of such exposures through various pathways) to arrive at reasonable conservative estimates of the potential impacts of the Proposed Action.

Comment 80: Chapter 2: There appears to be some confusion about the use of the term restricted use products to describe the total amount of pesticides applied by commercial applicators. Under New York State's pesticide reporting program, commercial applicators report applications of all pesticides, both restricted and general use, not restricted use only. Similarly, sellers of pesticides to farmers (private applicators) report sales of all pesticides, restricted and general use. Not captured by the reporting program are general use pesticides applied by homeowners themselves. **Thier**

Response: The FEIS has clarified the descriptions and language of what is reported in the annual NYSDEC usage reports.

Comment 81: These are the EPA "Precautionary Statements," p. 2, May 20, 1998, for the formulation "Scourge." This is with proper application.

"Causes skin irritation. Harmful if swallowed or absorbed through the skin. Causes moderate eye irritation. Do not get on skin or clothing. Avoid contact with eyes. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse."

In an additional study labeled "primary eye irritation 83-6700D" results indicate "corneal opacity and 4/6 rabbits' eyes not clear at 21 days."

Can you tell me what the agent changes to after someone applies soap and chlorinated water? **Reilly**

Response: As for any chemical, the standard precautionary statements always include avoiding direct contact with skin or eyes. If such contact should occur, standard procedures include washing skin with soap and water and flushing one's eyes. It should be noted that these precautionary statements are present on a product's label to inform the user of the potential hazards associated with direct exposure to the undiluted product. These statements also apply following accidental exposure to spray mist or drift; however, the concentration of the product under these conditions has been diluted several fold from its original concentration. Use of soap and water is the most universally available approach to remove accidental deposition of an adulticide on skin; likewise, rinsing with large amounts of water is the method of choice to remove adulticides in eyes. The benefits of using soap and water to reduce and remove adulticides from skin or eyes far outweigh any hazards (if any) from potential exposures to chlorinated water.

Comment 82: Why does NYC plan to use pesticides characterized by the EPA as Category I -the most dangerous that are highly toxic to fish, aquatic; animals and wildlife - in one of the most highly populated areas in the country? Its not that big a stretch to extrapolate that if an animal can be poisoned, so can a human child or a fetus in a woman's womb. Reinstating Malathion and adding Naled to this year's pesticide arsenal just compounds the toxic effects geocentrically. Some of the pesticides the City plans to use were EPA approved in 1959. (So was DEET.) **Meenan**

Response: The potential impacts under the proposed *Adult Mosquito Control Programs*, which were analyzed in the EIS, are intended to cover active ingredients and types of

products that are registered for use by the federal and New York State governments. While NYCDOH is not intending to apply organophosphates in the near future, the EIS covered all adulticides and active ingredients that may be applied over the long term. Given the uncertainties with respect to West Nile virus and other emerging mosquito-borne diseases, and recommendations from federal and state agencies on the control of such outbreaks, NYCDOH prepared the EIS with the intention of understanding the potential human and environmental impacts from the choice of active ingredients and products registered for such use on a community-scale level in compliance with current law. The information is the EIS will be used to inform future operational decisions.

Comment 83: These pesticides were never intended for massive aerial spraying over human populations. They were only approved for spraying on food where people have option to avoid. **W. Krumholz**

Response: Under the Proposed Action, adulticides will be applied within the restrictions of the registered labels. Use of the products referred to in the EIS are not restricted only to locations where vegetation or crops are present, and thus, similar applications which may be necessary in the future under the Proposed Action would be in compliance with applicable laws.

Comment 84: Much of the discussion in Chapter 2 deals with issues that are peripheral to the evaluation of potential impacts from adulticide applications. These portions could be made into appendices so that the main document is more focused. **NYSDOH**

Response: Comment noted.

FRAMEWORK OF THE ANALSIS

Comment 85: Why does the DEIS not address the question specifically of how the pesticides that are being sprayed degrade over time – because the scientific literature on these chemicals and their properties does not support the contention that they degrade quickly into less harmless components.

Indeed, not only is the mix called Anvil designed not to degrade, but to the extent that it and its predecessor, malathion, do degrade they are said to become more toxic, not less. Degradation needs to be addressed and it ties in with the residue issue. **Foster**

The City of New York is indifferent to the fact that despite claims to the contrary pesticides can and do stay around for days, for months, for weeks, for years. **DeCarlo**

Response: The technical analyses in the EIS do take into account the degradation of the adulticide products being analyzed. Both the Public Health and Natural Resources analyses use specific information (see Table 3.A-3 in Chapter 3.A, "Framework of the Analysis") on several chemical and physical characteristics of the active ingredients, including half-life (i.e., the amount of time required for a chemical to break down to half of its original concentrations) in soil and water.

For the Natural Resources analysis, information on how the active ingredients degrade over time was used in the development of the exposure concentrations used in the risk assessment. In addition, breakdown products of active ingredients and their toxicological effects are taken into account both in the ecological risk assessment for this study and the toxicity tests that produced the toxicity data.

As with the Natural Resource analysis, the Public Health analysis took into account the degradation of the adulticides' active ingredients in estimating the exposure concentrations that individuals may experience (i.e., via water, soil, food, surfaces). As mentioned earlier, the half-lives in soil, water and on surfaces are presented in Table 3.A-3 for the active ingredients considered in this EIS. A more detailed description of the calculation to derive the exposure point concentrations, including degradation rates, can be found in Appendix 3.C-2 of the EIS. Breakdown of the parent chemical into more toxic chemicals is inherently accounted for in the toxicity tests performed for each of the adulticides' active ingredients whenever applicable. For example, potentially more toxic breakdown products could already be present prior to the initiation of the toxicity test. Or potentially more toxic breakdown products would be formed in the test animal following exposure to an active ingredient over the course of the testing period.

Comment 86: I noticed as I was quickly perusing through the Draft EIS, you had noted that there was information on inert ingredients. Well, there isn't a lot. **Dolack**

The draft EIS opines that inert ingredients in pesticides rightfully should be kept from consumers as well as health personnel because of manufacturer's trade secrets. This is in direct opposition to the stance that New York State Attorney General Eliot Spitzer's Office has taken on that issue. Of course consumers should know what ingredients make up these pesticide cocktails. It is wrong to foster pesticide laws that prevent consumers from knowing exactly what ingredients are making them sick, killing their pets, plants and ruining their recreational waters. **Meenan**

Response: The EIS describes the legal protections for confidential business information without taking a position on the question of whether such protections are in the public interest. As described in Chapter 2, "Pesticide Regulations and Usage," NYCDOH made numerous attempts to obtain information on the specific inert ingredients found in each adulticide product being considered for analysis. NYCDOH formally submitted Federal Freedom of Information Act (FOIA) and State Freedom of Information Law (FOIL) requests to USEPA, NYSDEC and NYSDOH. These agencies were not granted the necessary approvals from all the individual registrants of the products to release the proprietary information. NYCDOH also met and discussed with some representatives of the pesticide industry and manufacturers of adulticides registered in NY, in an attempt to reach an acceptable agreement on both receiving and disclosing the inert information. After several attempts, NYCDOH was unable to obtain the specific inert information it requested for the purposes of the EIS. However, information on the general categories to which the inert ingredients belong is available on the product Material Safety Data Sheets. This general information was therefore used to discuss qualitatively the potential health effects associated with such compounds.

Comment 87: I'm most amazed that malathion would still be considered. **Dolack**

Response: The 17 products included in the analyses in this EIS are those currently registered in New York State that can be used on a community-scale basis for mosquito control. Because NYCDOH's *Adult Mosquito Control Programs* address the long-term goals for mosquito control in New York City, the EIS included a thorough analysis of the potential adverse environmental impacts from all categories of active ingredients that are currently used in, and could potentially be found in future formulations of adulticides registered in New York State. Based on the specific conditions (which may vary from year to year), and the information and analyses provided in the EIS, NYCDOH will make the decisions on which adulticide product(s) to use, in the event that adulticiding is deemed necessary despite aggressive preventive measures under the *Routine Program.*

Comment 88: The cover of the September 9, 2000 New York Daily News tells the story of a real world exposure of one City resident, a woman, with the temerity to get between the Mayor's feeder spray and its tiny winged target. She is not represented in your document with its employment of all the sophisticated and State-sanctioned risk assessment formulas the authors could marshal. Whether or not she was within twenty-five feet of the spray nozzle or had been exposed to spraying cumulative ten times a season, she knows what it's like to be at ground zero. **Flynne**

Response: The EIS analyses took into account an individual's exposures near the point of application, including distances to people on sidewalks during truck applications.

Comment 89: I notice Dubos Point wasn't included in your targeted area. And it just sits right outside. As you heard today, several people mentioned Dubos Point. Is there any reason why there's an omission? And can we correct if it's a problem there? **Sanders**

Response: Chapter 4.A, "Framework of the Analysis" for the *Mosquito Population Control Program in the Rockaways,* describes the Representative Area for the EIS analysis. This area consists of four geographic areas of the Rockaway Peninsula, and includes Dubos Point.

Comment 90: I think for a comprehensive DEIS of any kind you have to consider the whole picture. Consider the impact of spraying everywhere, up and down the east coast. You have to get an overview. You can't just look at one area. **Haavind**

Response: As described in Chapter 3.A, "Framework of the Analysis," the potential impact of cumulative drift (either from NYCDOH-sponsored actions or from a combination of NYCDOH actions within City boundaries and concurrent adulticiding actions undertaken outside the City boundaries by non-New York City agencies) should be less than the airborne concentrations and deposition levels modeled and employed in the technical analyses for this study.

Comment 91: More details should be given for the air modeling scenarios. The document does not give necessary details on the length of the volume source (height and width are given), whether the source was a finite (pulse) or infinite (continuous) source. If the source was finite, then details should be given on the length of time and amount of release of pesticides. Also, if the source was finite, details on the time it takes for the pesticide "cloud" to pass a receptor should be given. This allows a determination of the exposure duration for inhalation. **NYSDOH**

Response: The text has been modified to include the length of source, type of release, length of time of the release and amount of pesticides released. The release of adulticides was simulated as a continuous source, releasing the adulticides for a period of 1 hour at the label recommended application rate for each product. The ISCST3 model accounts for the time it takes for the release to travel from the point of application to the point of exposure.

Comment 92: Chapter 3.A is very repetitive in regards to pesticides and their uses. Many of the topics were discussed elsewhere in the document and need not be repeated here. **NYSDOH**

Response: The intention of this Chapter is to bring into focus the key issues in order to "frame" the analyses undertaken in the EIS.

Comment 93: Page 3.A-9 states that all simulations will assume a volume median diameter of 55µm for all sprays. This assumption has significant ramifications for inhalation exposure and deposition. Consequently, the decision to use 55µm warrants a greater discussion than was given. **NYSDOH**

Response: As described in the EIS, sensitivity runs were performed to determine the effects of certain key parameters on the results of the concentration and deposition modeling. One of these parameters was the volume mean diameter (VMD), or droplet size distribution. The sensitivity analysis indicated that airborne concentrations (used in assessing exposures via inhalation) were not significantly affected when VMD was varied. Deposition levels however, were more sensitive to VMD variations, with maximum calculated deposition values at a VMD of 55µm. Therefore, in order to use worst-case assumptions for the drift/deposition modeling (inputs to the other analyses), all simulations were performed using a VMD of 55µm.

PUBLIC HEALTH

Comment 94: The DEIS should reflect the real health risks of pesticide exposure and West Nile, this one does not. It is past time to ask what the real health cost of our daily toxic exposures are. Please make sure the next draft is one that takes all the facts into account. **Yukon**

The toxic effect of these chemicals is far worse than the preventive effect it has regarding the viral illness for so few lives. **Wiedershine**

Response: The primary purpose of the proposed *Mosquito-Borne Disease Control Program* is to protect the public from outbreaks of mosquito-borne diseases, such as West Nile virus encephalitis. As stated in the EIS, the use of pesticide spraying to control adult mosquitoes may itself pose a risk to public health. The analysis in the EIS examines the anticipated benefits to public health of adult mosquito control (reduction in the potential for an outbreak of a mosquito-borne disease such as encephalitis) versus the potential for a percentage of the City's population to come into contact with a pesticide used for mosquito control and to react adversely to it following both short-term and long-term exposures. The process of weighing the risks and benefits of pesticide application is complex. It entails determining the likelihood and dose of the exposure and then reviewing the potential impacts on the general population and on

sensitive members of the public, such as children and people with chronic illness. The public health impact of not spraying (i.e., the likelihood that some members of the public may become seriously ill and/or die as a result of a mosquito-borne illness) is also evaluated in the EIS. Thus, the EIS combines available information (including a review of information in the scientific literature, a risk assessment using conservative exposure assumptions, epidemiologic and attributable risk analyses, and a summary of information from reports received by the PCC and NYSPPR) to determine whether potential adverse public health impacts would be significant. Each of these approaches can provide some of the necessary information required in evaluating these potential effects. Likewise, each has its limitations. However, when these elements are reviewed together, they provide a more complete assessment.

Comment 95: It's an inadequate statement that fails to address the very serious health risks that come from spraying nerve poisons on millions of people and on the other animals that live in this city and the aquatic organisms. There is minimal consideration of those risks and not an adequate consideration of the minimal dangers of the West Nile virus. **Treichler**

Response: As mentioned in an earlier response, the EIS relies on available information (such as the literature review, the results of the risk assessment and the epidemiologic and attributable risk analyses) in analyzing the Proposed Action. NYCDOH is aware that the experiencing of symptoms may be considered significant to those affected persons. With respect to the significance of the potential adverse impact of the Proposed Action on public health, NYCDOH has determined that the potential adverse effects to the individual exposed to the pesticides must be compared to the potential risk to the public health if the Proposed Action were not taken. NYCDOH may need to use adulticides to prevent serious illness and deaths from West Nile virus or other mosquito-borne viruses in future years. The results of this EIS will help inform the department's decision making in such adulticiding efforts.

Comment 96: Overall, the task at hand is a daunting one: to judge the level of risk posed by the disease as weighed against the level of risk posed by the pesticides. Given the sparseness of information available to estimate risk from pesticides (which the DEIS acknowledges at many points), and the lack of a true control scenario with which to make disease estimates (and the multitude of variables that combine to create such risk), the process is simply not capable of making a definitive judgment one way or the other on this question, or making a single blanket judgment as opposed to a series of conditions under which the balance of risk might tip more in one direction than another. **Thier**

Response: The EIS identified such uncertainties throughout the discussions and evaluations presented in the document. The potential uncertainties with respect to the known effects of pesticides, such as those related to individual human health, have been disclosed in the EIS, and taking into account the results from the various analyses conducted, the potential environmental impacts from the Proposed Action were determined. The uncertainties and limitations related to the estimates of the sicknesses and illnesses that may result from mosquito-borne viruses have also been identified. Due to such uncertainties, the EIS did not report numerical estimates of the number of human health illnesses and deaths which would be reduced by the

Proposed Action. NYCDOH believes, based on the weight of evidence and taking into account the potential adverse reactions of individuals to pesticides, that the Proposed Action would protect the public health. NYCDOH will continue to monitor the potential effects of adulticides on the population in the future under the Proposed Action.

Comment 97: Blanket pesticide spraying has devastating negative irreversible consequences to the well-being of all those concerned. **Barbera**

Response: Wide-are application of adulticides occurred in 1999 to help control an ongoing city-wide outbreak. More targeted applications of pesticides were done in 2000 in specific locations where birds died from WNV, human cases were found, and/or where adult mosquitoes carrying the virus were detected (*i.e.*, areas with the greatest concern for human infections with WNV). NYCDOH will continue to refine adulticide use, in consultation with NYSDOH, CDC and others. Furthermore, using available scientific information and established approaches to evaluate the potential health effects associated with the use of adulticides to control mosquitoes, the public health analysis in the EIS demonstrates that exposure to the adulticides evaluated in this EIS could result in minor, short-term, self-limiting symptoms including eye and nose irritation and/or respiratory symptoms from the Proposed Action for a minority of individuals. In addition, there is probably a small population of individuals who may have prior sensitization (e.g. exterminators, gardeners) or allergic responses to these ingredients, and these persons may also experience reactions. Long-term non-cancer and cancer health effects were determined to be lower than USEPA target risk goals.

The likelihood of symptom occurrence would be increased for people who are directly exposed, such as those individuals who are accidentally directly sprayed. As with other exposures that could potentially have adverse effects, reducing exposure is of prime importance. Reasonable precautions will be taken to prevent such occurrences. NYCDOH will make every reasonable effort to keep the public informed with respect to the schedule for applying the pesticides, so that sensitive persons and the general public can take appropriate precautions to prevent exposure. Spraying would generally be done in the late evening or early morning hours, and announcements preceding the vehicles' appearance would be made as a warning to people who may be in the immediate area.

Comment 98: I object to the DEIS dismissal of health risks which will take five or more years to manifest, when the present decision makers are safely drawing their retirement checks. We have the opportunity and the knowledge to plan for the future health, but it is being tossed aside. **Yukon**

Response: The EIS assumed an exposure of 30 years for residents and 25 years for workers. The EIS determined that the effect on public health of exposure to pesticides sprayed for 30 years would be less than EPA's target risk goals. Furthermore, cancer risks were evaluated over a lifetime. The public health analysis relied on three approaches (literature review, risk assessment, epidemiologic and attributable risk analyses) in determining the significance of the potential adverse impact of the Proposed Action on public health. As stated in the EIS, NYCDOH has determined that the potential adverse effects on public health from exposure to pesticides are outweighed by the

potential risk to the public health if the Proposed Action were not taken (i.e., considering human infections and deaths resulting from WNV outbreaks in Russia, Romania, and Israel). NYCDOH may need to use adulticides to prevent serious illness and deaths from West Nile virus in future years. The results of this EIS will help inform the department's decision making in selecting which chemical or chemicals to use in adulticiding efforts.

Comment 99: West Nile Virus is a mild illness and poses no great threat to the general population. The devastating, long-term effects of such spraying greatly outweigh the risk of the disease. The very, very small population possibly at risk for contracting this virus is put at greater risk by being exposed to the immunosuppressant properties that the pesticides contain. **Barbera**

Response: It should be noted that West Nile virus can result in serious illness. Recent outbreaks in Russia (40 deaths and 1,000 diagnosed cases) and Romania (17 deaths and 500 diagnosed cases) show that this disease does have serious health implications for the general population if left unchecked. Furthermore, based on the literature reviewed, adverse health impacts from potential exposure to adulticides at the levels associated with adult mosquito control are not expected for such public health issues as gastrointestinal distress, neurological effects, cognitive developmental disabilities, endocrine disruption and developmental/reproductive effects. At this time, it is not possible to determine solely from the literature the potential effects of the adulticides on the immune system and MCS reactions. However, based on the Risk Assessment, exposures to the adulticides at levels expected from applications for mosquito control indicate no adverse health impacts for all non-cancer public health issues. NYCDOH may need to use adulticides to prevent serious illness and deaths from West Nile virus in future years. This EIS will help inform the department's decision in selecting which chemical or chemicals to use in adulticiding efforts in order to obtain the greatest benefit to the general population (*e.g.*, protection from WNV) compared to potential health effects associated with the use of adulticides.

Comment 100: Law requires the final EIS, to demonstrate that the use of adulticides will not adversely affect humans and the environment. The burden is on the group that wished to release toxins to demonstrate safety. The information in the EIS demonstrates that, at best, we do not fully understand the adverse effects of the City's adulticides and at worse, we are subjecting millions of people to higher risks of cancer, asthma and other afflictions. **Lewis**

Response: The law requires that potential adverse environmental impacts of a proposed action be disclosed to the public. This EIS does identify the potential adverse impacts from the Proposed Action on public health and the environment.

As discussed in the EIS and in responses to previous comments, the Public Health Analysis includes various components. Each of these components (literature review, risk assessment, etc.) provide necessary information required in evaluating these potential public health effects. Likewise, each has its limitations. Inherent in each step of a public health analysis are uncertainties that ultimately affect the final risk estimates. For example, uncertainties may exist in numerous areas, including environmental sampling data, derivation of toxicity values, and estimation of potential site exposures. However, where these uncertainties exist in the EIS,

conservative (i.e., health protective) inputs or approaches were used so that potential risks, if any, would be overestimated.

Comment 101: On the whole, the DEIS has assembled a tremendous amount of useful information from the literature search (though we disagree with some of the characterizations and feel some information is missing) and the asthma analysis. The DEIS also repeatedly makes clear, however, that in spite of all that it was able to assemble fundamental data about a host of health effects are simply not there. The final conclusion that there will be few or no adverse pesticide effects beyond skin and eye irritation expected from the spraying, stretches far beyond what the data can support or even what some of the analyses actually indicate (e.g., acute effects for malathion and naled, asthma exacerbation).

We believe it would be more productive not to make that last leap. The DEIS should stop at offering a full accounting of potential pesticide risks, given our current state of knowledge, without conflating lack of information and lack of risk, and without minimizing risks by declaring that exposures will be too low to be a problem. We simply cannot know whether this is true. **Thier**

Response: Although there are limitations specific to each one of the approaches employed in the Public Health analysis in this EIS, nevertheless, the cumulative information derived from these approaches (literature review, risk assessment, epidemiologic and attributable risk analyses) suggest that the potential risks on a population-wide basis of adverse health effects from use of adulticides are not significant. Based on available information, these were weighed against the potential risks from West Nile virus if the Proposed Action is not undertaken.

Comment 102: I understand that there are concerns over the risk of adverse reaction to the chemical ingredients in the adulticides proposed for the *Adult Mosquito Control Programs*. However, I am in agreement with the New York City Department of Health that the potential for illness, both mild and serious, would likely be greater without the proposed Adult Mosquito Control Programs. **Colon**

Response: Comment noted.

Comment 103: The Draft EIS treats pesticide ingredients as if people were exposed to only one at a time. The combinations of pesticides create an additional synergistic toxic effect, entirely ignored by the Draft EIS. It is negligent to assume that in the absence of information on these effects, they create no additional danger. For example, not only does piperonyl butoxide inhibit the ability of arthropods to rid themselves of pyrethroids, it has a similar effect on humans. The Draft EIS fails to even speculate as to the effect that combinations of toxins will have when sprayed upon millions of New Yorkers. **Lewis**

You failed to properly evaluate the synergistic detrimental effects of the poisons you seek to introduce. **Scarcella**

Response: Although piperonyl butoxide does inhibit pyrethroid metabolism in humans, it only does so at exposure concentrations much greater than those inhibiting pyrethroid metabolism in insects. Therefore, while piperonyl butoxide concentrations used in

insecticide formulations will effectively inhibit pyrethroid metabolism in insects, they are expected to have a negligible effect on pyrethroid metabolism in humans. Regarding possible synergistic effects with other adulticides evaluated in EIS, it is not expected that they will be sprayed simultaneously.

Comment 104: This document dismisses the health risks of spraying toxic pesticides in residential communities widely cited in the literature attached. The cumulative build up of pesticide residues in the human body compromises the health of all people in NYC. The pervasive use of toxic pesticides by NYC should be supplanted by the least toxic approach to pest management. **Buchwald**

Organo-chlorines are perhaps the most toxic substances known. **Scarcella**

Response: A residential exposure scenario was used as one part of the approach to determine whether the potential exposures to adulticides would result in adverse impacts to residents. Use of conservative exposure assumptions in the residential scenario risk assessment resulted in estimates of potential impacts lower than USEPA target risk goals. This scenario assumed a person living at the same location for 30 years, including part of those years as a young child. It should also be noted that the adulticides considered in this EIS have relatively short half lives (hours to days; only PBO has a half life of 240 days), considerably shorter than the half life of organochlorine pesticides (which are not considered under the Proposed Action), such as DDT and chlordane, which have half lives measured in years. This is consistent with the desire, on the part of all agencies, to find a least toxic approach. As stated in the EIS, these adulticides also do not tend to persist in mammalian bodies. Measured half-lives in the body are less than 7 days.

Comment 105: Experts tell me that spraying has not been effective against malaria. Peer review of all sections of the EIS by impartial experts in the various areas is needed, including risk assessment, in order to obtain balanced professional judgment on all the issues. **Haavind**

Response: Peer reviewing of the EIS is not required under State or Local law. The FEIS is a culmination of the completion of 1) a Draft Scope of Analysis document, which was subject to public and professional comment, 2) a Final Scope of Analysis document, which documented the comments received on the Draft Scope of Analysis and incorporated revisions based on such comments, and 3) a DEIS, which was made publicly available and was widely distributed to State and Federal health and environmental agencies. An extensive set of comments (approximately 275 from 87 commentors) were received on the DEIS, through a combination of oral comments received at 6 public hearings held throughout the City and written comments forwarded directly to NYCDOH. The DEIS was also one of the topics of a CDC-sponsored conference call during the public commenting period, with nationwide State and Federal participation. While the NYCDOH completed the DEIS and FEIS through the combination of efforts from numerous professionals from New York City agencies and consultants, a broad array of commentors on the DEIS provided extensive independent evaluation of the DEIS, and the comments raised on the DEIS have been responded to and taken into consideration for the FEIS.

Comment 106: There is a great deal of repetitiveness throughout the chapter, both within individual paragraphs which often state the same sets of assumptions or conclusions twice, and

within the entire chapter where portions of some paragraphs are repeated nearly verbatim in different sections. **NYSDOH**

Response: Comment Noted. Because of the voluminous nature of the document, every attempt was made to re-iterate conclusions where appropriate to provide ease to the general public in accessing key information.

Comment 107: Numerous references in the chapter do not appear in the reference list. This is particularly the case of references cited in the asthma discussion (e.g., Aligne et al; 2000: Platts-Mills et al; 2000) and apparently all of the citations in the attributable risk analysis. **NYSDOH**

Response: The references cited above in the Literature Review and Attributable Risk Analysis sections have been added to the Literature Cited section for this chapter.

Comment 108: Most of the conclusions section is repetitive of earlier material in the chapter-- almost all of the discussion from page 3.C-116 - 3.C-121 could be dropped. **NYSDOH**

Response: Because various analysis approaches were used in the Public Health Analysis (Literature Review, Risk Assessment and Epidemiologic and Attributable Risk), and conclusions were drawn for each approach, a separate section presenting all conclusions was provided at the end of the Public Health Chapter to provide ease in accessing this information.

Comment 109: Footnote one should appear on the bottom of page 3.C-11, but is at the bottom of page 3.C-12 **NYSDOH**

Response: The text has been modified to reflect this comment.

Comment 110: In several places, information appears to be missing from the appendices. For example, it appears that the graphs in Figure 3.C-2 are incomplete. **NYSDOH**

Response: The appendices have been modified to reflect this comment.

Comment 111: Figure 3.C-2:2 includes a footnote describing an assumed mixing depth of 5 feet for the swimming and wading pool scenarios. This assumption is not appropriate for a wading pool for a small child. **NYSDOH**

Response: The commentor is correct in stating that a 5-foot water depth may not be sufficiently conservative to assess risks associated with wading for a small child. The calculations used in the DEIS assumed a 5 foot (60 inches) water depth to assess risk associated with swimming for children and adults. If the depth of water in a wading pool is assumed to be 6 inches, estimated risks for the selected individuals would be approximately 10 times greater (i.e., the association is directly linear). The resulting cancer risks and non-cancer hazards would be 10 times greater. Considering that the swimming pathway does not contribute significantly to overall cancer risk and non-cancer hazards, the use of a 6 inch water depth for a wading pool would not result in an overall increase in total non-cancer hazard (i.e., less than 2.5% increase in total non-cancer hazard for PBO to less than 0.06% increase in total non-cancer hazard for malathion) and total cancer risks (e.g., less than 0.02% of total cancer risks).

Comment 112: The discussion provided in the main text and in the appendices is inadequate for readers/reviewers to clearly determine how specific assumptions were developed and in some cases, how they were subsequently employed in the assessment. The

document would be significantly improved if these elements were made more transparent with supporting text. **NYSDOH**

Response: Comment noted; however, the detailed discussions regarding the estimation of daily doses (*i.e.*, exposure equations provided in the Exposure Analysis Section), estimation of exposure point concentrations (*i.e.*, Exposure Analysis and Appendix 2), and the rationale and sources for the exposure parameters (*e.g.*, body weight, intake rates as provided in Appendix 1), as well and the detailed description of the selected toxicity criteria all provide ample information to determine the approach and estimation of risks and hazards.

Potential Characteristics of Future Outbreaks without the Proposed Action

Comment 113: A single-digit mortality rate from a feared virus does not constitute a substantial threat to health evoking any necessity to even consider the spraying of toxic chemicals, toxic pesticides by helicopter and trucks throughout all the boroughs of New York City. **Buchwald, BK**

Statistics have shown that the rate of these kinds of mortality was not increased by the advent of the West Nile virus. On the other hand, what is also clear is that overall illness increased with spraying of insecticide. **Tschudy**

Response: NYCDOH does not use mortality rate as the only indicator of a potential public health threat. While mortality rate may have been relatively low for those individuals hospitalized due to illnesses caused by West Nile virus, long term health effects were evident in many of these cases 6-12 months after the onset of illness. The EIS included an assessment of the potential impacts from the use of adulticides under the Proposed Action and the potential effects if the Proposed Action were not undertaken.

Comment 114: The experience of our region, as well as that of regions with inferior sanitation and health facilities, indicates that WNV poses less of a danger than this report indicates. **Lewis**

Response: NYCDOH believes that the EIS provides a reasonable assessment of the danger posed by the West Nile Virus and other adult mosquito-borne diseases, considering current knowledge of such diseases and their transmission. The EIS does caution that the scenario without adulticide spraying, as described in Chapter 3.C, "Public Health," could be over or under predicted. That said, the danger of death and long-term disability from the West Nile virus and other encephalitic diseases carried by mosquitoes is real and well-documented. Long-term physical symptoms persisting well after the acute illness has passed include difficulty walking, muscle weakness and pain, fatigue, and insomnia; cognitive symptoms include memory loss, loss of concentration, depression, irritability, light-headedness and confusion. A follow-up survey of the hospitalized cases from the 1999 outbreak found the majority of persons suffering from one or more of these symptoms even 18 months after the acute illness (NYCDOH data). Age appeared not to be a factor in the presence of these symptoms. Whether the danger proves to be less or more than that portrayed in the EIS, the danger is real and cannot be ignored by the NYCDOH when disease carrying adult mosquitoes are found in an area.

Comment 115: Fifty-nine persons were hospitalized in the New York metropolitan area. Of the four people in NYC who died from West Nile Virus in 1999, three were undergoing cancer treatment and one was HIV positive. In that same year, more than 2000 persons died from the flu in New York City. In the year 2000, fourteen New Yorkers contracted WNV, and one died. Neither the recent patterns in the New York City area, nor the "worst case scenario" of southern Russia, warrant the characterization of "epidemic." **Lewis**

Response: The HIV-infected patient did not die (see Szilaki and Minamotogy " West Nile encephalitis in an HIV positive woman in New York" New England Journal of Medicine 2001; 342:59-60) and none of the four persons who died had active cancer (see Asnis DS, et al "The West Nile Virus outbreak of 1999 in New York: The Flushing Hospital Experience" Clinical Infectious Diseases, 2000 30:413-418) where three case histories of patients who died are described. When compared with the complete absence of West Nile virus infections in the western hemisphere before 1999, the 1999 outbreak of West Nile Virus in the New York City area is appropriately characterized as an epidemic.

Comment 116: In the attempt to demonstrate how important it is to retain the spraying of adulticides as a last line of defense in protecting the public from a West Nile virus outbreak, the DEIS presents Table 3.C-3 which projects the rate of West Nile infection "Without the *Adult Mosquito Control Programs*." The table does not address the use of the preventive measures (public education, reduction of mosquito breeding habitat and the application of larvicides). Since, in actuality, no one has proposed no action; presenting Table 3.C-3 does not serve any purpose. In light of what we know, New York City will not revert to the level of mosquito monitoring and control measures that existed in 1999. A more relevant table would project the number West Nile virus infections with all the preventive measures in place without spraying adulticides. Since larviciding was done in the year 2000, where is that data? **Bourque**

Response: The discussion of Table 3.C-3 in the EIS does note that the scenario represented in the table could be an overestimation or, based on the experience in Russia and Israel, and underestimation of the results of an outbreak (see page 3C-12). A note has been added to the table to this effect. A serosurvey was performed in 2000 in Staten Island, Fairfield County, Connecticut, and Suffolk County, New York, areas where disease outbreak or surveillance had identified the presence of infected mosquitoes, birds, or other animals. Staten Island was the only location with severe cases (10) of the West Nile Virus. Some 871 residents who lived in Staten Island were surveyed; of these, 4 were found to have been infected, which translates to an estimated 1,574 infections throughout the borough. This rate is lower than the 2.6 percent infection rate found in Northern Queens in 1999. The difference may have been due to a less intense outbreak, which could be attributed either to prevailing environmental conditions in SI in 2000, or to the beneficial effects of larviciding, education, clean-up, surveillance, and spraying. Or the difference may have related to the method used to select the sites for the surveys. The 1999 survey focused on a 3-mile area of Northern Queens, where 9 of the identified severe cases of West Nile Virus had originated. Because there was no such concentration in 2000, the samples were taken from the full 56-square-mile borough. In any case, in 2000 NYCDOH undertook a systematic effort to control the virus, including spraying to control adult infected mosquitoes, so

this condition could not be considered to be "No Action." The empirical data from 1999, as discussed with caveats in the EIS, more closely represents a no action condition.

Comment 117: Your reasoning behind the number of cases that would appear if you took a course of No Action (i.e., no pesticide spraying) is unscientific and over inflated. There is no way to gauge that and there is no data as to what your "action" even accomplished, other than hundreds of people sickened, with weakened immune systems, and no where to go or call. Too many doctors are also complicit in denying the effects of pesticides. **Swan**

Response: The reasoning behind the number of cases that could appear should there be no pesticide spraying was based on studies of the population of northern Queens, in 1999, when there was a West Nile Virus outbreak. While a West Nile Virus outbreak is not likely to result in the same rate of infection, hospitalization, or death in all other areas of the city as it did in northern Queens in 1999, such an outbreak could also result in higher rates in some areas of the city. As noted in an earlier response, the danger posed by the threat of illness is real, and for those who experience severe acute symptoms, the long-term consequences often include physical and mental loss of function.

Comment 118: Page 3.C-12: The DEIS states that the fall of 1999 was the closest situation to a no action scenario available for the purposes of analysis. But there are other no action scenarios to consider, such as neighboring states that detected virus but did not react and other nations that had outbreak years followed by years of few or no cases (despite relatively high rates of sero-positivity). Numerous factors contribute to the potential for a human outbreak, including the weather (which the DEIS briefly discusses). Monitoring and surveillance data can help hone predictions of disease severity. Yet this portion of the DEIS assumes the worst disease year is the comparison year when assessing pesticide use, skewing the balance of risk. In a broader discussion elsewhere, however, the DEIS specifically describes adulticide use as being a response to the likelihood of a human outbreak (not assuming a human outbreak will be a risk every year). The DEIS should conduct a separate no action analysis for a low disease incidence year unless there is some definitive guarantee that no adulticide use will be entertained in those years. **Thier**

Response: The EIS presents a very conservative analysis of the health risks from spraying to control adult mosquitoes. It compares this analysis with the potential for a disease outbreak without spraying, relying on empirical data for an estimation of the consequences of such an outbreak. There is no way to be assured that the empirical data from the 1999 outbreak represent a worst case for the disease (data from other areas of the world suggest that it may not be) but NYCDOH considers use of the empirical data, with the caveats already supplied in Chapter 3.C, to be a reasonable way to estimate the consequences of a future outbreak. In answer to the last part of this comment, the proposed plan is to rely on larvicides, education, clean-up, and surveillance for controlling the spread of mosquito-borne disease. Larvicides, education and clean-up are preventive measures, which can be expected to reduce, but not necessarily eliminate adult infected mosquitoes. Surveillance will be used to identify those areas, if any, where the possibility of a human outbreak can be

expected if adult mosquitoes are not controlled. If, using these approaches, NYCDOH determines that the risk for an outbreak of disease in humans is very low, then spraying would not be required.

Comment 119: The projected number of WNV infections, without adult mosquito control (Table 3.C-3) is based on applying the 1999 "hotspot" infection rate in northern Queens to the entire City population. This is a very conservative assumption, but that conservativeness is not mentioned, as is the conservativeness of many of the risk assessment assumptions for adulticiding. When comparing infection rate estimates with adulticiding risk estimates, both should be characterized as conservative or overestimates unless additional reasons are provided to the contrary. **NYSDOH**

Response: In Chapter 3.C, "Public Health," the EIS includes a discussion on how the projected West Nile Infection values were determined. The EIS states that since citywide larviciding actions were not undertaken in 1999, data on the benefits of larviciding could not be included in the assessment of projected illness without the Proposed Action. Therefore, the projection of illnesses and hospitalizations in the Representative Areas may in fact be an overestimation. However, since the scenarios for the project's Representative Areas rely on empirical data that are recent and come from New York City, it is possible, given the experience in Romania, Russia and Israel, where the outbreaks were not identified and dealt with as quickly as in New York City, that the illustrative scenarios could underestimate the extent and severity of the public health consequences associated with no action larviciding and no adulticiding.

Literature Review

Comment 120: The DEIS is misleading in its treatment of inert ingredients. The definition of inerts as "ingredients with no pesticidal activity" is extremely misleading since it ignores synergistic effects which can (and have) cause products to become far more toxic than they appear at first sight. Your report candidly includes information about unwillingness to disclose this information.

"In an effort to obtain information on inert ingredients, NYCDOH formally submitted Federal FOIA (Freedom of Information Act) and State FOIL (Freedom of Information Law) requests to USEPA, NYSDEC, and NYCDOH. In order for these agencies to release such confidential data, the individual registrants must grant approval for the release of their proprietary information. In addition to the FOIA/FOIL requests, NYCDOH met with representatives of the pesticide industry, in an attempt to reach an acceptable agreement on both receiving and disclosing inert information. Ultimately, after several attempts, NYCDOH was unable to obtain all inert information for the purposes of this EIS." (*Executive Summary* S-17)

It is nice that your researchers went to all this trouble, but it is indeed incredible that the report continues as if the fund of information upon which it is based had not been flawed at the outset. It does not in any way hamper their ability to make judgments on the effects of inerts on our water supply, and the following may be admired for being a masterful example of obfuscation.

Chapter 3 discusses the inert ingredients contained in the adulticides evaluated in the DEIS. In most cases the inerts consist of petroleum distillates or white mineral oil.

Mineral oil is included in USEPA's list of minimal risk inert ingredients, which include substances which are ubiquitous in nature and not expected to present a hazard to human health or the environment. The amount that would make its way into the City's waters should not affect water quality or aquatic organisms. (S-61)

It is true that companies are not at present required to reveal the identity of the so-called "inert ingredients" of their products, but no less than 650 chemicals that have been classified as hazardous (21 as carcinogens) by federal, state or international agencies have escaped notice by being listed this way. The "mineral oil" mentioned in your reports sounds innocuous enough. It is usually described, however, as a "petroleum distillate," and we do not know that it is found in Anvil. Scientists have discovered (contrary to the cavalier treatment in you report) that aerosolized petroleum distillates can cause allergic reactions and even a dangerous chemical pneumonia when inhaled. There is evidence that it may be carcinogenic. **Hopkins**

Response: The definition of inert ingredients used in the EIS is consistent with terminology used in describing the constituents of adulticide products. To clarify the role of inert ingredients within adulticide products, the following additional language has been included in the EIS: "Inert ingredients are present in pesticide formulations mainly as a vehicle or dispersant for the active ingredient, and not necessarily for their insecticidal properties; however, these ingredients can and sometimes do possess toxicological properties."

Because information was not available to assess more specifically potential impacts associated with exposures to inert ingredients (either *via* a literature search of health effects and/or through risk assessment), the EIS only presented a qualitative assessment of the likely inert ingredients potentially present in the adulticides. This is a limitation of the EIS with regard to inert ingredients. The goal of this EIS is to help inform the department's decisions in selecting which actions to use in order to obtain the greatest benefit to the general population (*i.e.*, protection from WNV) compared to potential health effects associated with the use of adulticides. Should information on inerts become publicly available, NYCDOH will take such information into account in its future decisions about use of adulticides.

Comment 121: In your executive summary you list stronger issues of illness when exposed to pesticides of the broadcast spray. Some of the inerts (oils) etc. have side effects both short- and long-term that haven't any conclusive evidence that they are safe for our babies, children, the elderly, those in cancer remission, asthmatics, the already chemically sensitive, those with AIDS; 40% or more of the population. Some of the added ingredients, for example PBO, is a possible cancer causing agent. You state it! Supporting Attorney General Spitzer's findings and publication of those findings. Neurological damages. The research is either lacking or inconclusive enough to warrant extreme caution to spray ever again. Asthmatic effects are positive danger, addressing concern in a city with children's asthma's already tipping the scales. **Snow**

Response: The reviewer is correct in stating that the lack of information regarding the inert ingredients is a limitation of the public health assessment. Additional information regarding which ingredients are present in the adulticide formulations would be helpful in providing an even more comprehensive assessment of the potential health

risks associated with exposures to adulticides. As the EIS has made clear, however, information on inert ingredients of each registered adulticide is not publicly available. With this in mind, the goal of this EIS is to help inform the department's decisions in selecting which actions to use in order to obtain the greatest benefit to the general population (*i.e.*, protection from WNV) compared to potential health effects associated with the use of adulticides. As mentioned above, should information on inerts become publicly available, NYCDOH will take such information into account in its future decisions about use of adulticides.

Comment 122: There is a paper by the EPA where an official sites a strong concern that DEET combined with pyrethroid chemicals creates a third more toxic chemical. This paper even cites the possibility that the soldiers sick during the Gulf War may have been made sick by the common exposure to the DEET they put on their skin and the pyrethroids on their uniforms. Parents have a fear their children may be made sick by the WNV. **Snow**

Response: There is no information available in the published scientific literature regarding such an interaction between DEET and pyrethroids. Therefore, this was not discussed in the EIS. The literature review conducted for this EIS did not reveal a paper such as the one referred to by this commentor. Furthermore, it was beyond the scope of this EIS to evaluate potential interactions between the insecticides considered, and the myriad of other chemicals to which the public may be exposed.

Comment 123: The data and science used in the DEIS dismisses the wealth of research data by non-chemical industry researchers. **Buchwald**

Response: The literature search performed for the EIS on potential public health issues associated with exposure to the active ingredients in the adulticides did not make any distinction whether the information was from chemical-industry researchers or non-chemical industry researchers. A literature search was conducted to assess potential human and animal effects of pesticide exposure based on peer-reviewed published articles as well as government documents by scientists in industry, academia, health practices and government. This literature search was performed in three major databases using the DIALOG information retrieval service. Two databases—MedLine and ToxLine—from the National Library of Medicine (NLM) were included in the DIALOG searches. NLM contains abstracts for thousands of scientific and medical publications. MedLine covers the medical and public health journals (including, among others, Journal of the American Medical Association, the New England Journal of Medicine, the CDC's Morbidity and Mortality Weekly Report (MMWR), Environmental Health Perspectives, Environmental Research, the Journal of Occupational and Environmental Health, and the American Journal of Epidemiology). ToxLine surveys broader toxicology literature, including some conference proceedings and international toxicology guidance documents. These two databases offer extensive toxicological and health information on chemicals, including the six active ingredients evaluated in the EIS. Additionally, the DIALOG query searched the National Technical Information Service (NTIS) database, which contains Federal government documents and EPA reports. This DIALOG query was performed for all known adulticide active ingredients (malathion, naled, permethrin, resmethrin, sumithrin, and piperonyl butoxide), the general categories of inert

ingredients found in the adulticide products considered in this EIS, and all possible health effects they might cause. Searches were performed for the active ingredients, because toxicity information is generally reported for active ingredients rather than the products themselves.

The DIALOG literature search included parameters to search all human epidemiological and case-study data resulting from exposure to one or more of the insecticides. Studies of toxicity in whole animals and isolated tissues under experimental conditions were also included in the literature search parameters. From the full list of search results, only those documents relevant to single compound exposures at common daily or occupational levels were reviewed. This excluded some studies (e.g., those examining exposure to multiple adulticides) that were unable to clearly implicate toxicity from the active ingredients under the exposure scenarios expected after spraying. The literature search also almost exclusively covered publications in English, although abstracts that had been translated into English from certain publications in other languages were also reviewed. The resulting body of literature discovered using these methods is comprehensive for all important scientific peer-reviewed literature to date on the six active ingredients and their likely human health effects. More than 500 scientific articles were reviewed regarding the potential health effects associated with exposure to the active ingredients in the adulticides. Approximately 150 of these documents were deemed relevant and are cited in this literature review.

Comment 124: An impact not represented in the DEIS is what happened to the Department of Transportation worker. Last fall he was working on a Brooklyn street when he was sprayed. Although he has no prior history of health problems, he has now been diagnosed with occupational asthma as a result of, quote, direct misting by a truck during West Nile spraying. He was diagnosed and treated by a specialist at the Mt. Sinai Occupational and Environmental Health Clinic. He is a City worker. And yet on page 3.C-31 you write "There are no reports of asthma caused by the pyrethroids considered for use in New York City. There are no data on respiratory effects from chronic exposure to pyrethroids". **Flynn**

Response: The EIS takes into account both reports to the New York City Pesticide Control Center (PCC) of pesticide illness and a review of scientific literature for potential respiratory health effects. Information on individuals who experience adverse health effects are sometimes reported in scientific peer-reviewed literature as case reports. No reports had been submitted to the PCC registry and there had been no case reports to refer to in the literature.

Comment 125: The repeated spraying has a cumulative, multi-generational disruptive impact on all of us. Those particularly vulnerable are the following: infants, children, our children, pregnant women, the elderly, the immuno-compromised like those challenged with cancer and AIDS, those with autoimmune illnesses such as lupus and MS, those suffering from allergies and asthma. NYCDOH provided neither information about the multitude of the ill effects that the spraying would cause, nor supplied us with health care practitioners trained to treat their symptoms. **Barbera**

Response: The *Public Health Characteristics of Proposed Adulticides – Literature Review* section provides health practitioners with information regarding skin and eye

irritation, gastrointestinal distress, respiratory problems (including asthma), immunologic/allergic reactions, multiple chemical sensitivity reactions, acute neurological effects, cognitive developmental disabilities (including autism), endocrine disruption, developmental/reproductive effects (including birth defects), and cancer.

Comment 126: Page 3.C-46: The findings of Thomas et al. study[1] regarding birth defects after malathion spraying for medfly control in San Francisco are misleadingly described as failing to determine that malathion posed a developmental risk in pregnancy. In fact, the authors concluded that even correcting for confounding factors, gastrointestinal abnormalities were higher in infants who were in the second trimester of gestation during the spraying, though, as is the case with most epidemiological studies, the authors state that their findings demonstrate an association but not necessarily causation. But the DEIS inappropriately dismisses the finding of a positive association with malathion spraying, even neglecting to elucidate it.

Developmental effects at certain junctures can occur as a result of doses that do not have an effect at other gestational times. The Thomas et al. finding of a possible window of vulnerability is all the more compelling for this and should have been factored into any conclusion about malathion's possible developmental effects. Instead, the DEIS goes on to cite toxicological findings of adverse reproductive effects from malathion from animal studies and then dismisses them as being at very high doses. With at least one study suggesting an empirical effect in humans (and very few others, period), and toxicological findings that demonstrate a positive effect, it is inappropriate to dismiss this risk. Estimates of risk and doses and exposure levels are all merely that: estimates. For all we know, humans are more sensitive to malathion than study animals, or the effects occur at critical stages that can be lost in larger, averaged analyses or if (in the case of toxicological analyses) dosing does not happen to occur at a key vulnerable time. The Thomas et. al study in combination with suggestive evidence in the toxicological record should have been given considerable weight in this discussion.

There are also several additional studies of malathion's reproductive and development effects not cited in the DEIS that reinforce the potential for adverse effects.[2] **Thier**

Response: The article by Thomas *et al.* (1992) showed an association between 13 gastrointestinal abnormalities and exposure to malathion occurring during the second trimester. Although the association between malathion exposure in the second trimester and gastrointestinal (GI) abnormalities is statistically significant, what is more important is that the association did not appear to be biologically significant. For example, for 4 of the 13 GI abnormalities, the critical time period, when chemical

[1] Thomas, D.C. et al. 1992, Reproductive Outcomes in Relation to Malathion Spraying in the San Francisco Bay Area, 1981-1982. *Epidemiology*. 3:32-29

[2] Comtreras H.R. and E. Bustos-Obregon. 1999. Morphological alterations in mouse testis by a single dose of malathion. *Journal of Experimental Zoology*. 284(3):355-9. see also Balasubramanain, K. et al. 1987. Effect of malathion on the testis of male albino rats. *Medical Science Research*. 15:229-230. see also Wyttenbach, C.R. and S.C. Thompson. 1985. The Effects of the Organophosphate Insecticide malathion on Very Young Chick Embryos; Malformations Detected by Histological Examination. *The American Journal of Anatomy. 174:187-202*.

exposures are most likely to cause abnormalities, is the first trimester, such that exposures occurring in the second trimester are not expected to result in these abnormalities. Consequently, based on biological plausibility, the association between gastrointestinal abnormalities and exposure to malathion during the second trimester may only be relevant for 9 rather than 13 abnormalities.

The referenced Balasubramanain et al article (1987) is from a journal that is no longer published. Contreras and Bustos-Obregon (1999) observed effects on mouse testis and sperm morphology, following a single injection in the abdominal region of 250 mg/kg. This dose is 5 fold greater than a dose at which maternal toxicity is observed. Therefore, this study does not provide good evidence that the mouse testis is preferentially sensitive to malathion, as the effects observed may have been secondary to maternal effects, rather than a direct effect of malathion or its metabolites on the fetus.

Wyttenbach and Thompson (1985) observed malformations in chick embryos following direct injection of malathion into chick eggs at 24, 48, and 72 hours. However, this is not an appropriate exposure route for evaluating effects in humans, because it bypasses both the liver and the placenta, which both play a significant role in detoxification of malathion. Furthermore, in this study severity was not dose-dependent, as would be expected if there were a true relationship between dose and effect.

Based on the deficiencies in these additional studies that are discussed above, they were not considered demonstrative of developmental effects, and thus, were not included in the literature review.

Comment 127: (3.C-50) "Reproductive effects were found in animal tests for every adulticide…" This discussion as others in the DEIS shows a lack of concern for individual risk. **Haavind**

Response: Although reproductive effects were found in animal tests for every adulticide, the doses needed to produce those adverse reproductive effects varied widely. With regard to reproductive toxicity effects in animal tests, the lowest doses causing adverse effects were the following: malathion (1 mg/kg and reduced conception rates), sumithrin (300 mg/kg and birth defects), and resmethrin (500 mg/kg and developmental toxicity in a 3-generation study). The literature suggests that the safest compounds in animal tests based on the doses needed for adverse effects were permethrin (greater than 2,500 mg/kg) and piperonyl butoxide (1,000 mg/kg). With very limited data available for naled it is not possible to determine safe doses of naled at this time. In contrast, each of the doses described in the animal studies summarized here correspond to human exposure levels much greater than those anticipated following the spraying of adulticides for mosquito control. For example, the anticipated exposure to malathion ranges from 0.000013 mg/kg to 0.244 mg/kg. Therefore, no reproductive adverse health effects are expected at the environmental doses following spraying. This expectation is confirmed by the human evidence citing a lack of reproductive harm in people in areas treated with adulticides for mosquito control. For malathion and permethrin, the limited human data from past pest-control efforts suggest that no adverse reproductive or developmental effects should be expected from the anticipated exposure levels of these ingredients.

Comment 128: (3.C. 53) Although resmethrin is recommended in the DEIS, it is noted that the USEPA has not yet evaluated carcinogenicity potential (3.C-54) PBO is linked with malignant tumors in mice and rats. The DEIS glosses over these admissions of lack of data and of implication of data. Health effects in a study of sumithrin exposure are acknowledged (3.C-78), including increased liver and thyroid weight, thyroid changes, increased adrenal gland weights and lesions, but dismissed. The DEIS admits cancer potency factors for sumithrin are not available, (3.C-79) and tables and discussion are missing from the DEIS (Tables 7, 8, 9, 14), indicating the comment period on this Draft needs to be extended. **Haavind**

Response: The EIS evaluated the cancer potential for all of the identified chemicals in the adulticides. In the *Public Health Characteristics of Proposed Adulticides – Literature* Section, a literature review of peer-reviewed medical and public health journals, toxicology literature, and other literature about cancer related to spraying was conducted. In addition, the risk assessment evaluated the potential cancer risks associated with potential malathion and permethrin exposures using USEPA's recommended cancer slope factors and risk modeling and a margin of exposure (MOE) analysis for sumithrin, resmethrin and piperonyl butoxide (see sections *Toxicity Analysis* and *Risk Characterization*). Available data indicates that naled is not associated with cancer. However, exposure levels anticipated as a result of spraying are estimated to have an almost insignificant increased effect on overall cancer rates when compared to cancer rates in the general population (the American Cancer Society has determined that the lifetime probability of developing cancer is 43.5% (0.435, or one chance in 2.3) in men and 38.3% (0.383, or one chance in 2.6) in women). The public health analysis relied on three approaches (literature review, risk assessment, epidemiologic and attributable risk analyses) in determining the significance of the potential adverse impact of the Proposed Action on public health. It should be noted that the EIS combines available information using a weight-of-evidence approach, such as a review of information in the scientific literature, performance of a risk assessment using conservative exposure assumptions, performance an epidemiologic and attributable risk analyses, as well as provides a summary of information from reports received by the NYC Poison Control Registry and NYSDOH Statewide Pesticide Poisoning Registry in determining whether potential adverse public health impacts would be significant. Each of these approaches can provide some of the necessary information required in evaluating these potential effects. Likewise, each has its limitations. However, when these elements are reviewed together, they each contribute to provide a more complete assessment. It should be noted that inherent in each step of a risk analysis are uncertainties that ultimately affect the final risk estimates. Uncertainties may exist in numerous areas, including environmental sampling data, derivation of toxicity values, and estimation of potential site exposures. However, where these uncertainties exist in the EIS, conservative (i.e., health-protective) inputs or approaches were generally used so that potential risks would be overestimated.

Comment 129: From the official New York City Chem-bio Handbook, signed by Mayor Giuliani himself: exposure to malathion can cause, headache, nausea, vomiting, cramps, weakness, blurred vision, pin-point pupils, tightness in the chest, labored breathing,

nervousness, sweating, watery eyes, drooling or frothing of the mouth and nose, muscle spasms and coma.

Malathion is: a "suspected cardiovascular or blood toxicant," according to NIOSH; Not suspected, but apparently confirmed "gastrointestinal or liver toxicant," again according to NIOSH. The EPA and the United Nations considered it as a neurotoxicant. It's also a respiratory toxicant, a skin or sense organ toxicant, and, of course, an inhibitor of cholinesterase. That's according to the International Program on Chemical Safety. Excessive exposure limits may result in death. Again, that's according to the United Nations study. It's pretty remarkable to me that something like this would be considered. **Dolack**

Response: As with all chemicals, the biological response to pesticide exposure depends on the magnitude of the exposure. While it is true that adverse health effects of malathion can be severe, such effects are only seen following exposure to very high levels of malathion, such as would occur following accidental exposure to or intentional ingestion of large quantities of malathion. However, for many chemicals, including malathion and the other adulticides evaluated in this EIS, there are exposure levels that can be considered to pose insignificant risk. The purpose of this EIS was to compare expected exposures of the public to these exposure levels to determine the likelihood that adverse health effects would occur following exposure to malathion. The EIS determined that exposure levels expected as a result of malathion spraying for WNV control are substantially lower than the levels associated with the adverse effects listed by this commentor.

Comment 130: Section 3.C-9 lists potential public health effects of insecticides. It enumerates 10 issues but neglects to mention high blood pressure, a known symptom of exposure. In addition, the DEIS in the Public Health section admits lack of data concerning immunologic reactions, multiple chemical sensitivity reactions,[3] and many other areas including asthma, lack complete data. Tables are missing as well in this chapter (Public Health). Perhaps political pressures to issue a DEIS are to blame, but in the absence of data, it seems the conclusions are mere assumptions. **Haavind**

Response: The 10 public health effects discussed in the EIS were selected by NYCDOH because they were either the most likely to occur following exposure to insecticides, or the most voiced concerns by the general public. Cardiovascular effects are only known to occur following exceedingly high exposures to some of the organophosphate insecticides, and are not expected due to environmental exposures to low levels of insecticides. The EIS contains all the referenced tables.

Comment 131: Page 3.C-34: The DEIS cites only one negative study regarding pyrethroid effects on the immune system. Other studies, however, have found an effect and should be reviewed before concluding, as the DEIS does, that pyrethroids in general do not affect the immune system.[4] **Thier**

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[3] Some medical professionals believe intermittent chemical exposures may produce sensitivities.

[4] Santoni, G. et al. 1999. Alternations in T cell distribution and functions in prenatally cypermethrin-exposed rats; possible involvement of catecholamines. *Toxicology*. 138:175-187. see also Santoni, G. et al. 1998. Cypermethrin-induced alteration of thyomocyte distribution and functions in prenatally-exposed rats. Toxicology. 125:67-78. Santoni, G. et al. 1997. Prenatal exposure to cypermethrin modulates rat NK cell

Response: The papers cited by the commentor describe immunotoxicologic animal studies on one particular synthetic pyrethroid (cypermethrin), which will not be used as an adulticide in New York City. Unlike the pyrethroids discussed in this EIS, cypermethrin does not break down at all in sunlight and is not typically used for adult mosquito control on a community scale basis. Based on toxicity values reported by the USEPA, as well as in the scientific literature, the pyrethroids discussed in this EIS (permethrin, resmethrin, and sumithrin) are considered less toxic to mammals than cypermethrin. The EIS cites seven primary studies and three secondary papers describing immunological effects attributable to the particular pyrethroids discussed in this EIS. The data from these studies are inconclusive as to what effects, if any, permethrin, resmethrin, and sumithrin may have on the immune system and illness rates in humans or animals.

Comment 132: The DEIS omits important facts relevant to the dangers of the pesticide ingredients. Sections 3.C-41 states that there are "no examples or data of neurological effects in humans caused by sumithrin within the literature government." However, the five workers involved in spraying Anvil 10+10, a solution of 10% sumithrin 10% PBO, concerns New York citizens-especially those affected and will be affected by the deleterious effects of the pesticide. **Kupferman**

Response: Based on the extensive literature in the *Probable Impacts of the Proposed Action, Literature Review* Section, no examples or data were located which discuss neurological effects in humans associated with exposure to sumithrin. Incidences as reported by this comment were not noted in any literature reviewed.

Comment 133: To those chemically sensitive, to those who have symptoms of sensitivity some of which you support, (including mental confusion, depression, learning declines, memory loss). This is a serious concern in a city with children having so many learning disabilities already. This is serious in the light of our educational goals, to make our younger population, our future leaders, sick is an awesome, crippling possibility. This alone should make any risk of a relatively mild illness as WNV is at a minimum chance to broadcast spray, when one considers the consequences to our children, let alone, the rest of us. Your statements and broad based statistics on cancer lead us to believe that what was first called by your department safe, you now state you do not know truly if any of these agents is tried and true safe. Cancer, an everyday illness, as you describe it. This is a justification for spraying possible cancer some probable cancer causing agents over all of us. You are part of the all of us. We are all future statistics data. We need to be sensitive to the reality that cancer caused by any of these chemicals, including inerts, PBO, pyrethroids, organophosphates, is very, very poisonous to us all, especially our elderly and our children. **Snow**

These chemicals can cause liver and kidney damage, breast cancer and people who sprayed with them became sick. **Pollock**

Response: Please refer to responses to Comment 94 and Comment 99.

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cytoxic functions. *Toxicology*. 120: 231-242. See also, Desi. I. Et al. 1985. Immunological Investigation of the Effects of a Pesticide; Cypermethrin *Archives of Toxicology*, Supplement 8: 305-309.

Comment 134: We are facing a real epidemic in the United States. However, that epidemic is cancer rather than the West Nile Virus. In recent decades we have experienced a uniform increase in cancer across age groups. Childhood cancer is now the second leading cause of death of children between ages one and fourteen.[5] Pesticides have contributed to this extra risk and our current epidemic.[6] And yet, the Draft EIS contemplates further additional toxins to our already inundated environment, thereby endangering our children. **Lewis**

The material and gas sprayed breaks down into carcinogens which are truly harmful and dangerous. **Pacifici**

Response: Malignant neoplasms (cancers) remain the second leading cause of death of children between ages one and fourteen, accounting for approximately ten percent of all deaths in that age group.[7] This is in accord with the earlier review paper cited.[8] Yet the same paper also notes the limitations of epidemiologic research used to address the causes of childhood cancer. The Children's Cancer Group research asserts a strong association between pesticide exposure and childhood Acute Myeloid Leukemia, one particular form of cancer, without identifying the substance(s), class of pesticide, or level of exposure responsible for the association. Likewise, a different case control study has at best equivocally related childhood brain cancer cases to several forms of high-level pesticide exposure, but is limited by the small sample sizes, potential recall bias, multiple comparisons, and lack of detailed exposure verification of particular substances or classes of pesticides.[9] The Draft EIS demonstrates that the spraying of adulticides at the levels discussed in the EIS constitutes negligible or no additional risk for cancers according to many population exposure scenarios, including children.

Comment 135: Some of these chemicals are proven carcinogens. **Osuna**

Response: The EIS evaluated the cancer potential for all of the identified chemicals in the adulticides. In the *Public Health Characteristics of Proposed Adulticides – Literature* Section, a literature review of peer-reviewed medical and public health journals, toxicology literature, and other literature about cancer related to spraying was conducted. In addition, the risk assessment evaluated the potential cancer risks associated with potential malathion and permethrin exposures using USEPA's cancer slope factor and risk modeling and a margin of exposure (MOE) analysis for sumithrin, resmethrin and piperonyl butoxide (see *Toxicity Analysis* and *Risk*

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[5] LL Robinson, JD Buckley, G. Bunin, "Assessment of environmental and generic factors in the etiology of childhood cancers: The children's cancer group epidemiology program, "*Environmental Health Perspectives* 103: 111-116 (1995).

[6] Davis, JR, Brownson, RC, Garcia RIB, et al. "Family pesticide use and childhood brain cancer." *Arch Environ Contam Toxicol* 24:87-92 (1993).

[7] U.S. National Center for Health Statistics, Vital Statistics of the United States, annual. Deaths by Selected Causes and Selected Characteristics: 1997.

[8] Robison LL, Buckley JD, Bunin G. Assessment of environmental and genetic factors in the etiology of childhood cancers: the Childrens Cancer Group epidemiology program. *Environ Health Perspect* 1995 Sep;103 Suppl 6:111-6.

[9] Davis JR, et al. Family pesticide use and childhood brain cancer. Arch Environ Contam Toxicol 1993 Jan;24(1):87-92.

Characterization sections). Available data indicates that naled is not associated with cancer. The EIS showed that for exposure levels anticipated as a result of spraying for mosquito control, there should be no concern for excess cancer risk.

Comment 136: Page 3.C-117: The DEIS states: "in general, the identity and mechanisms of endocrine disruptors are not well understood at this time. Many researchers and environmental health specialists agree that more laboratory screening and testing are needed on potential endocrine disruptors, including pesticides…" After acknowledging the rudimentary stage of our understanding, the discussion concludes that " in all cases, it is unlikely that insecticide exposure due to spraying would be high enough to be deemed responsible for causing endocrine effects."

Because there is little information about endocrine effects and no testing at this time, there is no basis for making such a conclusion. Furthermore, existing testing protocols may not even detect low-level endocrine effects. The National Toxicology Program is in the midst of a process to examine low-dose endocrine-disrupting effects and dose-response relationships, with an eye to revising testing protocols to account for these. Simple dose-response analyses may not address the mode of action for some endocrine-disrupting effects, and have also been criticized in particular for obscuring reproductive effects.[10] The extremely limited information about endocrine-disrupting properties of all of the chemicals being considered should preclude any judgments about them at this time. **Thier**

Response: The aim of the discussion of endocrine disruption in the literature review was to inform the reader of the current state of the science by describing the hormonal effects research to date on the adulticides. For example, malathion has been seen to interfere with reproduction as described in the section on Development/Reproductive Effects, perhaps by way of endocrine disruption. Only high-dose organophosphate poisoning, generally occurring among under-protected workers, showed clear and significant endocrine disruption effects. A comparison of those poisoning doses to the low doses from pesticide drift and residues suggests that endocrine disruption effects from adulticide spraying are unlikely. However, it is acknowledged in the Endocrine Disruption section that only a few studies were available at the time for review. The uncertainties due to a lack of research on some of the adulticides' ingredients are emphasized in the Summary/Conclusions.

Comment 137: Page 3.C-54: EPA has classified piperonyl butoxide as a possible human carcinogen. The DEIS states that it has no classification. **Thier**

Response: The DEIS stated "Piperonyl butoxide is classified by the International Agency for Research on Cancer (IARC) as a Group 3 carcinogen, indicating it is not classifiable as to its carcinogenic potential in humans," Classifications by IARC are independent of, and often differ from, classifications by the USEPA. Therefore, although the EIS correctly stated that carcinogenicity of piperonyl butoxide is not classifiable according to IARC, the EIS has been revised to state also that USEPA has classified piperonyl butoxide as a Group C – possible human carcinogen, and additional text has been added to the Literature Review section and Risk Assessment section to address this comment.

Comment 138: Anvil speeds up cancer growth. **Snow**

Response: As discussed in the EIS, several studies, using both rats and mice, suggest that sumithrin (the active ingredient in Anvil) causes cancer (i.e., carcinomas and adenomas in the liver) at doses where there is excessive liver toxicity, which are 10-fold greater than doses associated with non-cancer health effects. Therefore, any potential carcinogenicity is not likely to occur at low, environmental exposure levels.

Comment 139: Malathion breaks down into malaoxon and isomalathion, which are far more dangerous than the malathion itself. **Mitchel Cohen**

Response: Many of the toxic effects observed following exposure to malathion are likely due to its breakdown products, which can be formed once malathion has been taken into the body, rather than due to malathion itself. This breakdown of malathion into more toxic metabolites that occurs under normal physiological conditions is accounted for in observations of toxic effect levels. In other words, the health impacts associated with malathion as described in the EIS take these breakdown products into account.

Comment 140: Pyrethroids can cause everything from headaches to seizures in people who are poisoned by large amounts, while the chemically sensitive and immune compromised experience eye, skin, nose, and throat poisoning reactions and breathing difficulties from lung tissue poisoning at doses way below what has been established for the general population. These individuals are hypersensitive and can have seizures from very low doses of poison and repeated doses of poison increase their inability to detox these agents and create serious short- and long-term health risks. I know this from first-hand experience. The City's decisions since 1999 have greatly impaired my ability to function healthfully. **Reilly**

Response: These symptoms describe an illness known as Multiple Chemical Sensitivity (MCS) and the possibility of exacerbating symptoms or causing new cases of MCS was reviewed in our review of the public health literature. Because there are no agreed upon causes or triggers for MCS reactions, it is not possible to determine a cause and effect relationship between adulticide spraying and the health effects described by MCS sufferers. The triggers and causes of MCS merit more research to determine the biological mechanisms of the illness and better means of relief than simple chemical avoidances. However, in the meantime, it is advised that those who feel that they are susceptible to MCS should minimize their adulticide exposure as much as possible.

Comment 141: Page 3.C-26: The asthma discussion section describes numerous studies and mechanisms of pesticides' role in asthma, but misses the information in EPA's *Recognition and Management of Pesticide Poisonings*. The following description of poisoning symptoms is from the chapter on organophosphates: "Bronchospam and bronchorrhea can occur, producing tightness in the chest, wheezing, productive cough and pulmonary edema."[11]

While the DEIS does describe other respiratory effects in relation to organophosphates, the fact that asthmatic reactions are an identified symptom of

[10] Selevan, S. and G.K. Lemasters. 1987. The Dose-Response Fallacy in Human Reproductive Studies of Toxic Exposures. *Journal of Occupational Medicine*. 29(5):451-454.

[11] Reigert, J.R., and J.R. Roberts. 1999. *Recognition and Management of Pesticide Poisonings.* United States Environmental Protection Agency. Washington, D.C. EPA 735-R-98-003.

organophosphate poisoning should have a prominent role in the asthma assessment, particularly because later analysis in the document identifies an increase in hospital visits after spraying, and because the DEIS acknowledges that some direct exposure is unavoidable in such a densely populated area. **Thier**

Response: This commentor is referred to the second paragraph on page 3.C-29, which specifically discusses the occurrence of asthma following exposure to organophosphate insecticides. Exposure levels associated with asthma were either higher or more prolonged than exposures expected from mosquito control in New York City.

Comment 142: Are you aware that pyrethroids have the same effect on the nervous system as DDT? They affect the same sodium ion channels in the same way. Call any neurotoxicologist. If you need the numbers of some, they will be supplied. **Reilly**

Response: It is true that pyrethroids and DDT have a similar mechanism of action with respect to sodium channels. However, DDT is not registered for use in New York State (and has been banned for use in the US since the 1970s), and therefore was not evaluated in this EIS. Furthermore, concern for environmental exposure to DDT is primarily due to the ability of its metabolites to interfere with hormonal and reproductive functions in non-mammalian species. However, both the structure and metabolism of pyrethroids differs significantly from DDT, such that similar hormonal and reproductive effects are not expected in non-mammalian species.

Comment 143: The Draft EIS recklessly presumes safety in the absence of definitive evidence. For example, the Draft EIS notes that, "At this time it is not possible to conclude with certainty what impact, if any, the adulticides might have on the immune system." It similarly notes, "the identity and mechanisms of endocrine disruptors are not well understood at this time." In the absence of certainty, rather than assume that the toxic adulticides will harm at least a small percentage of individuals, the draft assumes that it is safe to spray millions of people. **Lewis**

Malathion and these pesticides suppress our immune system functioning actually making us more susceptible to virus and infection. I am speaking about damage to the organs, genetic damage, disruption to hormones and cancer risk. **Pico**

All the scientific studies documenting the damage to central nervous system and immune system done by the pesticides has not been researched. **W. Krumholz**

Response: The aim of the discussion in the literature review on Immunologic/Allergic effects of adulticides was to inform the reader of the current state of the science by describing research to date on the adulticides. As was the case with the review for Endocrine Disruption, the EIS acknowledged that only a few studies were available at the time for review of the Immunologic/Allergic effects of adulticides. The uncertainties due to a lack of research on some of the adulticides' ingredients are emphasized in the Summary/Conclusions and judgments about safety based on scientific certainty are neither made, nor should they be presumed.

Comment 144: The issue of linkage of breast cancer and pesticides, and the issue of hormone disruption are linked to low levels of exposure; low dose has created reproductive changes; yet the DEIS uses low dose as a justification for low impact. **Haavind**

Response: The aim of the discussion of endocrine disruption in the literature review was to inform the reader of the current state of the science by describing the hormonal effects research to date on the adulticides. There is a great deal of speculation in the scientific community about the possible effects of low dose exposure. At this time, however, there is insufficient evidence in the data available to support the argument for low dose impacts. Only high-dose organophosphate poisoning, generally occurring among under-protected workers, showed clear and significant endocrine disruption effects. A comparison of those poisoning doses to the low doses from pesticide drift and residues does suggest that endocrine disruption effects from adulticide spraying are unlikely. However, it is acknowledged that only a few studies were available at the time for review in the Endocrine Disruption section. The uncertainties of low dose effects due to a lack of research are emphasized in the Summary/Conclusions and judgments about safety based on scientific certainty are not made, nor should they be presumed.

Comment 145: Lung cancer, related to respiratory function, and exposure, needs to be considered in the DEIS. Clearly spraying creates avenues for impact on lung health, and lung cancer is a leading cancer in women now. **Haavind**

Response: The topic of cancer, including lung cancer, has been covered in several sections of the EIS. The commentor is invited to review the following sections: *Respiratory Effects Including Asthma* and *Cancer* Subsections located in the *Public Health Characteristics of Proposed Adulticides – Literature Review* Section as well as the specific inhalation discussions for each of the active ingredients in the *Toxicity Analysis* Subsection found in the *Risk to Public Health from Use of Proposed Insecticides – Risk Assessment* Section.

Comment 146: Page 3.C-32, first full paragraph under "Summary/Conclusion" - Nothing in the literature reviewed in the chapter directly addressed whether application of adulticides in NYC would or would not affect the occurrence of asthma attacks or other respiratory health effects. The only information presented up to this point suggests that, qualitatively, respiratory effects can be elicited by exposure to various active ingredients and inerts under some non-specific exposure scenarios. Relevant asthma dose-response data for pyrethroids (resmethrin plus allethrin; tetramethrin plus either allethrin or pyrethrins) which could at least be considered as reasonable surrogates based on structure activity relationships could be included in the discussion (Salome, et al., 2000; Eur Resp J. 16:38-43). **NYSDOH**

Response: The aim of the discussion of asthma in the literature review was to inform the reader of the current state of the science by describing the research to date only for the specific adulticides in the formulations proposed for use in the DEIS. Therefore, because allethrin and tetramethrin were not constituents of the proposed formulations, they were not included in the literature review. Regarding the review of asthma caused or linked to the specific adulticide ingredients, the discussion is correctly described as qualitative as there are no available dose-response studies to date.

Comment 147: There are several points in the literature review where only a very small number or no literature references were found relating to certain toxicological endpoints such as immunological or neurological effects for malathion and naled. A Medline search could provide additional references. For example, under the discussion of immune effects for malathion in animals, 2 papers (both from 1986) are mentioned. A much more recent paper (Rodgers & Xiong, 1997; Intl Immunopharmacol 19(8):437-41) by the same researchers describes histamine release in rats and mice exposed to malathion. This could have direct relevance to asthma exacerbation since hyper-responsive asthmatic airways are sensitive to histamine. It also appears to be an effect of malathion itself and not any contaminant as suggested in the DEIS. Likewise, searching Medline for the terms malathion, naled or dichlorvos and neurotox* or nerv* resulted in over 70 hits, many of which appeared to be relevant mammalian toxicity studies. Such Medline searches could provide references that would fill in some of the data gaps.

The chapter depends to a large degree on citations of textbooks, material safety data sheets and other secondary reference sources, many of which are 10 or more years old. Some older peer-reviewed literature references are cited, although newer papers are missing in the discussion. Toxicity and exposure data are always rapidly evolving, and an additional effort to include the newer literature would assist in increasing the credibility of the public health analysis. **NYSDOH**

Response: Comment noted. Regarding the general concerns about the thoroughness of the literature search, the literature review was designed to produce results as comprehensive as possible of articles and text references to the various health effects of the adulticides. Three databases – MedLine, ToxLine, and the National Technical Information Service (NTIS) database – produced over 500 citations which were reduced to approximately 150 citations made in the DEIS. Studies were excluded if the exposures involved multiple adulticides which could not clearly implicate toxicity from the active ingredients of the adulticides reviewed in the DEIS. It is also possible that some studies were not included in the query because their doses, measurements of exposure, or exposure routes were not relevant to the urban adulticide application scenarios.

Comment 148: There is a confusing variety of section and sub-section headings (i.e., large all-cap bolded font, small-cap bolded font, mixed-case bolded underscored font, italic underscored font, bolded italic font, italic font). In some places, it is difficult to tell whether one part of the discussion is a sub-section of a previous section or not. For example, on page 3.C-28 the heading “Mechanism of Adulticide Exposure in Asthma Exacerbations” is in bold italic. Based on the font it is on the same section level as “Review of Information” (page 3.C-26), “Organophosphates” (page 3.C-30), “Pyrethroids” (page 3.C-31) etc. That implies that the heading below on page 3.C-28 (“Potential Role of Adulticides on Asthma Prevalence in New York City”) is a sub-head under the “Mechanism...” heading, but that doesn't seem to make sense. Another example is the section beginning on page 3.C-9 with a bolded small-cap heading (“Potential Public Health Characteristics...”) that is nearly exactly repeated in a subsequent bold underscored mixed-case heading on page 3.C-12. The organization of the headings could be made clearer with a numbering system. **NYSDOH**

Response: Appropriate modifications to the levels of headings on pages 3.C-26 through 3.C-30 have been made.

Comment 149: Page 3.C-22, first full paragraph—the sentence that begins "This study suggests that permethrin is relatively non-toxic…" should add the phrase "in this form" after the word "permethrin" to indicate the conclusion from that study is only relevant to permethrin treated clothing. **NYSDOH**

Response: Comment noted. The text has been revised for the FEIS

Comment 150: Page 3.C-26, second full paragraph under Respiratory Effects Including Asthma—The explicit contrast made in the paragraph either is unclear or questionable. First it states a contrast between non-allergic asthmatics and "substances that might elicit such a response". If the intent is to contrast asthma exacerbation triggers of non-allergic asthma with triggers that might be significant in allergic asthma, that is unclear and the examples given are not correct in that instance. Both lists described "non-specific" (i.e. not mediated via an antigen-specific immune mechanism) exacerbation triggers to which both allergic and non-allergic asthmatics may react. The important mechanism that is not mentioned at all is that in allergic asthma (which is the preponderance of prevalent cases), continual exposure to even low levels of allergens promotes airway inflammation that in turn maintains airways in a hyper-responsive condition. Allergen exposure can also be an exacerbation trigger. Nothing in the entire paragraph actually discusses or gives examples of allergen-mediated effects. **NYSDOH**

Response: The text has been modified to address this comment.

Comment 151: Page 3.C-27, first line under "Asthma Morbidity and Mortality"—the word "asthma" should be inserted after "While". **NYSDOH**

Response: The text has been modified to reflect this comment.

Comment 152: Page 3.C-28, first full paragraph under "Potential role of adulticides..."—The sentence that begins "Fenthion, dichlorvos and tetramethrin..." is a non-sequetor with respect to the rest of a paragraph. **NYSDOH**

Response: Comment noted and the text was corrected.

Comment 153: Page 3.C-29, last sentence before the heading "Solvents" – "oleoresin" is a term used to describe complex mixtures derived from plant extracts; it is not a specific chemical compound. Components of oleoresin extracts such as plant proteins may be allergenic and not present in synthetic pyrethroid products. **NYSDOH**

Response: This sentence has been revised. The word chemical has been removed from the sentence.

Comment 154: Page 3.C-29, last line on page—the Antti-Poika study appears to also be an occupational exposure study, but that is not clear from the discussion. **NYSDOH**

Response: Comment noted and the following sentence referencing the Antti-Poika study has been added to the text: "Antti-Poika et al. studied 31 pairs of identical twins including some twins with asthma who had varying solvent exposure because of their different occupational exposures."

Comment 155: Page 3.C-30, first full paragraph—a footnote #1 appears after "no-effect levels"; the number should be #6, and the associated footnote does not appear in the chapter. **NYSDOH**

Response: The text has been modified to reflect this comment.

Comment 156: Page 3.C-31, last paragraph (under Resmethrin, Evidence in Humans)—the paragraph seems contradictory—if Mackison et al., suggested resmethrin exposure could worsen some respiratory diseases, then there has been some observations about resmethrin exposure and human respiratory health. **NYSDOH**

Response: Comment noted. The Mackison reference in fact pertains only to malathion-related gastrointestinal effects, and therefore has been deleted from the paragraph mentioned above.

Comment 157: Page 3.C-32, Inert ingredients section—MSDS information is a poor resource for details of dose-response data. There is literature on respiratory and other effects of human exposure to petroleum distillate fractions that overlap with mixtures such as aromatic petroleum solvent or mineral spirits (e.g., kerosene). Those data could be used as surrogates. **NYSDOH**

Response: Because information was not available for the DEIS to more accurately assess (either *via* a literature search of health effects and/or through risk assessment) potential impacts associated with exposures to inert ingredients, the DEIS only presented a qualitative assessment of the likely inert ingredients potentially present in the adulticides. This is a limitation of the EIS with regard to inert ingredients. With this in mind, the goal of this EIS is to help inform the department's decision in selecting which actions to use in order to obtain the greatest benefit to the general population (*i.e.*, protection from WNV) compared to potential health effects associated with the use of adulticides.

Comment 158: Page 3.C-39, paragraph under "Naled"—The ACGIH TLV documentation on naled describes several studies documenting neurological effects of naled exposure in animals and humans including depressed plasma, RBC and brain acetlycholinesterase activity, intoxication, discomfort and inactivity in lab animals, and cramps, nausea, emesis, hypersecretion, cough, perspiration, anxiety, depression, vertigo, and spontaneous horizontal nystagmus in acutely-exposed humans. **NYSDOH**

Page 3.C-39 states that there are no reports of neurological effects in humans or animals for naled. However, the USEPA Health Effects Division Chapter of the Reregistration Eligibility Decision document for naled (7/13/95) contains a discussion of several neurotoxicity studies conducted in laboratory animals that could be used as a resource for information on this, and other, aspects of naled toxicity. **NYSDOH**

Response: Comment noted. A more detailed discussion regarding the acute neurological effects in humans and rats for naled has been added to the EIS.

Comment 159: Page 3.C-51, paragraph under "Human studies"—The first sentence is missing some information. As it currently reads, it implies that malathion exposure was found to not be the cause of the workers' lymphocyte genetic material. Something about the

effect on the genetic material (e.g., damage to genetic material) needs to be in the sentence. **NYSDOH**

Response: The paragraph has been revised to: "The literature review produced only one study of relevance to the question of human cancers caused by malathion exposure. The one study available found no evidence of genetic damage (i.e. DNA breaks or anomalies) in certain blood cells (lymphocytes) of 14 farm workers occupationally exposed to malathion (van Bao, et al., 1974)."

Comment 160: In several places (e.g., 3.C-38, 3.C-50), the document makes statements about health effects not being expected when the risk assessment required to make such a statement had not yet been completed in the document. **NYSDOH**

Response: These general statements were provided in the document in several locations to put in perspective with everyday life the toxicological data provided in the Public Health effects section.

Comment 161: Cancer and non-cancer risks for dichlorvos should be more fully considered in the document. **NYSDOH**

Response: Although dichlorvos is a breakdown product produced from the degradation of naled, dichlorvos was not one of the active ingredients in the adulticides considered in the DEIS. However, it should be noted that in the derivation of the toxicity criteria, the differing toxicities associated with the primary breakdown product of naled (dichlorvos) as well as naled itself are accounted for in the toxicity tests performed for the active ingredient (and hence the derivation of the toxicity criteria accounts for the presence of naled and dichlorvos).

Comment 162: The DEIS admits lack of knowledge regarding developmental disorder causation, yet dismisses pesticide implication (3.C-43). **Haavind**

Response: The aim of the discussion on Developmental/Reproductive effects of adulticides in the literature review was to inform the reader of the current state of the science by describing research to date on the adulticides. The only two adulticides which have been studied for human developmental effects are malathion and permethrin. Neither adulticide was linked to any poor developmental outcomes in exposed children or mothers. However, it is acknowledged that very few studies were available at the time for a thorough review of possible Developmental/Reproductive effects of adulticides. Therefore, uncertainties due to a lack of research on some of the adulticides' ingredients are emphasized in the Summary/Conclusions.

Comment 163: The DEIS (3.C-45) admits the identity of and mechanism of endocrine disruption is not well understood, and that more study is needed, but dismisses pesticide impacts in the NYC spraying past or future. In 1999 I did experience immediate metabolic effects. I take a supplement for low thyroid but after being sprayed I could not take it for over a week because I felt too hyper. (like the mosquitoes who when sprayed become first more aggressive before dying?). **Haavind**

The DEIS admits that scientific literature indicates that exposure to some of the active ingredients of adulticides, as well as some of the inerts, is associated with neurological effects to humans and animals. Neuropathy is associated with disability

in the cases of agent orange and the socio-economic impact of this is not recognized in the DEIS. I personally know several people who were not able to handle normal work loads for months following the spray, as well as people who experienced depressed immune response, including myself. **Haavind**

Response: The metabolic effects such as aggressive behavior and hyperactivity are typically caused by neurological impairment, not endocrine disruption. The adulticides reviewed in the EIS are effective precisely because of their neurological effects on mosquitoes. According to the literature review, adverse human symptoms of neurological damage were reported only in extreme exposure scenarios such as poisoning attempts and occupational exposure due to inadequate safety equipment or training. Regarding other possible, thyroid-specific effects, sumithrin and malathion both caused physiological changes in the thyroids of laboratory animals that were regarded as important health end-points. The effects were only visible in the animal autopsy (*e.g.* thyroid size and weight anomalies) and not in behavior. For the cited evidence of thyroid effects, please refer to the Toxicity Criteria sections for pyrethroids and organophosphates.

Risk Assessment

Comment 164: Now more is known about the pesticides and their harmful effects. Not enough time has gone by for a cancer epidemic, but it seems obvious that that will occur soon enough, and that any more exposure to these toxins will make more people much more likely to contract this serious disease that we are already at a disproportionate risk for. **Osuna**

Response: The EIS assumed an exposure of 30 years for residents and 25 years for workers. Furthermore, cancer risks were evaluated over a lifetime. For a more detailed discussion of the assessment of cancer risks associated with potential exposures to the adulticides, please see the Risk Characterization, Evaluation of Cancer Risks section. Briefly, carcinogenic risks are characterized as the upper-bound (highest estimated) incremental probability that an individual will develop cancer during his or her lifetime due to chemical exposure. The term "incremental" implies that this risk corresponds to the added probability of cancer above the background cancer risk typically experienced by all individuals in the course of daily life. The American Cancer Society has determined that the lifetime probability of developing cancer is 43.5% (0.435, or one chance in 2.3) in men and 38.3% (0.383, or one chance in 2.6) in women. USEPA has determined an acceptable target risk range of less than 0.000001 (i.e., one in a million) to 0.0001 (i.e., one in ten thousand). The highest estimated cancer risk of 0.00000489 (i.e. roughly 1 in 200,000) is for residents ("child and adult combined" to describe a child who grows up to be an adult during the spraying period) under reasonable maximum exposures to permethrin. Cancer risks associated with exposures to malathion are approximately 10 to 100 times lower than risks associated with permethrin. For example, exposure to malathion by a resident adult (including those belonging to a sensitive population group) who is potentially exposed to malathion under reasonable maximum exposure conditions over a lifetime would have a 0.0000000952—or approximately one in ten million—increased risk of developing cancer. Based on the Risk Assessment, exposures to the

adulticides at levels expected from application for mosquito control indicate no adverse health impacts for all non-cancer public health issues.

For those active ingredients for which a cancer toxicity criteria has not been developed at this time but for which there is some evidence to support a threshold for carcinogenic effects, a margin of exposure (MOE) analysis was used to evaluate cancer risks. This approach is explained in more detail in the MOE Analysis subsection in the Risk Characterization, Margin of Exposure Analysis section in the EIS. In this analysis, to ensure adequate protection for human health, a calculated MOE should be greater than the comparison MOE. The comparison MOE was selected as an additional safety factor to ensure adequate protection for human health. The calculated MOEs (*i.e.*, reference dose divided by exposure dose) for resmethrin and sumithrin are greater than the comparison MOEs for these two chemicals, which indicates that potential exposures to these two chemicals by resident children is low enough not to be of concern. The calculated MOE for PBO (at the highest concentration found in pyrethroid products – 54%), is slightly lower than the comparison MOE. Although this would imply that potential exposures to PBO present in an adulticide product may not be low enough to ensure adequate protection for human health, it is not considered a significant adverse public health impact due to the likelihood of overestimation in the calculations.

Comment 165: There is no epidemic and we (that includes you and your family) are being mass poisoned. Where do you think all these chemical breakdowns go? They go into our atmosphere, are absorbed into our skin and mucous membranes, we swallow them and we breathe them in. We are ecological sponges. **Reilly**

Response: The primary purpose of the proposed *Mosquito-Borne Disease Control Program* is to protect the public from outbreaks of mosquito-borne diseases, such as encephalitis from West Nile virus. It should be emphasized that WNV may result in a serious illness. Recent outbreaks in Russia (40 death and 1,000 diagnosed cases) and Romania (17 deaths and 500 diagnosed cases) indicate that these diseases could have serious health implications for the general population if left unchecked.

Furthermore, based on the literature reviewed, adverse health impacts from potential exposure to adulticides at the levels associated with mosquito control, are not expected for such public health issues as gastrointestinal distress, neurological effects, cognitive developmental disabilities, endocrine disruption and developmental/reproductive effects. At this time, it is not possible to determine solely from the literature the potential effects of the adulticides on the immune system and MCS reactions. However, based on the Risk Assessment, exposures to the adulticides at levels expected from application for mosquito control indicate no adverse health impacts for all non-cancer public health issues.

NYCDOH may need to use adulticides to prevent serious illness and deaths from West Nile virus in future years. The results of this EIS will help inform the department's decisions in selecting which chemical or chemicals to use in adulticiding efforts in order to obtain the greatest benefit for the general population (i.e., protection from WNV) compared to potential health effects associated with the use of adulticides.

Comment 166: What is the danger of everyone turning on their air conditioners? Each time they've sprayed our communities, with the wind blowing from the various boroughs, the pesticides got into those filters. So when you turn on the air conditioner - and there were tests made - there are millions of particles of these chemicals in the air conditioners. **Snow**

I had my neighbor's air conditioner's filter tested. It had 250,000 times more than the average exposure to a normal person. **Santillo**

We didn't get any word from the Department of Health telling people not to turn on their air conditioners this year as the weather warms up. As soon as you turn on the air conditioner, if you haven't changed the filter, you are going to be blasted with all the saturated chemicals from the past year of spraying. That would be a simple thing that the Department of Health could do, should have done. **Mitchel Cohen**

Response: The EIS findings suggest the general public would not need to wash air conditioner filters after adulticide applications. In addition, typical air conditioner filters would only capture larger size particles, and most of the adulticide applications that could drift to the intake of air conditioners would be of finer size, and have a greater likelihood for entering into an apartment or household. Therefore, NYCDOH recommends that the public put air conditioners in the re-circulate mode at times when trucks or aircraft apply adulticides in their area. Nevertheless, as part of general good housekeeping practices unrelated to adulticide spraying, residents may wish to wash the filters of air conditioners at least once a year. Residents are encouraged to consult NYCDOH's website and future notices for the most current recommendations on this issue.

Comment 167: The safety of our lactating mother's breast milk needs to be determined. Mothers have the right to know if their breast milk is best. If inadvertently sprayed or if some of the chemical is absorbed through the skin of a nursing mother, will pesticides be secreted into her infant's only source of food? Mothers need this information in order to choose the safest food for the infant's developing nervous system. **Stiles**

Response: Exposure of infants to the active ingredients *via* consumption of breast milk is an exposure pathway that was evaluated qualitatively. In order to assess the potential for exposure to occur *via* consumption of breast milk, the literature was reviewed for evidence that the active ingredients are found in breast milk, and also considered other factors affecting accumulation of the active ingredients in breast milk. Such factors include rate of absorption from the gastrointestinal tract, rate of metabolism to compounds that are water-soluble and can thus be eliminated *via* the urine, and subsequent elimination rate from the body. In general, chemicals, such as DDT, that tend to accumulate in breast milk, are generally fat soluble, thus facilitating their absorption. Once such chemicals are absorbed, they are not metabolized very rapidly, thus allowing them to accumulate in the body. The potential for the individual active ingredients to accumulate in breast milk is discussed below:

- As discussed in Hayes and Laws (1991), malathion is rapidly metabolized and eliminated from the body, with 92% of malathion eliminated *via* urine and feces

within 24 hours, in rats. Within eight hours following administration, there is no un-metabolized malathion detected in the body, in rats. Therefore it is unexpected that little, if any, malathion would accumulate in the body, including in breast milk.

- Information regarding elimination of naled was not found in the literature reviewed. However, naled is rapidly degraded to dichlorvos, and therefore elimination characteristics of dichlorvos should be similar to those of naled. As with malathion, dichlorvos (and by analogy naled) is rapidly eliminated from the body, and has not been detected in the body, including milk from cows and rats given doses that cause severe poisoning (Hayes and Laws, 1991).
- In rats, permethrin is rapidly metabolized, and almost completely eliminated *via* urine and feces, within a few days following exposure. Furthermore, less than half of 1 percent (0.5%) of an administered dose was excreted *via* breast milk, in four lactating cows (WHO, 1990a).
- Resmethrin is rapidly eliminated from the body *via* the feces, with greater than 50% of an administered dose eliminated within 72 hours in rats (Miyamoto *et al*., 1971). In hens, 90% of an administered dose is eliminated within 24 hours (Christopher *et al*., 1985).
- Sumithrin is rapidly eliminated from the body *via* both the urine and the feces, with 90-100% of an administered dose eliminated within 3 to 7 days, in rats. Therefore, the percentage of an absorbed dose found in the breast milk is likely to be very low.
- Piperonyl butoxide is not absorbed very well from the gastrointestinal tract (and likewise probably not absorbed well either through the skin, or *via* the respiratory tract). Of the small amount absorbed, piperonyl butoxide is rapidly excreted *via* the urine (Hayes and Laws, 1991). Due to its poor absorption, and rapid elimination, piperonyl butoxide is not expected to accumulate in the body, including in breast milk.

In summary, based on a review of the literature, the active ingredients evaluated in this EIS are not likely to be present at significant levels in breast milk. Furthermore, if the active ingredients are present in breast milk, exposures occurring *via* consumption of breast milk are expected to be much lower than exposures occurring *via* other pathways quantified in this EIS (*e.g.*, inhalation, ingestion, dermal contact), which are not associated with health risks that are greater than regulatory limits set forth by USEPA.

Comment 168: The playgrounds and benches and sandboxes that were poisoned in Central Park, why isn't anybody cleaning them up? The gardeners have been worried and the children are playing in sandboxes that were covered with spray. This is avoidable if you don't broadcast spray.

Sand boxes and playground equipment in public places need to be cleaned after each exposure of spraying both larvicides (if sprayed) and adulticides (both on ground and aerial). Why isn’t this procedure including all park benches (the elderly sit here frequently)? Why is this cleanup being overlooked, never worked on or mentioned? In your newest pamphlets you mention the private clean up but never alert parents to

the toxic issues of public playground and park bench clean up you have yet to address. **Snow**

Response: While frequent cleaning of park benches and playgrounds is preferable for reasons not related to the potential presence of adulticide residues, NYCDOH's public health risk analysis made the conservative assumption that the surfaces would not be cleaned. The results of this analysis indicated that there would be no significant public health impacts from children playing in such areas after spraying. It should also be noted that the residues on outdoor surfaces degrade quickly with exposure to the sun and the elements.

Comment 169: You failed to address that ingestion of dust accounts for an estimated seventy percent of infant exposure to pesticides, I think it's much more important to debunk risk assessment with all its supposedly scientific calculations and all those false assurances of safety. **Flynn**

Response: The ingestion of dust by infants is addressed in the risk calculations for child residents (0-6 years old) as the pathway titled "Incidental Ingestion from Hands *via* Surfaces." The risks for this pathway were evaluated for both the average and reasonable maximum exposure using the mean and high-end exposure doses and daily contact with dust. Furthermore, the risk assessment assumes that the indoor dust, is equal in adulticide amounts to the outdoor dust rather than diluted by other sources of interior dust as would normally occur. The risks produced by this combination of conservative assumptions were still negligible (in the of range three in a billion to two in ten million cancer risk.)

Comment 170: Where in the statement does it address the toxicity of the level of pesticides that's left as a residue on grass where children play in playgrounds, on playground equipment, on sidewalks, on air conditioner filters? **Paczkowski**

I do not see addressed the issue of saving our children from the devastating accumulative effect of playing extensively on playground equipment sprayed the night before. It is well known that pesticides themselves and the metabolites are easily absorbed through the skin. **Stiles**

Response: The risks to children exposed to surface residues is detailed in the risk calculations for several distinct populations: Young Child Residents, Children in Schools, Adolescents in Schools, Older Child Park Visitors, and Adolescent Park Visitors. These hypothetical populations of children are evaluated for incidental ingestion from and *via* surfaces and dermal absorption of pesticides on the skin from dust among other pathways. For all pathways, the risks are evaluated for both the average and reasonable maximum exposure using the mean and high-end exposure doses from daily contact with surface dust both indoors and outdoors. The cancer risk summaries for these pathways and populations of children are found in Table 3.C-10 on page 3.C-90 of the report. They are all lower than one in a million.

Comment 171: Concerning two of the *active* ingredients of pesticides under consideration, the report admits that they may be cancer-causing; an "Evaluation of Cancer Risks…describes whether exposure to malathion and permethrin can be associated with a significant increase in cancer health risks." (S-84) It concludes: Although still within acceptable

risk range, the highest risks for all human populations evaluated in this assessment are associated with exposures to permethrin. Cancer risks associated with exposures to malathion are approximately 10 to 100 times lower than risks associated with permethrin. (S-86).

Malathion should not be taken lightly according to a prominent scientist, Philip Landrigan, Director of the Center for Children's Health and the Environment and the Chair of the Department of Community and Preventive Medicine at Mount Sinai School of Medicine.

We should always regard the massive spraying of pesticides in our neighborhood as potentially dangerous. Malathion is an organophosphate pesticide that poisons the nervous system of mosquitoes and other insects. It can also affect the nervous system of people, and acts by inhibiting an enzyme to the brain, acetylcholinesterase.

Malathion is far less toxic than other organophosphate chemicals, such as sarin, the nerve gas, and methyl parathion, the pesticide that the EPA sharply limited…

Yet Malathion employs a similar mode of action to these other chemicals, and it has caused a myriad of nervous system disturbances. Adults who have worked with the chemical have experienced agitation, insomnia, weakness, nervousness, irritability, forgetfulness, confusion and depression.

To make matters worse, malathion- along with many pesticides- may be more harmful to children and, at lower doses, than it is to adults. Children breathe more air per pound of body weight than do adults, and they are more likely to put toys and hands in their mouths than adults are. Both of these factors cause them to be exposed to a greater quantity of chemicals in their environment…

A child's developing nervous system is not well able to repair any structural damage caused by environmental toxins. Thus, if cells in the developing brain are destroyed by chemicals, there is a risk that the resulting dysfunction will be irreversible. The consequences can be loss of intelligence and alteration of normal behavior. (*Newsday* 9/14/99).

Malathion is the first item listed under the rubric, "Nerve Agents" in the official *City of New York Chem-Bio Handbook* (1998) which bears the official seal of New York on its cover, as well as the names of Mayor Rudollph Giuliani, former Police Commissioner Howard Safir and Director of the Mayor's Office of Emergency Management Jerome Hauer. According to this source, the even more toxic breakdown components of malathion are malaoxon and isomalathion. Malaoxon is formed when malathion comes into contact with the human body, even sometimes just through contact with the atmosphere, and- especially- water. According to a study from the University of Vermont at Burlington: "The lesson to be learned from this is we do not want to expose ourselves to chemicals (such as malathion) that can accelerate gene loss in important cells which are protecting us from bacteria, viruses, etc." (*Cancer Research* 1998) Dr. Wayne Sinclair, immunologist, summed it up: "malathion can cause mutations to our human genetic structure that lead to birth defects, immune weakening, genetic damage and childhood leukemia …The bottom line is that although it takes more malathion than other pesticides to cause death, it

takes less malathion than many other pesticides to cause birth defects, immune weakening and genetic damage."

Unfortunately, long-term effects are barely mentioned in the report. As noted above, both malathion and permethrin are admitted to be carcinogenic, but neither the long-term effects of malathion on children's nervous systems nor the synergistic hazards are adequately dealt with. We can only wonder how much objective study came before the conclusion that: "At this time, it is not possible to determine solely from the literature, the potential effects of the adulticides on the immune system and MCS reactions." (S-87). **Hopkins**

Response: Malathion's neurological effects mentioned in this comment are discussed in the EIS, on page 3.C-38. The risk assessment performed for this EIS used child-specific exposure factors for evaluating children's exposures. These child-specific exposure factors account for aspects of children's behavior, such as hand-to-mouth behavior, which result in greater exposures per body weight than for adults. Regarding the toxicity of malaoxon, see response to Comment 139. Regarding the potential for malathion to cause birth defects, immune weakening and genetic damage, such effects have not been documented in humans, nor have they been documented in animals under exposure levels expected due to use of malathion for mosquito control. Long-term effects are addressed by considering exposure over a 30-year period.

Comment 172: The gist of my comments can be summed up by William Ruckelshus, who as EPA Administrator observed: "Risk assessment data can be like the tortured spy, if you torture it long enough, it will tell you anything you want to know" (cited in Wall Street Journal, 1/3/85). **Flynn**

Response: As stated in several locations above, the public health analysis included in this EIS consists in the weight-of-evidence from three different approaches (literature search and review, risk assessment, and epidemiologic and attributable risk analyses). Each of these approaches can provide some of the necessary information required in evaluating these potential effects. Likewise, each has its limitations. However, considered together, the three approaches provide a more complete assessment than does risk assessment alone.

Comment 173: On page 3.C-62 of the Draft and in Table 3.C-6 we learn that deposition values are calculated on the basis of an average deposition on surfaces within three hundred feet of the source. On this basis it is calculated that malathion, for example, will be deposited at a maximum rate of two one hundred thousandths of a milligram per square centimeter on surfaces, which works out to about 2 micrograms over the surface of an apple. But I can tell you that actual deposition rates near the spray trucks are vastly higher than this average. Fifteen feet from the trucks, as I observed, there is nothing approaching complete dispersion of the spray. On the contrary, clouds of pesticides drift and soak what is in their paths before dispersing. As a result, there will be apples coated with tens and hundreds of micrograms of pesticide after the truck passes by. And individuals are exposed to far higher levels than the comforting small average figure that's reported in the Environmental Impact Statement. Likewise, direct exposure levels of individuals close to the source will be much higher than the reported average figures. Such individuals, who may be liable

to acute toxic reactions, are invisible in the report because it deals only in spatial averages. **Logan**

Response: As discussed on page 3.C-61, the modeled air concentrations included conservative assumptions to account for exposure to lingering clouds of adulticide drift within 25 feet of spraying as well its eventual dispersion and deposition. The possibility of acute exposure from spraying is real, particularly if advisories to avoid the application areas on the day of spraying are not heeded. The different distances from spraying were selected as appropriate exposure approximations for the areas in which most residents would spend their time. The maximum airborne concentrations were used for assessing acute and short-term effects and only used the averages for long term, chronic exposure, assuming individuals would contact both areas higher and lower than the average over time. The deposition of adulticides on fruit and vegetable stands are also addressed in the EIS.

Comment 174: The long-term public health impacts are not considered in this statement. **Treichler**

Long-term effects, such as heart problems, cancer, genetic consequences—pesticides create genetic changes in children who are exposed, and they have been found in the uteruses in the surrounding area, fetuses – have not been addressed. **Haavind**

Response: Please see responses to Comment 104 and 164.

Comment 175: The report claims paucity of data for the other pesticides under consideration at this time. As with the lack of information on inerts, the report equates a lack of data with lack of toxicity and comes up with the conclusion that "Carcinogenic risks characterized for the human populations described above [*i.e.*, child and adult resident, workers, homeless people, school children and teacher, and park visitors and community gardeners (*sic*)] are within or below the USEPA-determined acceptable target risk of less than 0.0000001 to 0.0001." It states that, "Uncertainties in this public health risk assessment exist in numerous areas, including derivation of toxicity values, and estimation of potential exposures to adulticides by human populations." It asserts: "Overall, despite the inherent uncertainties associated with this public health risk assessment, the risk estimates calculated in this assessment are conservative, and are likely to over-predict actual risks." (S-86) This is no less than an amazing statement, considering the way authoritative sources have been ignored, the way absence of information has included in statistics, and the way significant issues have been trivialized in the document under review. **Hopkins**

Response: Although there are uncertainties in this risk assessment, as noted on page 3.C-95 of the EIS, conservative inputs or approaches were generally used where there were uncertainties. Use of these conservative inputs and approaches would likely overestimate actual risks.

Comment 176: The DEIS arrives at many definitive judgments, concluding overall that: "…exposures to the adulticides at levels expected from application for mosquito control indicate no adverse health impacts for all non –cancer public health issues," (elsewhere skin and eye irritations are noted as inevitable). These statements are based on health effects data that the DEIS repeatedly acknowledges are thin at best – non-existent in some cases – and which, in the more detailed discussions, it states are

insufficient for drawing conclusions. The lack of information extends even to the identity of the chemicals themselves. The products' inert ingredients, for example, were not available. Although the analysis makes assumptions about what these inerts might be, there is not way of knowing whether these assumptions are accurate. **Thier**

Response: Please see responses to Comment 99, Comment 100 and Comment 120.

Comment 177: The analysis of long-term pesticide exposure is calculated by accumulating a series of hypothetical average exposures experienced over the duration of the spray season and then averaging over that period. For cancer risk the averaging period is an entire human lifetime. And in this way they computed an average exposure level. But this analysis completely fails to capture the effect of peak levels of exposure which may be far more relevant for individuals unfortunate enough to be on the street, unprotected, when spraying takes place. Acute episodic exposures to a thousand times the seasonal average level of the toxic chemical can be far more harmful or far less harmful than continuous exposure to a much smaller background amount. It is a dangerous assumption to blindly equate the two, which is what's done in the report. **Logan**

Response: Acute exposures to the insecticides are evaluated using risk-based-concentrations, which compared a "safe" risk-based exposure concentration to estimated exposures occurring within 24 hours of spraying. Thus, this EIS does not equate long-term exposures with short-term exposures, but rather evaluates them separately.

Comment 178: The authors of this report mention that no human toxicity data are available for a single one of the pesticides under consideration. So they cite the available animal data instead. And to be conservative they add an extra factor of ten to allow for possible differences between species. But in actuality there is no way to choose an appropriate factor of this kind. As most of you know the sedative Thalidomide, which caused such dreadful malformations in the babies of women who took the drug while pregnant, is completely harmless to rats, including pregnant rats. Elaborate quantitative models like those used in the study can give an appearance of certainty and a dangerous illusion of balanced risks where prudence requires that we admit how much we don't know and act accordingly. **Logan**

Response: It should be noted that the USEPA has determined, based on its protocol, whether an uncertainty factor (which can also be considered as a safety factor) of 10 is appropriate to allow for possible differences between species. This determination was not made by NYCDOH. It should also be noted that several other "safety factors" are included in the derivation of the toxicity criteria to account for differences within a specific population (e.g., variability in sensitivity in humans), such as the use of a short term study to derive toxicity criteria, or the use of a lowest-observed-adverse-effect-level (LOAEL) to estimate a no-observed-adverse-effect-level (NOAEL). Typically, the most sensitive response determined in animal studies is used to develop toxicity criteria. These sensitive responses can be measured (e.g., by change in enzyme level in blood) but may not be observable (as opposed to a gross abnormality associated with exposures to a chemical). The net effect of these procedures is that the total safety or uncertainty factor for a chemical can be as high as 10,000 times lower than the NOAEL to ensure adequate protection of the human population, including sensitive individuals (e.g., pregnant women, developing

fetuses, the elderly, the chronically sick). For example, the subchronic and chronic oral RfD for malathion is based on a chronic 24-month study in which rats were fed diets containing malathion. Diets contained either 0, 50, 100, 500, 600 or 1200 ppm (parts per million) malathion. A no-observed-adverse-effect level (NOAEL) of 50 ppm (2.4 mg/kg-day or 2.4 milligram malathion per rat body weight per day) was identified, based on the absence of inhibition of blood enzyme activity. A total uncertainty factor (UF) of 100 (based on a 10-fold UF for extrapolating from animal dose-response data to human response and a 10-fold UF to account for variability in sensitivity within the human population) was applied to the NOAEL. *This results in a USEPA-recommended sub-chronic and chronic reference dose (RfD) of 0.024 mg/kg-day*. In another example, the USEPA recommends the use of an oral RfD of 0.03 mg/kg-day as the level at which resmethrin is not likely to cause adverse health effects. This value is based on a three-generation study in rats in which pup weight and viability were lowered at levels of 25 mg/kg-day. A NOAEL was not established from this study because this level was the lowest dose tested. A total UF of 1000 was applied in the RfD calculation (based on a 10-fold UF for extrapolating from animal dose-response data to human response, a 10-fold UF for variability in sensitivity within the human population, and a 10-fold UF to account the lack of a definitive NOAEL value). *This results in a USEPA-recommended chronic reference dose (RfD) of 0.03 mg/kg-day (USEPA rounded up the 0.025 to 0.03 mg/kg-day).*

It is true that animal models may not always be appropriate in determining whether a chemical exposure would or would not elicit a health response in humans based on animal test data. As the reviewer reports, the use of thalidomide by pregnant women is one such example (it should be noted that doses of thalidomide were massive when compared to a potential environmental exposure to a chemical, such as exposure to an adulticide). Arsenic exposure is another such example. There are no good animal models to predict the cancer potency of arsenic; and yet arsenic is known to cause skin and other cancers in humans. This observation was made from analysis of exposure data in humans. Conversely, the federal FDA determined that saccharin causes cancer in laboratory animals (rats) fed massive daily doses (approximately 800 times what would normally be consumed). Only recently has the cancer mechanism for saccharin been elucidated (rats fed massive doses of saccharin developed crystals in their kidneys which elicited a tumor response). Under normal feeding conditions (and not super saturation), saccharin has not proven to be carcinogenic in animals or humans. Based on these results, USEPA has withdrawn the carcinogenic classification for saccharin.

Comment 179: Limited information and yawning data gaps become even more problematic when used in quantitative exposure, toxicity and risk calculations. Exposure and risk estimates that appear precise (by virtue of extending out to 8, 9 and even 10 significant digits, for example), belie the myriad of assumptions and modeling used to generate them. This is not a shortcoming unique to this DEIS; it plagues all risk assessment. But in a document that needs to guide very practical decision-making, the use of numerical estimates that stem from a cascade of uncertainties (different decisions at each step can tip the conclusions of the analysis in any number of directions), should not be represented as precise in a way they can never be.

That does not mean that there is no place for these kinds of analysis because there is no place for these kinds of analysis on assisting with judgments. They are useful for relative comparisons, as when certain of the risks for naled appeared higher than for the other pesticides under consideration, or when glaring figures point the way to effects that need immediate attention. But the foundation for the DEIS analysis should remain qualitative: a discussion of what we do and do not know from the literature and toxicological studies, a synthesis that does not impart a quantitative gloss to the findings, and a greater reticence to reach conclusions for which there is so little grounding. The language of the conclusions should match that of the analysis and not overstate what cannot be known at present. **Thier**

Response: Please see responses to Comment 94 and Comment 100.

Comment 180: All of the organic gardens in New York got poisoned. My friends grow organic food on their roofs in gardens. They're gone. Many of us eat organic food to help give us a better quality of life. We have lost our quality of life in New York since the spraying has started. **Miller**

Response: Utilizing standard scientific methods and tools, the potential for the public to experience adverse effects from food exposed to adulticides was addressed. It was assumed that fruits and vegetables were located on food stands adjacent to the street, and a spray truck came down the street applying pesticides which deposited onto the exposed fruits and vegetables. It was then assumed that these fruits and vegetables would not be washed prior to eating, and over 3 pounds of such fruits and vegetables would be consumed daily by each member of the public. The results of this simulation indicated that the potential effects on the public from the assumption that the fruits/vegetables are not washed after a spray application, the study indicated that exposures to the public would be from 10,000 to 10,000,000 times less than estimated exposure levels which could result in adverse effects to the public. Regardless of whether spraying occurs or not, it is highly recommended that food be washed before ingestion.

Comment 181: We have to consider all of those exposed to ambient spray, those who were symptomatic but didn't know what hit them, those for whom the impact will after a long latency period surface at a point when the cause and effect determination is impossible to make. **Flynn**

Response: Using the available information in the scientific literature and approaches to evaluate the potential health effects associated with the use of adulticides, the public health analysis in the EIS has demonstrated that among a minority of persons in the general, healthy population, exposure to the adulticides from the Proposed Action evaluated in this EIS could result in minor, short-term, self-limiting symptoms including eye and nose irritation and/or respiratory symptoms. In addition, there is probably a small population of individuals with prior sensitization (e.g. exterminators, gardeners), sensitive individuals (e.g., young children, the elderly, the chronically ill), or those with allergic responses to these ingredients, that may also experience reactions. The probability of long-term non-cancer and cancer health effects were determined to be lower than USEPA target risk goals.

It should be noted that sensitive individuals in the population (*e.g.*, pregnant women, developing fetus, elderly, and chronically ill) are accounted for in this assessment by

using USEPA-derived toxicity criteria. These criteria include safety factors (also known and uncertainty factors) to account for the variability in sensitivity in human populations. These safety factors account for sensitivity of pregnant women, the elderly, and those suffering from chronic illnesses, as well as developing fetuses.

Comment 182: Admitted lack of knowledge regarding pesticide consequences indicates the presence of many uncorrelated health problems that are due to pesticide exposure. The DEIS dismisses animal studies indicating various health problems, and concludes it is not possible to conclude, what impact if any, the adulticides might have on the immune system, although noting "resmethrin did cause a fast and higher than normal immune response in animals." (3.C-35) **Haavind**

Response: Increased toxicological knowledge about the adulticides discussed in the EIS may not strengthen any epidemiologic correlation between adulticide exposures and particular health effects in humans. Also, it may be overly speculative to assign "pesticide exposure" as the default etiology of disease for all cases where there is no other attributable cause, and where there is no supporting exposure data. While evidence of health effects in animal models is often appropriate and essential to the understanding of risks due to exposure, the same evidence does not dictate the magnitude or existence of effects in humans. Data from surrogate species should be accompanied with appropriate caveats and information on physiological, metabolic, and behavioral homologies between species. Two studies gave contradictory evidence of immune responses in animals due to exposure to resmethrin, and at this time it is not possible to extrapolate with certainty from these results what impact, if any, resmethrin might have on the human immune system.

Comment 183: The Draft EIS consistently alleges that, since the concentrations to which people will be exposed by adulticide spraying is less than the concentrations used in studies, there is no serious danger to people. This reasoning is flawed for several reasons. First, simply because existing studies indicate dangers at higher concentrations, does not imply safety at lower concentrations. In fact, often the opposite it true. Lower exposures can sometimes create more danger than higher ones, especially with cancer causing endocrine disruptors. **Lewis**

Response: It is true that effects occurring at low levels can differ qualitatively from effects occurring at high levels. For example, whereas high levels of exposure to benzene for short periods of time cause depression of the central nervous system, prolonged exposure to low levels of benzene can cause serious blood disorders such as aplastic anemia and leukemia. However, for any given effect (*e.g.*, skin and eye irritation, gastrointestinal effects, asthma), the likelihood of observing that effect decreases with decreasing dose. Furthermore, for many chemicals, there is a threshold dose, below which adverse effects are not observed. This is even true for chemicals that act as endocrine disruptors. Although there may be chemicals that can act as endocrine disruptors at very low doses, the observance of endocrine disruption at very high exposure levels does not necessarily imply that endocrine disruption will occur at low environmental exposure levels. For a chemical to act as an endocrine disruptor, it must compete with the body's natural endocrines for binding to endocrine receptors. Luckily, the body's natural endocrines bind with endocrine receptors much more effectively than most chemicals, which may only bind to

endocrine disruptors *in vitro*, at concentrations that are many orders of magnitude greater than environmental concentrations.

Comment 184: Page 3.C-101: The RBC's for acute exposures from malathion and naled were exceeded, meaning that risk is potentially too high. In noting this, the DEIS then states: "However, conservative assumptions are used… Therefore, although the modeled air concentrations for these two active ingredients exceed the RBC's… this calculation is likely to overestimate exposures." The DEIS cannot, on the one hand, give assurances that the conservatism of assumptions will preclude an erroneous finding of no effect, and then, when a finding of adverse effect does emerge, disown that finding based on the conservatism of its assumptions. **Thier**

Response: Because the maximum air concentration for malathion (57 ?g/m^3) is only slightly higher than the risk-based exposure concentration (51 ?g/m^3), adverse health effects due to acute exposures to malathion are not likely to occur due to conservative exposure assumptions. For example, whereas the risk-based exposure concentrations assumed a 24-hour exposure period, they were calculated using toxicity criteria from studies ranging anywhere from 12 days to 3 months in duration (because toxicity criteria were not available for 24-hour exposures). Because toxicity criteria (and consequently RBCs) decrease with increasing exposure durations, use of toxicity criteria from studies with exposure durations greater than 24 hours will likely result in RBCs that are conservative (*i.e.*, lower than necessary to be health protective). Furthermore, RBCs for 24-hour exposures were compared to maximum air concentrations occurring within 1-hour of spraying, which would be greater than the average exposure occurring within 24 hours of spraying. For naled, the maximum air concentration (18 ?g/m^3) is significantly greater than the RBC (1 ?g/m^3), such that there is some potential for adverse effects to occur, even with the use of conservative exposure and toxicity assumptions.

Comment 185: It is not enough to look at only varying doses of a substance in order to determine its potential health effects. Examining the timing and duration of exposure are particularly important in research on reproductive and developmental effects. Critical windows of vulnerability may make a fetus sensitive to small amounts of a substance at critical time-amounts that have no detectable effects at other times. **Lewis**

Response: Because the fetus may be more sensitive than adult animals to toxic effects of many chemicals, studies in which fetuses were exposed *in utero*, during the sensitive period of organogenesis were evaluated. Results from these studies indicate that, for the insecticides evaluated in this EIS, fetuses are not more sensitive than adult animals.

Comment 186: Your efforts to present a balanced risk assessment is pure whitewash. Your real aim is to create, rationalize and enshrine in regulations allowable levels of poisoning. Cancer risks and non- cancer risks are calculated in a routine fashion from a master model in EPA reports. What about looking at the endocrine disruption factors? Respiratory effects? Synergistic effects of how the pesticides interact with other chemicals existing in the New York City Environment? Close up exposure instead of average and distant exposures? When you average out far from the source dangerous numbers seem to be reassuringly small. However, what about the street-side fruit and vegetable stands and outside eateries that get sprayed up close? How would you feel if it was your infant that was bathed in pesticide dust. **Meenan**

Response: Calculations of cancer and non-cancer risks for the EIS are performed in a customary and transparent manner according to peer-reviewed EPA methodology, using conservative estimates of potency factors and upper bound estimates of exposure. Respiratory effects are already encompassed within the cancer and noncancer calculations. Endocrine disruption effects were available at the time of the risk assessment from only a few select studies. Although there has been great interest in identifying aggregate or mixture effects among chemicals, particularly endocrine active chemicals found in environmental media, there is no prevailing methodology on how to quantify or combine effects. The deposition of adulticides on fruit and vegetable stands are also addressed in the EIS.

Risk assessment methodologies for chemical mixtures commonly assume a non-interaction model based on additivity for mixtures of chemicals with similar modes of toxicity.[12] Acute exposure pathways are defined in this EIS as those pathways with exposure durations of less than one day, and include scenarios where individuals are exposed to highly concentrated pesticide drift immediately after application. The uncertainties due to a lack of research on some of the adulticides' ingredients are emphasized in the Summary/Conclusion.

Comment 187: The EIS fails to account for synergistic effects of the multiple ingredients in each pesticide, and of the synergistic effect between the pesticide ingredients and other environmental contaminants. **Lewis**

The data and science used in the DEIS discounts the public health risks resulting from the presence of a mixture of pesticides in the environment. The research bears out that it is not merely the presence of a single pesticide but the neurological systems in the fetus, infants, children and adults. Since NYC holds the dubious distinction of using more pesticides than all other areas in NYS including agricultural areas, the health environment for NYC residents is already greatly compromised. **Buchwald**

Nobody, not doctors, not scientists, not the government, knows the cumulative effects or synergistic effect. **DeCarlo**

Response: As discussed in responses to other comments, limited information is available on synergism. Nonetheless, it is a valid concern and risk assessors are in the early stages of developing the research techniques for examining the effects of chemical mixtures on living organisms. In the current state of the science, however, interactions are simply too complex an issue because the mechanisms of toxicity for many single chemicals are still not fully understood. Therefore, in order to address such uncertainties, the overall approach in the analysis methodology was to prepare high-end estimates of the potential exposure to the public and wildlife in the environment. These procedures were employed in order to address potential unknowns, such as synergistic effects between active ingredients and synergists, from the test data compiled for these analyses.

[12] USEPA. 1999. Risk Assessment Forum: Guidance for conducting Health Risk Assessment of Chemical Mixtures. External Review Draft. Washington, D.C.

Comment 188: Evaluation of Acute Exposures - The method employed (calculating "Risk-based Concentrations") attempts to assess acute effects for all three exposure routes simultaneously. However, combining criteria values to arrive at a single air concentration to compare to an exposure level is not appropriate. To consider all three exposure routes together, for a systemic acute effect, internal doses for each route should be calculated and summed, and that sum would then be compared to an internal-dose criterion for the effect of concern. As an example, by combining the criteria values first, the analysis has generated the result that the Permethrin RBC is above the maximum air concentration. However the permethrin dermal acute RfD (1.5 mg/kg/d) implies an air concentration, based on the values on page 3.C-94, of 18.3 ug/m3 which is below the max air concentration of 22.1. By using a process that combines the three acute exposure routes, the dermal-route effect has been masked by the results of the other two routes. Any combined analysis method that derives a criterion without significant risk for all routes combined should also be without significant risks for each route individually. If the acute effect of concern is not a systemic effect, e.g., respiratory or skin irritancy, then a combined-route analysis is inappropriate and the criterion for each relevant exposure route should be compared with exposure levels independently.

The RBC analysis, as presented is highly dependent on the assumed averaging time for the acute exposure. The choice of 24 hours as an averaging time is questionable, considering that direct airborne exposure to any of the ULV spray applications is not likely to last more than about 30 minutes, and may be significantly shorter than 30 minutes. If the RBCs presented in Table 3.C-13 (page 3.C-95) are each divided by 48 (i.e., AT=0.0208 d), the results of the combined analysis are changed for permethrin, resmethrin and PBO. Many more of the individual-route air concentrations would also exceed the max air concentration comparison values.

Acute respiratory or irritancy effects in the Acute Exposures analysis do not appear to be addressed. Acute criteria values tended to be from sub-acute or sub-chronic animal studies of systemic effects such as enzyme-activity or organ-weight changes. Acute respiratory and skin irritancy data are available for several adulticides and petroleum distillates that could be used to assess these acute exposure concerns on a relevant time scale (i.e., < 30 min). **NYSDOH**

Response: The approach used in the EIS is appropriate and conservative based on the following:

1) The approach is basically a reverse risk calculation. In a forward risk calculation, one estimates the risks for each pathway and sums all three hazard quotients to derive a hazard index for all three acute exposure pathways. In the calculation used in the EIS, the reverse was done (and contrary to the commentator's assumption, the exposures were neither averaged nor were the criteria combined) to arrive at a concentration that would be protective of health under acute exposures. Thus, a conservative approach was employed in the EIS that integrates all three pathways to derive the air concentration that would not be associated with health impacts to the public (i.e., exposure to the lowest air concentration that would not be associated with adverse health effect to the general public via all three pathways combined). (It should be noted that for all exposure routes (ingestion, inhalation, and dermal) the

acute criteria values were based on systemic, rather than point of entry, or non-systemic effects.)

2) The permethrin RBC is correctly calculated in the report (the commentator's RBC value of 18.3 ug/m3 for the dermal pathway was incorrectly calculated; it should be 183 ug/m3 which is still above the max concentration of 22.1 ug/m3). Furthermore, this analysis has shown that there is no significant risk for the combined pathways or the individual pathways (as suggested by the commentator) for sumithrin, permethrin, resmethrin, and PBO. The calculations showed that the maximum concentration for naled would exceed the combined and individual RBCs (the estimated combined RBC is 0.94 ug/m3, whereas the individual RBCs are 2.3, 7.6, and 1.2 ug/m3 for inhalation, ingestion, and dermal contact, respectively, based on the commentator's approach). Using the conservative approach outlined in the report, the combined exposures to malathion via inhalation, dermal contact, and ingestion would result in a RBC that is lower than the maximum modeled air concentration (i.e., potentially associated with adverse effects); even though the RBCs for each of the pathways would be greater than the maximum air concentration for malathion. To summarize, the approach used in the EIS determined the lowest air concentration for an adulticide active ingredient that would not be associated with adverse health effects.

3) It was assumed that the mode of action and target organ is the same for all three pathways (i.e., additivity); a conservative approach in light of the commentator's suggestion of the inappropriateness of the combined-route analysis.

4) The commentator is correct is stating that the RBC calculation is dependent on the averaging time. However, the choice of the averaging time was dictated by the availability of suitable acute toxicity criteria, including the acute toxicity criteria recommended by USEPA. For example, whereas the risk-based exposure concentrations assumed a 24-hour exposure period, they were calculated using toxicity criteria from studies ranging anywhere from 12 days to 3 months in duration (because toxicity criteria were not available for 24-hour exposures). Because toxicity criteria (and consequently RBCs) decrease with increasing exposure durations, use of toxicity criteria from studies with exposure durations greater than 24 hours will likely result in RBCs that are conservative (i.e., lower than necessary to be health protective). It should also be noted that the acute criteria for malathion and naled are those recommended by USEPA (criteria are also based on subacute or subchronic animal studies). As for the other active ingredients, the acute toxicity criteria were based on the use of data from subacute or subchronic animal studies based on exposures most relevant to the pathways assessed in the DEIS. So, the approach used in the DEIS is a conservative and health protective approach.

Comment 189: Page 3.C-94, RBC equation—the right-hand-side denominator is ambiguous; to make the units consistent, the closing square bracket should follow the term (RfC x 24 x CF1) just before the first + sign (instead of being at the far right end of the denominator). To make it clearer the entire term to the right of the first + sign in the denominator should also be in square brackets. Also, the fonts and multiplication symbols are not consistent between the numerator and denominator. **NYSDOH**

Response: Comment noted. The formatting of the equation has been revised.

Comment 190: Page 3.C-94, definition of parameter CF2—it is not obvious from the acute exposures discussion how this deposition-to-air concentration conversion factor is derived. It appears that it must be based on modeling of some sort, but it does not, e.g., follow the air concentration and deposition data provided in Table 3.C-6 (page 3.C-63). It should be explained. **NYSDOH**

Response: The commentator is correct in stating that the conversion factor (CF2) is derived from the air modeling (see section on air modeling). In addition, the acute (short-term) exposures EPCs are based on the maximum *air*-model results at a distance of 25 feet from the spray source during a single application of the adulticides (see Table 3.C-6 on page 3.C-63 under the Acute Exposure EPCs). The CF2 is used with the CF3 (0.0001 m^2/cm^2) conversion factor to convert an air concentration in ?g/m^3 to a surface concentration in mg/cm^2 for the acute exposure relevant pathways (*i.e.*, the skin contact with drift during spraying and incidental ingestion of drift deposited or transferred onto hands).

Comment 191: Page 3.C-95, Table 3.C 13—malathion Acute RfCair should read 0.0001. **NYSDOH**

Response: Comment noted. The text in the EIS has been revised.

Comment 192: The document concludes throughout that the risk analyses are "conservative" However this statement would hold more weight if the exposure point concentrations calculated for environmental media were compared to measured values from available studies of ULV spraying. A table of comparison between the measured values in field studies and the calculated values from the modeling would allow an evaluation of the degree of conservatism in these calculations.

The assessment is heavily reliant upon the outcome of dispersion modeling. Comparisons of the modeled exposure point concentrations to monitoring results would increase the validity of the modeling exercises, and lend credence to the conclusions presented. **NYSDOH**

Response: Monitoring data specific to the scenarios being studied are not readily available to the extent required for a thorough assessment of the impacts from these adulticide releases. The Risk Assessment was conducted using standard USEPA approved models and recommended methodologies for exposure and toxicity analyses to assess the fate of these adulticides and the potential risk to human health.

Comment 193: The maximum air concentrations used for the acute exposure scenario are 1-hour averages, presumably because the ISC model dispersion coefficients used are based on one-hour averaging times. This assumption needs justification, as the exposure time for inhalation (acute) will probably be less than 1 hour. It will only take several minutes for a spray truck to pass a residence and if a 2-mph cross-wind is assumed the resulting pesticide cloud will quickly pass through the receptor location in much less than one-hour. This issue raises some doubt about the conservatism of the air concentrations calculated using one-hour averages. The one-hour average concentration would then greatly underestimate possible short-term (e.g., five minute) inhalation exposure concentrations that a bystander might experience. **NYSDOH**

Response: Please see response to Comment 188.

Comment 194: The exposure scenarios are divided into 3 groups; acute, subchronic and time-weighted chronic exposures. The individual who receives an acute exposure is not assumed (in this document) to also be exposed to the pathways included in the subchronic and chronic assessments. It is reasonable to assume that there may be individuals who are exposed to the spray directly and also to the residues that remain after spraying (the subchronic exposure routes). Therefore, the document should also time-weight the acute exposures and add them to the subchronic and chronic exposures to assess risk. **NYSDOH**

Response: An evaluation of the potential impact associated with an acute exposure (i.e., accidental exposure to adulticide mists during spraying) in addition to chronic exposures to deposited adulticides on surfaces, water, food, and soil has been included at the end of this Chapter. Please see the complete response under the heading ***Time-Weighted Exposures – Response to Comment 194.***

Comment 195: Chronic and subchronic post-deposition exposures are tied to modeled concentrations averaged over 182 days. This approach is not conservative for the short-term exposure periods evaluated. **NYSDOH**

Response: As discussed on page 3.C-61, the modeled air concentrations included conservative assumptions to account for exposure to lingering clouds of adulticide drift within 25 feet of spraying as well its eventual dispersion and deposition. The possibility of acute exposure from spraying is very real, particularly if advisories to avoid the application areas on the day of spraying are not heeded. The different distances from spraying were selected as appropriate exposure approximations for the areas in which most residents would spend their time. Maximum airborne concentrations were used for assessing acute and short-term effects and only used the averages for long term, chronic, exposure, assuming individuals would contact both areas higher and lower than the average over time. Please see response to Comment 188.

Comment 196: The document repeatedly refers to modeled Exposure Point Concentrations as having been "determined"; "estimated" would be a better characterization. **NYSDOH**

Response: Comment noted.

Comment 197: In numerous places in the document, numbers are expressed as decimals. Such presentation makes comparisons more difficult than they would be if numbers were expressed as exponents. **NYSDOH**

Response: In order to make more understandable to the general public who may be unfamiliar with scientific notation, the numbers in the EIS have been expressed as decimals rather than as exponents.

Comment 198: Page 3.A-11 presents modeled air concentrations for the various active ingredients on the basis of one-hour averages. Given the assumed droplet size, deposition would occur in much less time than one hour and actual air concentrations at the time of application could be much greater than the one-hour average. The one-hour average concentration would then greatly underestimate possible short-term (e.g., five minute) inhalation exposure concentrations that a bystander might experience. **NYSDOH**

Response: The ISCST3 model was used to simulate a continuous one-hour release of adulticides, and the deposition and concentration levels for this one-hour release were determined at various distances from the source. Although the shortest time averaging time period of one hour is a limitation of the model, these 1-hour concentrations were conservatively compared to RBC's for 34-hour exposures.

Epidemiologic and Attributable Risk Analyses

Comment 199: How much monitoring of asthma has been conducted? **Haavind**

Response: Asthma surveillance is an on going effort at NYCDOH year round. With respect to the possible impact of pesticide use on asthma exacerbations, NYCDOH is analyzing 2000 asthma data similar to the 1999 data analyses presented for the EIS. While the EIS is complete, NYCDOH is investigating other analytic methodologies to more clearly delineate the potential impact of pesticide use on asthma hospitalizations and public hospital Emergency Department visits for both 1999, 2000 and for 2001should adulticide use be required in the future.

Comment 200: Referring to adulticide use and asthma exacerbation, the report asserts, "However, in some subgroups or boroughs increases were found." How is a community supposed to form an educated opinion based on blind assertions like these? What subgroups? What boroughs? Why is the information not included for the reader to assess? **D'Ermilio**

Response: The scientific literature indicates that persons with existing respiratory conditions such as asthma may experience an exacerbation of symptoms if exposed to pesticides such as pyrethroids or organophosphates. Therefore, the EIS examined the role of exposure to pesticides used in adult mosquito control in increasing asthma hospitalizations or public hospital emergency department and urgent care visits during the 1999 control actions. The data available allowed for examination of this association at the population level but not at the level of the individual. However, despite increases in some subgroups, such increases were not consistent across all boroughs or age groups. In epidemiological research, when such inconsistencies are identified, it is difficult to draw conclusions regarding the association between the use of pesticides in the summer of 1999 and asthma hospitalizations, emergency department and urgent care visits at the population level since these may be chance findings. These issues are explained in the EIS. However, this does not preclude the possibility that exposure to pesticides did not cause exacerbations among certain individuals.

Comment 201: The Draft EIS, for example, first cites evidence of pesticide harms to asthmatics, and then bizarrely concludes, "the application of adulticides is not expected to appreciably increase the occurrence of asthma attacks or other respiratory health effects due to the very low exposure concentrations." No evidence is cited to for this conclusion. **Lewis**

Response: Please see response for Comment 200.

Comment 202: Page 3.C-111 and Page 3.C-116: Increases in asthma rates in some areas were found to be correlated with spray times. This analysis is admittedly a first step. But it is a positive finding and a potentially serious one given the nature of asthma disease patterns and increased incidence and mortality over the past few decades. There is no

basis for limiting the finding to "…a susceptible sub-population who might have a pre-existing sensitization due to prior exposures due to occupation (e.g., exterminators), hobbies (e.g., gardening), or home use of insecticides." Anyone with asthma (and that is a large and unfortunately ever-increasing number of people) may be at risk for a reaction. By referencing sensitized populations this way, the analysis minimizes the findings in a way not indicated by the raw data. **Thier**

Response: Sensitive subpopulations are often considered in this type of analysis since they are those persons who would most likely (if exposed) experience an asthma exacerbation. However, sensitive subpopulations are not necessarily the only populations that might suffer symptoms. Though the analysis indicated that in some instances spraying may have been associated with increased number of visits in September to August 1999 relative to other years, this finding was not consistent among all weeks or months in 1999 relative to prior years. Therefore, the EIS did not conclude that exposure to pesticides used in adult mosquito control increased asthma hospitalizations, ED or urgent care visits at a population level nor was it concluded that these pesticides had no effect again at a population level.

Comment 203: Your spraying has introduced asthma and poisoned individuals' eyes. **Scarcella**

Response: Pesticide use to control adult mosquitoes may cause persons with existing respiratory problems exacerbations of these conditions and cause eye irritation if exposed. In order to reduce the possibility of asthma exacerbations and eye irritation, NYCDOH widely disseminates notifications to the public so that they may avoid direct exposure to the pesticides used against West Nile Virus and possible irritant effects.

Comment 204: (3.C-111) DEIS admits suggested higher asthma rates following spraying, and admits lack of data, re: zip codes and individuals. What about drift factors in asthma? Costs of asthma hospitalizations vs. WNV hospitalizations are compared but ignore chronic incidences for asthma in a preventative, multi-episode spray program. **Haavind**

Response: The analyses showed increases in some subgroups and boroughs. These findings were not consistently found and should therefore be interpreted with caution. Since analyses at the zip code level were not possible for 1999 or at the individual level (i.e., exposed individuals only) only gross population changes can be detected. Therefore, this analysis cannot rule out the possibility that use of adulticides precipitated an increase in asthma or respiratory exacerbations in subgroups of New York City's population. More detailed analyses are planned for 2000.

Though in both the attributable risk analysis and the epidemiologic analysis, the impact of drift was directly assessed, the assumptions in both these analyses assumed that 100% of the population was exposed to adulticides.

In chapter 3.I, "Socioeconomic Conditions," using currently available data on the costs associated with West Nile virus-related hospitalizations and asthma hospitalizations, a comparison was provided on the socioeconomic impacts of these direct medical expenses. It is acknowledged however, that regardless of the type of illness, there are intangible costs associated with becoming ill and these costs cannot be quantified.

Comment 205: It is important to state that an analysis of daily hospital admission data was performed in some boroughs. This analysis was limited by the lack of detailed

information indicating which areas were sprayed on specific days, but is the only analysis that directly addressed the question of whether a temporal relationship existed between adulticide spraying and asthma exacerbation. We suggest adding the following paragraph:

"Since 1999 respiratory (i.e., asthma) admissions were relatively high for some weeks after spraying in the Bronx and Manhattan, daily admissions in those boroughs were tracked. Zip codes were grouped by common spray dates and the daily admissions for these groupings were plotted. The same zip code may have been sprayed multiple times and therefore may be in multiple groupings. The results of this exploratory analysis did not follow a discernable pattern. Admissions for some groupings declined after the spraying, whereas for others there was an increase. As the exact spray areas are not known (i.e., was not conducive to geo-coding), it is difficult to accurately estimate the population at risk. These groupings also had small numbers of admissions, rendering the analysis imprecise." **NYSDOH**

Response: New York State Department of Health participated in performing the asthma analysis. The above paragraph represents an exploratory analysis, the results of which are presented above. It was not included in the text in Chapter 3.C since the daily variability of asthma visits is quite large and would require controlling for other predictors, such as climatic and pollutant variables.

Comment 206: The preliminary results of weekly analyses on ambient pollutants including sulfur dioxide, ozone, and nitrogen dioxide, and weather data such as humidity, temperature, precipitation, and barometric pressure during the study period can be added into the report and help strengthen the results. Since these factors are known confounders for asthma events, these additional analyses can estimate how these variables affected the results. We suggest adding the following paragraph:

"Weekly weather and air pollutant data from 1995 through 1998, for the five boroughs combined, were compared to 1999 data to identify any differences that may partially account for the variations of weekly hospitalizations or ED visits due to respiratory (i.e., asthma) illness. The data were plotted by time for barometric pressure, relative humidity, temperature, total nitrogen oxides, ozone, precipitation and sulfur dioxide. The results were variable from week to week, with no general pattern during the pre- and post-spraying periods for 1999 that could explain the observed hospitalization on data compared to earlier years." **NYSDOH**

Response: Comment noted. The text above has been added to the Epidemiologic Analysis section in the Public Health Chapter of the EIS.

Comment 207: If the analyses from this study were viewed as a first step and no clear conclusion can be made based on the current findings, what is the plan for the next step? It will be helpful to provide more details about the planned analysis of the year 2000 data and how the exposure assessment will be improved by having more information on what areas were sprayed and when. **NYSDOH**

Response: An analysis similar to that performed in 1999 will be performed in 2000. In addition, the NYCDOH in collaboration with the CDC is performing more detailed analyses utilizing the 2000 hospitalization, ED and urgent care visits that will incorporate geographic coding, climatic and pollutant data and certain measures of SES.

Geographic coding is possible using 2000 data since much of the spraying of adulticide was zip code based.

Comment 208: The discussion should also cite as another limitation that the current design does not evaluate whether a specific pesticide may have an effect. **NYSDOH**

Response: The discussion did not evaluate whether a specific pesticide may have an effect since both aerial spraying of malathion and truck spraying of resmethrin occurred in the 1999 spray season. The available data did not allow for an analysis separating out the independent effects of the different pesticides used on the number of asthma exacerbations in this analysis. Since only Anvil (sumithrin) was used in 2000, the 2000 analysis will focus on effects of this product.

Comment 209: Page 3.C-111, under "Conclusions" – In some ways, the conclusions for the epidemiological analysis could really stop after the first sentence of that section; i.e., no conclusions can be made because the results by age group and by location are so variable and the numerous limitations in the study design prevent causal inferences. A conclusion could be suggested that, as a screening analysis, at least there were no extremely large increases in acute exacerbations in 1999 relative to earlier years. Consequently, the second sentence may be more appropriately stated as "asthma hospitalizations and emergency department visits in 1999 did not appear to be greatly higher than those in earlier years when adulticides were not used". Similarly, the final sentence of the first paragraph may be more appropriately stated as "this screening analysis cannot rule out the possibility that the use of adulticides precipitated a small to moderate increase in asthma …". **NYSDOH**

Response: As suggested by the commentor, the asthma study was an ecologic analysis that could be viewed as a screening analysis in the sense that it does not provide etiologic information regarding the variation in asthma hospitalizations seen in 1999 relative to prior years. The second sentence has been changed in the EIS text as suggested above.

Comment 210: The relevance of using prevalence to estimate the attributable risk of asthma hospitalization is not clear. It should either be clarified or removed from the narrative. If prevalence information is indeed somehow used in the attributable risk analysis, then the uncertainty of using a national estimate of 7.4% for all zipcodes except Hunts Point and how that could influence the attributable risk needs to be addressed. **NYSDOH**

Response: Calculation of attributable risk requires the use of a measure such as prevalence to use as a baseline of sorts to determine the proportion of disease that is at least theoretically the result of the exposure which if removed would be eliminated. The EIS examines the impact of adulticide use in five representative areas. These five representative areas were also used to estimate the citywide asthma visits that are attributable to adulticide use. The nationwide estimate of 7.4% put forth by the CDC was used for four of the areas as other prevalence rates were unavailable. The NYC DOH had performed a prevalence survey among children in Hunts Point and therefore was able to use that estimate of prevalence data for the attributable risk analysis.

Comment 211: Attributable risk analysis -- Several limitations in this analysis need to be more thoroughly discussed: 1.) Ambient PM10, as noted, is much different in composition from adulticide aerosols, even if a portion of the adulticide aerosol particles are in the PM10 size range. The adulticides' droplets contain active ingredient in solution in a liquid carrier that would be expected to diffuse into or mix with the airway surfactant and then possibly be absorbed into the circulation. Ambient PM10 particles such as soot or dust particles will presumably have much different fate characteristics in the airways with uptake by macrophages or capture in the muco-cilliary escalator. Are these different mechanisms of airway disposition likely to be comparable in terms of effects on airway hyper-responsiveness? 2.) Time-weighting the adulticide aerosol to a 24-hour average causes a significant decrease in the modeled exposure concentration compared to what may be relevant (inhalation exposure more on the order of minutes). If data to evaluate effects of short-term peak PM10 exposure on asthma are unavailable, that data gap should be acknowledged. 3.) The sensory-nerve irritancy of pyrethroids, the effects of malathion on mast cell degranulation and histamine release, and the mucous-membrane irritancy of petroleum distillates suggest that direct toxicity effects could play an important role in bronchoconstriction with inhalation of the adulticides that is not accounted for in the analysis (i.e., effects other than immune-mediated effects which is the only caveat mentioned in the discussion of the study limitations on page 3.C-115). **NYSDOH**

Response: These limitations are valid, and an additional discussion is provided under the limitations section of the Attributable Risk discussion.

NATURAL RESOURCES

Ecological Risk Assessment

Comment 212: It's an inadequate statement that fails to address the very serious risks that come from spraying nerve poisons on animals that live in this city and the aquatic organisms. There is minimal consideration of those risks and not an adequate consideration of the minimal dangers of the West Nile virus. **Treichler**

Response: Chapter 3.D, Section E, of the EIS evaluates the potential risks to organisms resulting from the application of adulticides for mosquito control. The risk assessments evaluated the potential risks to terrestrial and aquatic organisms that are found within the City using conservative assumptions as well as realistic assumptions that were based on the resources and habitats found within the representative areas.

Comment 213: This long term dispersal of pesticides in the environment that the DEIS finds short lived is itself open to dispute and needs study. **Haavind**

Inadequate attention is given to the environmental consequences of the pesticides and to the chain of impact down the road. **Treichler**

Response: Chapter 3.D, Section F of the EIS examined the risks to natural resources associated with multiple application of the active ingredients in the adulticides examined in the document. Multiple application of sumithrin and PBO, the active ingredients in the adulticide applied by the City in 2000, did not suggest a potential effect on aquatic resources. Potential risks were suggested under certain circumstances for some of the

other active ingredients under multiple application scenarios. However, the window for adulticide application is restricted in both time and space—adulticides would only be applied as necessary during the mosquito season and would not be applied to all target areas at the same time.

Comment 214: Under Aquatic Receptors in Wetlands the statement "Because pyrethroids partition to organic matter, the organic matter contained within CSOs and stormwater sewers should reduce the concentrations of these adulticides available in the water column" raises the question as to the availability of suspended or settled pyrethroid-bound organic matter to benthic filter feeders (bivalves) and barnacles (Balanidae). Does the partitioning of pyrethroids to organic matter (phytoplankton) reduce the toxic effect on filter feeders or mysids that ingest the pyrethroid bound organic matter? **Bourque**

Response: Empirical studies do not suggest that the active ingredients evaluated in the EIS bioaccumulate through being consumed by filter-feeding invertebrates. Furthermore, bacterial decomposition (a degradation route for all of the active ingredients evaluated in the EIS) should result in a decrease in the concentration on particulate matter and algae.

Comment 215: What percentage of the total stormwater runoff into Jamaica Bay is through stormwater sewers that discharge directly in the bay or tidal basins? What is the acreage drained by the direct discharge stormwater drains? Drainage area maps would be useful. **Bourque**

Response: Storm sewers and CSOs essentially drain the entire developed Jamaica Bay watershed. NYCDEP (1995 *Jamaica Bay Comprehensive Watershed Management Plan*) has estimated that approximately 95 million gallons a day of runoff enter the Bay (44.7 million gallons from combined sewer overflows and 50 million gallons a day from stormwater). Approximately 36,700 acres of Brooklyn and Queens drain to the Bay.

Comment 216: According to the statement there is no real residues left from any of the spraying in the water or on the soil. But samples that were taken by a toxicologist, Dr. Robert Simon, five months after the spraying were saturated.

Soil samples were taken from Gracie Mansion. Those soil samples taken four months after the fact were saturated still with the sprayed chemicals. **Mitchel Cohen**

Response: NYCDOH has not been supplied with the reports referenced in the comment. Chapter 3.D and Appendix 3.D-1 of the EIS discuss the physical and chemical characteristics of the adulticides and their persistence in the environment. Chapter 3.F also discusses persistence in the environment and the potential effect on surface water quality. The post-spray water quality sampling conducted by the City suggested that the application methods reduced the introduction of the adulticides to the sampled water bodies. As presented in Appendix 3.D-1, the half-life for sumithrin in soil is approximately 30 days, which suggests that substantial quantities should not remain several months after application.

Comment 217: In Appendix 3.D-1, Ecological Risk and Assessment-Tier I, on page 39 there is the following reference to duck weed (just Lemna minor or all duck weeds?) “Permethrin has also been found to bioaccumualate in duckweed (EXTOXNET), an aquatic, vascular plant, although this does not necessarily mean that the plant is injured.”

There is no further discussion of how much permethrin might bioaccumulate and possible effects upon ducks and coots that feed on duckweed containing permethrin. Duck weed that has bioaccumulated permethrin could also affect many other invertebrates that use it as food or structural support as the following excerpt from the New Field Book of Freshwater Life, Elsie Klots, Putnam; 1966, illustrates.

"An ephydrid fly, Lemnaphila scotlandae, lays its eggs on the upper surface of the tiny fronds, its larvae boring into the thallus and its adults eating out parallel rows across its surface. A rhyncophorus beetle, Tanysphyrus lemnae, also lays its eggs on the upper surface, plugging in the holes with pellets of grass; the emerging larva then mines within the thallus. These two insects are probably obligatory parasites; but Dr. Minna B. Scotland has shown that there are many other species of insects that may lay their eggs in Lemna by chance, the emerging larvae then remaining there to feed. One little pyralid moth, N eocataclysta, makes its case out of the tiny fronds, as does the larva of alimnophilid caddis fly. Snails lay their eggs on them and hydras and planarians browse over their surface." **Bourque**

Response: The potential risks from bioaccumulation of permethrin in duckweed is considered to have been adequately addressed in the EIS. A bioconcentration factor (BCF) is the quotient of the concentration of a substance in tissue divided by the concentration in water. The BCFs reported in EXTOXNET for duckweed ranged from 151 to 2520. Organisms living in the pond on the duckweed will be exposed primarily through eating the duckweed (ingestion) or by direct exposure to the water. Since the bioconcentration into duckweed actually lowers the concentration in the water, and risks due to direct exposure to water were investigated under extremely conservative assumptions, all risks due to direct exposure were addressed. Because quite a bit of dilution has to take place as rainwater runoff washes pesticides into ponds or after pesticide drift mixes with pond water, the risks due to ingestion of duckweed should be less than the effects due to ingesting food that was directly sprayed. Effects of ingesting food through the aquatic food web are already addressed using conservative assumptions and found to be acceptable, so no unacceptable risks due to ingesting duckweed are expected. Since bioconceentration factors for duckweed are in the same general range of those for fish, risks for organisms ingesting duckweed would be in the same range as those report in the EIS for the aquatic based food chain. Although organisms boring into duckweed might be exposed to pesticides through direct exposure of integument to the duckweed tissue, there do not appear to be any data to confirm or quantify this.

Comment 218: Breakdown products of insecticides used are not evaluated sufficiently, in terms of persistence in environment. In addition, Section 3.D-122 notes no information is available regarding breakdown or elimination rates of sumithrin by birds and mammals, an example of DEIS admission of incomplete data. Persistence is minimized. **Haavind**

Response: While breakdown or elimination rates may not be available for all of the active ingredients, as presented in Chapter 3.D of the EIS, toxicological data are available for all of the active ingredients for birds and mammals. These data were used to assess the risks to these two groups, which were found to be minimal. Breakdown products of active ingredients and their toxicological effects are taken into account in

the ecological risk assessment because breakdown is occurring over the duration of the toxicity tests that produced the existing toxicity data. In addition, information on how the active ingredients degrade over time was used in the development of the exposure concentrations used in the risk assessment.

Non-Target Insects and Other Aquatic and Terrestrial Wildlife

Comment 219: This spraying kills birds and fish causing problems in ecological systems. **Abse**

You are poisoning the bees, fish and frogs, polluting the water supply and oceans. You are killing the mosquitoes' natural predators and actually increasing mosquito population. The pesticide spraying is dangerous to health of humans, fish, birds, insects, and polluting our water supply. **W. Krumholz**

Response: The EIS evaluated the potential adverse impacts on bees, and other non-target wildlife. In addition, the EIS identified potential impacts on water supply sources. Potential impacts on predators were evaluated in the analysis of the food chain.

Comment 220: Ward Stone finally addressed his concerns as a bird expert that more and more birds are dying from pesticide poisoning than WNV. **Snow**

Ward Stone's recent admission that a significantly high number of birds are dying from pesticides cannot be ignored. That is our warning bell, ringing loud and clear. It will first show in the environment and work its way through the food chain. Humans cannot ignore the natural environment, the mosquito's natural predators – which are being killed by the pesticides as well (dragonflies for one), as well as the important organisms in our ecosystem (bees, butterflies). **Swan**

The bald eagle that died of pesticide poisoning last week. This is a warning to us. This eagle died in a horrendous way, described as dehydrated with its feathers filthy with its poisoned body fluids, not from WNV but from pesticide poisonings. **Snow**

I do not appreciate you deciding that I am an unavoidable casualty of this grossly overblown nonepidemic when pesticides are what are killing most of the bird population. **Reilly**

Spraying is responsible for the death of innocent birds! **Taylor**

Response: Based on current knowledge, no bird deaths have been directly attributed to the adulticides applied under past actions to control the outbreak of West Nile virus in New York City, nor to the other adulticides considered in the DEIS. Chapter 3.D, section E *Probable Impacts of the Proposed Action* of the DEIS evaluates the ecological risk associated with the application of the active ingredients in the adulticides evaluated in the document. This risk assessment examined the potential risk to birds exposed to the active ingredients through inhalation, preening and ingestion. The results of the Tier I risk assessment suggested there was little risk to birds exposed to the active ingredients through these exposure pathways.

Comment 221: My pet canary became terribly ill, and I'm convinced that the spraying of malathion was his nemesis. Findings from a noted toxicologist confirmed that malathion can remain "for months" upon anything that it comes in contact with – such as air conditioners (or leaves). **Culkin**

Response: Chapter 3.D of the EIS examines the risk to birds exposed to all of the active ingredients, including malathion, through inhalation, preening and ingestion. The results of this Tier I risk assessment (DEIS Chapter 3.D, Section E Probable Impacts of the Proposed Action, starting on page 3.D-107) suggested there was little risks to birds exposed to the active ingredients through these exposure pathways.

Comment 222: Where are the studies of all the birds, all of the tadpoles, all of the dragon flies? How many of them have we lost because they are larger predators of mosquitoes and, therefore, they eat a lot of mosquitoes or half-dead mosquitoes? We have to realize that the food chain exists. We have to question whether now we will ever have effective natural mosquito control. **Stiles**

Why are you not concerned about the die-off of beneficial insects? **Lazarus**

Response: Chapter 3.D, Section F of the EIS addresses indirect effects on insectivorous birds and predatory insects from the loss of mosquitoes as a food source. Empirical studies conducted on indirect effects of malathion (applied at twice the application rate used for mosquito control) on breeding bird populations found no effects of the insecticide on the fledgling success and weights of nesting birds. Studies of flying insects exposed to the adulticides indicate that while there may be an initial decline in the number of flying insects, the population rebounds quickly.

Comment 223: Last summer all insect life was killed. There were no bees or butterflies in my garden. You are killing fish and birds and all the natural predators of mosquito. **M. Krumholz**

And the pesticides also decimate the natural predators of the pests we seek to eliminate. **Lewis**

No Scientific data has been gathered as to the untoward effects in our environment, such as declined numbers of Spring Peepers, swallows and butterflies. **Elakman**

Response: Chapter 3.D of the EIS discusses the potential risks to, and effects on, non-target insects, and the ability of insect populations to rebound following adulticide application. While empirical studies conducted on the active ingredients have recorded an initial decline in some insects, the populations quickly rebound. As discussed in Chapter 3.D, because not all areas of the City are sprayed at the same time and because not all insects in a given area that receives spray will be affected, there should be a sufficient pool of insects from unaffected areas to move into areas that were sprayed. Additionally, Chapter 3.D, Section F of the EIS (*Potential for Adverse Natural Resources Impacts in Representative Areas*) addresses indirect

effects on insectivorous birds and predatory insects from the loss of mosquitoes as a food source. Empirical studies conducted on indirect effects of malathion (applied at twice the application rate used for mosquito control) to breeding bird populations found no effects of the insecticide on the fledgling success and weights of nesting birds. Studies of flying insects exposed to the adulticides indicate that while there may be an initial decline in the number of flying insects, the population quickly rebounds.

Comment 224: Baby squirrels and baby raccoons were found on front lawns the morning after spraying. It is presumed by wildlife rehabilitators that they were thrown by their mothers out of their nests when the helicopters came. **Stiles**

Response: Chapter 3.D, Section F. *Potential for Adverse Natural Resources Impacts in Representative Areas, Potential Related Impacts* page 3.D-161 of the EIS discusses potential effects to natural resources from the process of applying the adulticides, including noise. While there may be some disruption to normal activity patterns due to the movement of trucks and aircraft and the associated noise, the disruption is of a short duration and would not significantly affect the wildlife population.

Comment 225: As far as the water, it's the lobsters are dying, there's lot of fish dying all around the City. And it's due to this pesticide. **Jackson & Meenan**

Section 3.D-151-2 Lobster deaths in Long Island sound are dismissed as due to presence of parasites or low oxygen in high temperature waters, discounting facts of disintegration of pesticide recognized elsewhere in DEIS, regarding Jamaica Bay.

The DEIS in contradiction to the lobster reports in 3.D-15102, finds in Chap. 5-3, Cumulative Impacts, paragraph 2 "The one identified significant adverse impact (i.e., the runoff of malathion in Jamaica Bay and the resultant predicted impact on crustaceans) would also be the only predicted significant adverse impact from both programs.

It should be noted that pyrethroids affect lobsters, "in (Journal of Pesticide Reform/Vol. 10, No. 3) their ability to respond to tactile stimuli, which may affect their survival." This is even at low concentrations. **Haavind**

Response: As presented in Chapter 3.D, Section E of the EIS, pathologists at the University of Connecticut responsible for analyzing lobster samples provided by the Connecticut DEP believe that a combination of low dissolved oxygen and above-average water temperatures may have stressed the lobsters' immune systems, decreasing their ability to fight the paramoebae infection that was found in the tissue samples. Additionally, Hurricane Floyd had caused significant effects on the Long Island Sound system. NOAA, NMFS, the National SeaGrant Program, and the Long Island Sound Lobster Initiative (an endeavor of the New York and Connecticut SeaGrant programs, the Connecticut DEP and NMFS's Northeast Fisheries Science Center) has awarded research grants to determine the causes behind the 1999-2000 winter die-off of the Long Island Sound lobster fishery. This research will investigate many factors on an ecosystem-wide basis including: disease-causing organisms, pesticides, pollution, lobster crowding, water quality conditions (including elevated temperatures and changes in salinity), and environmental conditions such as storm

events. The NYCDOH will review the results of such future studies under the Proposed Action. Jamaica Bay is a very different system from Long Island Sound—it has limited flushing which increases the estimated concentration of the active ingredients and the potential for effects. Because of this, the assessment of potential risk and effects conducted for Jamaica Bay cannot be directly applied to Long Island Sound. Breakdown products of the active ingredients and their toxicological effects are taken into account in the ecological risk assessment because breakdown is occurring over the duration of the toxicity tests that produced the existing toxicity data. The potential effects of the pyrethroid active ingredients on lobsters were evaluated through the use of surrogate crustaceans (crab, mysid, and pink shrimp) and a safety factor to develop a chronic benchmark. This chronic benchmark was used to evaluate non-lethal effects to crustaceans such as the referenced effect to tactile stimuli.

Comment 226: There was a massive fish kill in Clove Lake on Staten Island, which the New York State Department of Environmental Conservation has attributed to the application of the pesticide malathion. **Meenan**

Your previous efforts in this matter resulted in hundreds of fish killed at Clove Lakes Park and other ponds, lobster kills in Long Island Sound, horseshoe crab deaths in Lower NY Bay and many other harmful transgressions. **Scarcella**

Response: Chapter 3.D of the EIS evaluated the potential risk to aquatic resources from the application of the active ingredients contained in the adulticides, one of which was malathion. The results of the risk assessment do suggest a potential risk to aquatic resources from the application of malathion as drift to ponds. The NYCDOH will continue to monitor the effects of the adulticide application program and study available information on the potential environmental consequences related to the proposed action. The adulticide application program will be modified as practicable in response to this information to minimize potential effects to the City's natural resources.

Comment 227: Pesticides are getting into the ecosystem and wreaking havoc with the natural chain of species and potentially creating also a resistant strain of mosquitoes. **Foster**

Response: Chapter 3.D of the EIS evaluates potential risks and impacts to the City's natural resources from the adulticides. Because the adulticides are being applied for adult mosquito control during limited time periods, the potential for developing resistance is reduced. Additionally, different areas are sprayed during each spray event, depending on surveillance data.

Comment 228: In the DEIS you mentioned the ecological effects, but I don't think you have tabulated them, because in my garden, there are no insects, there are no fireflies. When I moved there in '80 there were fireflies. There is nothing there now. In the draft you assume that these insects will move back in. But the plan here is not just in New York City, the plan is to spray the whole east coast, so they're going to have to move in from quite a distance. Then they will be spraying the Midwest. **Haavind**

The DEIS assumes that insect life will return to sprayed (3.D-153) areas. Environmental Advocates has informed me that, for example, fireflies which are gone from my Brooklyn garden since the 1999 spraying, have been on the decline. Multiple assaults of pesticide spray are not going to encourage the return of these and other insects, including dragonflies, Katydids, butterflies, ladybugs and others, from my yard, and instead these pesticides assaults assist the decline of insect populations, a fact not reconciled in the DEIS. I have a small wooded yard and garden behind the Brooklyn Hts. promenade and the area was heavily and repeatedly again sprayed in 1999, but reportedly (not in this zip code? 11201) in 2000. However, as of now, June 2001, the insects have not returned, including the above mentioned: fireflies, etc.

The assumption of insect revival after multiple spray assaults is in error and flies in the face of the fact of increasing endangered species that face multiple assaults, including pesticide applications. The DEIS does not consider the role of pesticide applicants in the context of all the environmental assaults in the cases of the insects. This view of pesticide use in a vacuum is irresponsible. **Haavind**

Response: Chapter 3.D of the EIS discusses the potential risks to, and effects on, non-target insects, and the ability of insect populations to rebound following adulticide application. While empirical studies conducted on the active ingredients have recorded an initial decline in some insects, the populations quickly rebound. As discussed in Chapter 3.D, because not all areas of the City are sprayed at the same time and because not all insects in a given area that receives spray will be affected, there should be a sufficient pool of insects from unaffected areas to move into areas that were sprayed. However, NYCDOH will continue to work with other agencies (e.g., NYSDEC, NYCDPR) and stay informed on observations made by local professionals documenting the presence/absence of such species throughout the City.

Comment 229: Section 3.D-144 discussing risk of West Nile virus to birds and mammals notes: "The application of the active ingredients may produce losses to non-target insects and aquatic organisms, but protect mammals and birds. The relative risks after considering both adverse and any simultaneous beneficial effects are presently not understood." Recent Audubon studies find more birds affected by pesticides, herbicides, and lead than West Nile virus. Admission that adverse effects on birds and mammals are not understood suggests a policy of error on the side of caution in the use of pesticides would be the responsible action. If you do not know the consequences of the action, abstain. **Haavind**

Response: The results of the risks assessment presented in Chapter 3.D of the EIS provide an assessment of the potential adverse effects to birds and mammals. This risk assessment suggests minimal adverse risks to mammals and birds from the active ingredients examined. What is not documented in empirical studies at this time are the potential benefit to mammals and birds. The risk assessment did, however, suggest a potential for adverse risks to some groups of aquatic organisms, as well as to non-target insects. There is still insufficient information concerning potential beneficial effects on birds and mammals due to a decrease in the number of disease-carrying mosquitoes. As presented in Chapter 3.D of the EIS, page 3.D-160, there is little direct information on background levels of the active ingredients evaluated in the EIS in New York City ponds or streams. However, the state-wide evaluation of

water quality conducted by the USGS on public water supply sources did not detect insecticides in the water supplies examined. This suggests that the background concentration of the adulticides in the City should either not be present, or occur only in very low concentrations. Additionally, the City did not generally find sumithrin or PBO in the water bodies at concentrations above the detection limits following the 2000 action, which supports the assumption that background concentrations are low.

Recent Adulticide Experience – Empirical Studies

Comment 230: With the exception the study of honey-bees in Manatee County, Florida, these studies looked at the effects of single adulticide application events. Given the NYCDOH response when human cases of West Nile virus meningoencephalitis occurred in New York City in 2001- multiple adulticide applications with a two-week period in the same community-multiple applications are again likely in the event of a similar human disease outbreak this year and years following. Therefore, the monitoring of the most sensitive invertebrates (HQ well above 1.0 for any particular adulticide) in Jamaica Bay subsequent to the multiple adulticide applications within the bay watershed would be useful in establishing the toxic their effects in this already burdened estuary. **Bourque**

Response: Chapter 3.D of the EIS identifies the potential for significant adverse impacts on aquatic organisms from the application of malathion to the area draining to Jamaica Bay. Therefore, the City will implement a monitoring program to assess the potential effects on the natural resources of Jamaica Bay should malathion be selected as the active ingredient in the adulticide selected for control of mosquito-born diseases.

Comment 231: In your Executive Summary on page 53 you state: "The potential for drift and deposition of adulticides onto ponds would not be expected to have a significant adverse impact to aquatic species in most cases. This finding is supported by the sumithrin and PBO water quality data collected by the City during adulticiding operations undertaken in the year 2000, which generally did not find detectable levels of these active ingredients in ponds following spray events." But we get our hands on a report from the New York State DEC, Division of Wildlife and Marine Resources, that stated: Found fourteen bluegill fish. It's highly probable that bluegills were killed by malathion. **Kupferman**

Response: Chapter 3.D, Sections E and F of the EIS provide a detailed assessment of the potential risks to aquatic organisms in ponds from the application of adulticides under conservative assumptions, as well as those conditions representative of the City's habitats and resources. The results of the risk assessment suggest that sumithrin and PBO should pose little risk to fish and the monitoring data following the application of sumithrin and PBO by the City suggest that application methods minimized the amount of adulticide reaching water bodies. The risk assessment did suggest a potential risk to fish from the application of malathion. The NYCDOH will continue to monitor the environmental consequences resulting from its application of adulticides, as well as the available information on the environmental effects of the adulticides and modify the City's program as practicable to minimize the effects on the City's natural resources.

WATER SUPPLY

Comment 232: Page 3.E-5: last paragraph; sixth sentence. Something is missing in this sentence, I think they omitted "are established" after MCLs. **NYSDOH**

Response: The text has been revised to reflect this comment.

Comment 233: Page 3.E-6: first full paragraph; fourth sentence. The sentence is incorrect, HALs are available for some contaminants for which MCLs have been established, such as toluene, which is cited in the following paragraph on page 3.E-6. **NYSDOH**

Response: The reference in the text refers to malathion as the only active ingredient with a recommended HAL, not all contaminants in the products. As acknowledged in the comment, the following paragraph discusses HALs for potential inerts in the adulticides, such as toluene or xylene.

Comment 234: Page 3.E-6: Next to last paragraph; last sentence. The last sentence is incorrect; these classifications are used to establish discharge levels not drinking water standards. **NYSDOH**

Response: The text has been revised.

Comment 235: Page 3.E-6: last paragraph; first sentence. The sentence is misleading; the paragraph is referencing ambient water quality standards not "water supply standards." The last sentence in the paragraph, on page 3.E-7 is also confusing in its choice of wording. A principal organic chemical standard is related to drinking water not ambient groundwater levels, although the standard may be the same. **NYSDOH**

Response: The text has been revised.

Comment 236: General Comment: A more thorough review should be presented of the applicability of state drinking water standards, particularly the POC and UOC standards. These regulations are as applicable as the federal drinking water standards, which are more thoroughly covered. **NYSDOH**

Response: Additional text has been included with a description of the comparisons of active ingredients and inerts to Unspecified Organic Contaminants and Principal Organic Contaminants standards, respectively.

Comment 237: Page 3.E-13: first paragraph; second sentence. Again the EIS is confusing ambient water quality standards with drinking water standards. While drinking water standards are used to develop the ambient groundwater standard and may be the same they are not interchangeable. However, we do not disagree with the conclusions drawn in this paragraph. **NYSDOH**

Response: Comment noted, and minor changes to the labeling and description of the drinking water standards have been incorporated into the text.

Comment 238: Page 3.E-14: last paragraph; first sentence. This sentence is incorrect, there are NYS drinking water standards for the pyrethroids - they are UOC's for which the drinking water standard is .05 mg/l. **NYSDOH**

Response: Additional text has been provided, further clarifying the comparisons of active ingredient and inert concentrations to applicable standards.

Comment 239: Page 3.E-15: second paragraph; third sentence. Same issues as above regarding "standards for surface drinking water." **NYSDOH**

Response: The text has been revised.

Comment 240: Page 3.E-16: second paragraph. Same issue as above regarding "Drinking water Quality Standard (0.007 mg/l for groundwater)." **NYSDOH**

Response: The text has been modified to reflect this comment.

Comment 241: Page 3.E-16: Pyrethroids Section. Again, it is incorrect to say there are no drinking water standards for these compounds. The NYSDOH UOC standard of .05 mg/l applies. **NYSDOH**

Response: Additional text on the comparison of UOC standards for the active ingredients in pyrethroids has been added to the text.

Comment 242: Page 3.E-17: third full paragraph. Same issue as above regarding differentiation of drinking water quality standards and ambient water quality standards. **NYSDOH**

Response: The text has been modified to reflect this comment.

Comment 243: Page 3.E-17: Air Strippers Section. The same issues identified above are carried through this section. **NYSDOH**

Response: The text has been modified to reflect this comment.

Comment 244: Page 3.E-19: Outside NYC Boundaries Section. The same issues identified above are carried through this section. **NYSDOH**

Response: The text has been modified to reflect this comment.

SOCIOECONOMIC CONDITIONS

Comment 245: People's health, people's health risks are all put in terms of cost effective/risk benefit analysis in terms of money. **Mitchel Cohen**

Response: Chapter 3.I focuses on costs that can be reasonably identified and quantified. However, NYCDOH recognizes that there are non-quantifiable costs related to losing one's health, and in severe cases, life----regardless of whether it is caused by the West Nile virus or by exposure to pesticides.

Comment 246: A lot of this is about the lobsters and what happened to the lobsters in the Long Island Sound, which is an example, if it can happen and go deep within the water and kill forty to sixty million pounds of lobsters the first year, which is almost the whole lobster population. The concern would be that that industry could go down, and this pesticide is spreading from state to state to state. **Snow**

The DEIS doesn't seem to consider the effect on the lobster industry in Long Island Sound. All the lobsters died the first summer spraying occurred. Was out of the scope of the EIS because it was out of New York metro area? **Haavind**

Response: Chapter 3.D, Section E of the EIS discusses the lobster die-off in Long Island Sound and the studies conducted by the Connecticut DEP and the SeaGrant Programs of Connecticut and New York on the causes of the decrease that was brought to the

attention of regulators in 1999. The adulticides applied in 1999 for control of West Nile Virus are not believed to be the primary cause of the lobster die-off. Pathologists at the University of Connecticut responsible for analyzing lobster tissue samples provided by the Connecticut DEP believe that a combination of low dissolved oxygen and above-average water temperatures may have stressed the lobsters' immune systems, decreasing their ability to fight the paramoebae infection that was found in the tissue samples. The NYCDOH will consider the results of additional studies that the SeaGrant Programs have recently awarded when such studies are completed.

Comment 247: The mosquito problem has stifled economic development of our waterfront. The things that most City residents take for granted during the summer, the residents of their communities only dream of. **Gaska**

As a resident of Bayswater, who lives just three blocks from this school, my neighbors and I are forced to endure a summer of indoor activities because of the mosquito problem that prevents us from remaining outdoors for any length of time. I'm seriously considering selling my house because I can't tolerate it anymore. I'll even take a loss. **Love**

The people that live in Edgemere Housing, five thousand people, a beautiful park that we pay for, the City pays for. City and State and Federal elected officials, listen to this. The workers can't even work during mosquito time because they are just bitten so viciously. The residents in those developments cannot use that beautiful park that we paid for because of the mosquitoes. **Colson**

Response: While NYCDOH is enhancing surveillance and reduction of breeding grounds under the *Routine Program*, it is acknowledged that even under the existing programs, there are difficulties in controlling the breeding of such mosquitoes in areas not controlled by the City (and the lack of federal and state approvals to apply larvicides in known breeding areas of aggressive salt marsh mosquitoes). Due to comments received from the public, community organizations and elected officials for the Rockaways (such as those voiced above during the hearings on the EIS), NYCDOH is proposing the *Mosquito Population Control Program in the Rockaways*.

Comment 248: There is also increased evidence that even the destruction of the bees, which is a fairly immediate response, will produce a loss of valuable pollination throughout the agricultural industry. **Doremus**

Response: The information and data supplied in the EIS indicate that adulticides can be very toxic to bees, and the EIS disclosed the potential impacts on such non-target species. In the City of New York, there are no agricultural uses that are solely dependent upon bees for crop or species survival. However, although many plants are pollinated by a variety of insects as well as other factors (e.g., wind), NYCDOH understands that bees are an important non-target resource for the enhancement of plant pollination.

ALTERNATIVES

Comment 249: Stop the spraying and begin to research and use other methods of pest controls that are safe, effective and mostly non-harmful to the citizens. **Seader**

Response: The EIS identified alternative methods of control, and the limitations of such alternatives render them incapable of completely substituting for the Proposed Action.

Comment 250: If done properly, larviciding is a much better alternative. **Mitchel Cohen**

Response: NYCDOH has adopted the *Routine Program*, which is intended to reduce the breeding of mosquitoes through the applications of larvicides. However, such actions would not reduce the adult populations that have already bred and are actively transmitting mosquito-borne viruses.

Comment 251: Why must these alternatives be judged as stand-alone measures instead of as part of a comprehensive program? Why is the exact same phrase used to define their effectiveness? **D'Ermilio**

Response: The EIS identified that some of the alternatives may be considered as additional components to controlling mosquito populations, but none of the alternatives, whether as stand alone alternatives or in conjunction with one another, would substitute for adulticiding. The reference to stand alone alternatives in the EIS was in the context of no other control actions, including the Proposed Action or other alternatives. The EIS noted that for the alternatives considered, "In many cases, they do not provide the flexibility to significantly reduce the adult mosquito population at numerous potential geographic locations in the relatively short period of time after surveillance data indicates a threat to public health. Adulticides can be used to depress adult mosquito populations in targeted areas in an attempt to significantly reduce the number of infected adult mosquitoes, break the virus cycle of transmission and, therefore, reduce the potential for a public health threat." This important aspect of any future control action proposed by NYCDOH was referred to directly or indirectly in the alternative section, because if alternatives (as stand alone or combined with other non-adulticiding control methods) did not fulfill these critical criteria, they would not be able to effectively protect the public health from mosquito-borne viruses as stand alone measures.

Comment 252: There are numerous alternatives to broadcast pesticide spraying and only these alternatives should be utilized and the blanket application of pesticides should be outlawed. **Barbera**

Please reconsider some alternates and give more weight to the alternates. **Scarcella**

Response: The EIS discussed and evaluated potential alternatives, and the relative issues and environmental impacts associated with these alternatives, compared to those related to the application of adulticides. Some of the alternatives presented in the EIS are currently being considered and will be employed as additional mosquito propagation control measures by NYCDOH, including the *Routine Program* (i.e., larviciding, surveillance), stocking NYCDEP Water Pollution Control Plants (WPCPs) with mosquito-eating fish (i.e., fish that eat mosquito larvae), and installing Mosquito Magnets? to trap adult mosquitoes in various isolated locations throughout the City

and at WPCPs. The alternatives in the alternatives analysis were determined not to be capable of achieving the goal of the Proposed Action: to protect public health by limiting the transmission of mosquito-borne diseases in an immediate fashion when surveillance detects a threat to an outbreak to the public health. The alternatives to adulticide use are not considered feasible as stand-alone measures to meet the objectives of the *Mosquito-Borne Disease Control Program*, which requires immediate action to reduce infected adult mosquitoes, break virus cycles, and reduce threats to public health.

Comment 253: This DEIS ignores most alternatives. For example, there is something called the mosquito magnet. The mosquito magnet works fine in areas where people don't live. Staten Island has the Bluebelt. People don't live in the Bluebelt. It covers a large amount of Staten Island. And the mosquito magnet would be absolutely perfect there. **Hamilton**

Use the tried and true mosquito magnets in parks and wetlands, do not spray them in a broadcast manner. The magnets are proven effective and cost efficient now and in the long run. **Snow**

The worst problem with your *Adult Mosquito Control Programs* is that it makes no use of mosquito magnet, a thoroughly effective and completely non-poisonous method of thoroughly eliminating the mosquitoes from an acre of non-residential area. The propane tank is replaced one time per month. No open flame is involved. The device uses a catalytic converter. It is EPA approved. The city has already purchased 107 of them. Where are they? The American Biophysics Co. of Rhode Island makes them. Time-released Bti briquets for commercial and municipal use are manufactured by Summit Chemical of Maryland. They are the safest and most effective for of Bti larvicide because of their time-release non-spray form. **Lerman**

Response: The EIS evaluated the use of Mosquito Magnets? as an alternative to the Proposed Action. It was determined that Mosquito Magnets? and other alternative technologies would likely fail to achieve the goals of the *Mosquito-Borne Disease Control Program* because: 1) they rely on carbon dioxide to attract mosquitoes and, there are a plethora of CO_2 sources throughout the City; 2) they can't be deployed on short-term notice at potentially numerous locations throughout the City; and 3) they can control only a small portion of the adult mosquito population. These devices would likely not reduce the potential for humans to contract mosquito-borne diseases as effectively as the application of adulticides. However, as previously stated, some of them may be used in select locations where space and conditions allow, and the City plans to employ them in the Rockaways.

Comment 254: There are alternatives to spraying, there are natural products that keep mosquitoes away, and there are natural predators, like dragonflies and bats, who can kill mosquitoes much more safely than pesticides can. **Osuna**

Find a natural alternative to replace the spraying in different areas to kill the mosquitoes. **Pacifici**

Response: As discussed in the EIS, such organisms (e.g., dragonflies and bats) are difficult to employ on short-term notice. In addition, the unknown ecological impacts (e.g,

disrupting predator-prey relationships, competition with native populations) as a result of introducing mass numbers of these organisms could have far reaching impacts that outweigh their potential for controlling a portion of the adult mosquito population. As discussed in the EIS, mosquitoes comprise only a portion of the diet of dragonflies, bats, birds, and other insectivores. The Migratory Bird Treaty Act prohibits breeding and releasing additional native and non-native bird species. These actions are illegal except under stringent permitted conditions (e.g., captive breeding bird programs). Larvivorous fish will be released in water pollution control plants, but NYSDEC does not permit their release in open waters.

Comment 255: We got a couple of mosquito magnets last year. In four days - and it wasn't in the height of the epidemic, but in four days one mosquito magnet captured a quarter pound of adult mosquitoes. In estimation, that is approximately 50,000 to 100,000 mosquitoes from one magnet. Just imagine those 50,000 to 100,000 mosquitoes invading our community. And that's only one. It didn't make an impact at all. **Cumberland**

Response: Mosquito Magnets? are currently employed in various locations throughout the City and according to results from surveillance activities, they will be installed at additional isolated locations where high densities of mosquitoes occur. However, based on existing data, they are not expected to completely obviate the need for adulticiding in the Rockaways.

Comment 256: I too fear the West Nile Virus and I urge the Department of Health and other agencies to fight this problem by first vigorously using natural and non-toxic means of infestation control, such as natural controls. There are natural predators that we need to look into. **Sanders**

Response: The potential uses of natural predators such as insectivorous birds, bats, and other arthropods were addressed in the EIS. As discussed in the EIS, in many cases there are restrictions on their introduction into the environment, such as the Migratory Bird Treaty Act and limitations on employing such measures on short notice to control the spread of mosquito-borne diseases.

Comment 257: Although on pages S-99 – S-100 that cover "Open Marsh Management (OMM) Alternative" (for spraying neurotoxic chemicals and chemical as well as fungal larvicides) there is enthusiasm expressed there is also doubt as to how effective the approach would be to eliminate the impact of the adult swarms. But on the contrary it is the stagnant water- as at Dubos Point Park that generates the problem. And furthermore among alternatives listed on page S-97 there is no mention of the Mosquito/Weed program of the City as carried out by the local governments agency-Community Board 14- and that has been employing heavy bulldozing/trucking/sifting equipment from Sanitation Department's Queens Lot Cleaning Division. If this alternative has been dropped it should be listed/eliminated/reason of not being effective (at least). Section 4.U Rockaways Alternatives on page S-103 and appropriate locations should also address the bulldozing alternative of Mosquito/Weed. Note Sanitation- directed at water collecting refuse- can be treated by manual pickups and mowing avoids leaving mosquito breeding ponded areas brought below adjacent sidewalk grade by an excavating style of bulldozing (even backblading) with huge volumes of missing topsoil unaccounted for clearly. The

stripping of living vegetation (includes trees and shrubs) has scarred open lands and also has not been a good management practice. So the protection of natural resources is important not just from the spray program approach!

The spraying of neurotoxic chemicals on humans and the ecosystem is an approach that should be avoided as much as possible and the focus should be on standing water in wetlands areas of the Rockaway peninsula - not bulldozing public and private lands.

So to avoid the return of a program that is not managed well will this Mosquito/Weed program be discussed in the FEIS? Note lot cleaning and rat control are related programs and so should be mentioned too in the discussion of dropped alternative. **Blum**

Response: Such programs are either included under the *Routine Program* which will be implemented under the Future No Action scenario, and would be carried forward regardless of whether the Proposed Action is adopted.

Comment 258: The sections of the DEIS from the Department of Health that I looked at, I think it was S and U, I don't even see lot cleaning/mosquito control mentioned. In other words, you don't even list it as an alternative because it's been a fraud and because it has been ineffective. **Blum**

Response: The cleaning of lots and collection of tires that may result in mosquito breeding are included in the *Routine Program*, which is part of the No Action scenario discussed throughout the EIS.

Comment 259: Are there not other alternatives to address the mosquito problem? For instance, I have read about a product called "Suredye." It has much research behind it and kills the medfly without poisoning beneficial insects, wildlife, the environment, and people! You can find information on this at www.suredye.com. Also consider the product "Mosquito Magnet" that is nontoxic manufactured by the American Biophysics Rhode Island firm. I have read that other cities use a bacterial spray on stagnant waters to kill mosquitoes, build bat houses since the bats eat mosquitoes, and stock their ponds with mosquito-eating fish. My question to you is this: Have you really researched alternatives that would be most beneficial and least toxic to the environment and creature living here? **Pico**

Response: The EIS addressed the potential impacts from adulticide products which are registered by the federal government and New York State for the control of adult mosquitoes. The other non-adulticide methods discussed in the comment were fully researched, evaluated and discussed in the EIS.

MITIGATION

Comment 260: Although it appears that the short and long-term effects of the adulticide spraying upon humans, mammals and birds as described in the DEIS and the proposed *Mosquito-Borne Disease Control Program* reflect the metabolic capacity of these receptors to minimize the toxicity, the possible effects on arthropods, aquatic and marine life remain an area of concern. Since the long and short-term environmental effects of adulticide applications depend on a series of complex factors that are site-specific routine monitoring of the most sensitive invertebrates populations can

provide an indicator of environmental damage. Data from monitoring the most sensitive invertebrates should be used to modify or adjust adulticide application protocols. **Bourque**

Response: Chapter 3.D of the EIS identifies a potential for significant adverse impacts to non-target insects from all adulticides and aquatic organisms from the application of malathion for mosquito-borne disease control. Additional text on why monitoring of non-targets is not included in the Proposed Action has been added to Chapter 3.0, "Non-Target Insects and other Arthropod Terrestrial Wildlife Impacts." Should malathion be selected by New York City for mosquito-born disease control, the City will implement a monitoring program to assess its effects on aquatic resources. For all adulticides, the City will stay abreast of reported fish kills or loss of species potentially associated with the Proposed Action.

PUBLICALLY REPORTED PESTICIDE RELATED ILLNESSES

The following oral and written comments were provided during the public comment period. Although not comments specific to the EIS, they have been presented in this Chapter for the public record.

Comment 261: I am a person who has been poisoned by Malathion (cholinesterase inhibitor) and the pyrethroid formulations improperly sprayed by Clarke Mosquito Control in 1999 and continue to be poisoned by them, due to their environmental persistence in my entire surrounding area and continued misapplications on the part of the spray applicators. **Reilly**

Comment 262: My daughter's immune system can no longer be compromised by further spraying. We have been discussing ways for Lauren to avoid the effects of spraying, but all ideas are impractical. Even long after the spraying, it will be around her everywhere? on the ground, on the house, in the screens and air conditioners, it is inevitable that she will be touched by this spraying. **Del Vecchio**

Comment 263: I am disturbed to hear that you are planning to spray pyrethroids to control mosquitoes in NYC. In my medical practice in Madison, Wisconsin I have seen patients who are toxic with Chlordane, Temick (Aldecare), DDT, and Agent Orange. Pyrethroids, which you are planning to use, are neurotoxic materials as well. Throughout the year, I see 3 to 5 patients per week that are experiencing multiple health problems linked to pesticide exposures. In fact, I have worked with two patients who died as a result of their neurotoxic injuries from pesticides that were sprayed by airplanes in Wisconsin. **F. Ehrlich**

Comment 264: A friend of mine was just diagnosed with non-Hodgkins Lymphoma. She lives across from Prospect Park in Brooklyn which was sprayed reportedly 8 times last year. The first question the doctors asked her was if she had been exposed to pesticides. Apparently, incidence of lymphomas have risen 80% in the last 2- years. You cannot ignore that. Secondly, you cite crazily low figures of asthma "hospitalizations" increase FROM the spraying. How many asthma cases are not hospitalized but require doctor care but are still serious? How many do not even do that? How many will go to a doctor or hospital and will be misdiagnosed? Pesticide poisoning/effects are too often misdiagnosed or are not recognized by the medical community. **Swan**

Comment 265: Following three hours of spraying, my son could not get out of bed. A few days later he was covered with a rash. And my doctor did specify it was pesticide poisoning.

There were periods of three-day spurts of being bedridden with a fever from the poisoning. He cannot be exposed to any more chemicals. I have asthma now because of this. **Santillo**

Comment 266: During the periods of spraying over the last year, I have experienced a continually sore throat, wheeziness, and shortness of breath. **Tschudy**

Comment 267: I am literally environmentally quarantined and have to carry a portable oxygen tank when outside my home with a special filtered mask, so I can breath and to assist in inhibiting or reversing any respiratory reactions which I experience many times in one day when outside. I am now permanently disabled. **Reilly**

Comment 268: I developed asthma with the malathion spray. At first I had severe coughing and chronic upper respiratory and that developed into asthma. The following summer with the spraying of Anvil my family fled from my home as much as possible. However, upon returning home, I had severe nausea, headache and dizziness. My eleven year old daughter had similar adverse effects. My husband developed a constant rash. **Taratunio**

Comment 269: My sister is also experiencing the same problem (INSERT PROBLEM)(she lives by me) and my 19-year-old niece was diagnosed with scleroderma? a fatal disease that is caused by environment factors such as pesticides (also lives in Flushing). She started getting ill 2 years ago. Same times spraying started. Please stop the spraying. My nieces doctor, Dr. Andrew Frank feels that since me, my sister, and my niece are experiencing some of the same symptoms (numbness of face, hands, feet) that there might be some kind of "cluster" effect. **Obidienw**

Comment 270: Millions of New Yorkers were thus exposed to toxic pesticides through careless practices. Clare Feltham, a Staten Island resident, testified at the hearing on September 18, 2000 about the severe health impacts she suffered when she was directly sprayed by a passing spray truck outside her home. She was outside her home well before the hours New York City had announced spraying was to take place - she was sprayed in the face. More than one hundred people sought medical assistance for pesticide related illnesses from Dr. Adrianne Buffaloe, including asthma attacks, respiratory distress, paralysis and allergic reactions. At least one of Dr. Buffaloe's patients was hospitalized for three weeks for treatment of pesticide related symptoms during the 1999 spraying activities. **Meenan**

Comment 271: In 1999, the helicopters went back and forth and then the truck sprayed. Last year just the trucks sprayed. I have high blood pressure from being sprayed. I am 65 years old. Initially in 1999 I had blood pressure 110 over 80, all my life. Suddenly, in the fall of '99, after the spraying started, in September I had a reading of 160 over 100. And then the next summer 180 over 105. It is now 130/90, May 2001. I, however, have had 138/95 in January and frequent rapid heart beat. Rapid heartbeat is a symptom of pesticide spraying. I submit that my high blood pressure has been triggered by the spraying, because it coincides with the spraying. I had a severe toxic reaction, burning in the throat, tightness in the chest, numbness in extremities, nausea, and headache. I still had some problem with the blood pressure. And I think other people had burning in the throat as I did, and respiratory symptoms that summer. They didn't know what was causing it. We all went around sniffling and we didn't know why.

I am concerned because I feel my immune system has probably been weakened by this. I am still standing. I am not dead yet. But on other hand, I don't think it was good for my health. And I feel that this is a massive experiment on millions of people here, many who have asthma and who are reacting badly to the spray.

My metabolism raced during the spraying. It's an endocrine reaction. I take thyroid medication usually because I have low thyroid, but during the spraying I couldn't take the thyroid because I was already revved up. The EIS in regard to skin and eye irritation dismisses immediate effects as short-lived. For months after both spray exposures, 1999 and 200, I have noticed various symptoms of exposure, including high blood pressure. I find that the absorption through external exposures and also respiratory absorption has created a longer-term problem. **Haavind**

Comment 272: While there is some debate over the long-term harmful effects of exposure to malathion and other pesticides, there were significant reports of immediate consequences such as eye irritation, respiratory distress and rashes following the last year's spraying. **Wrzesinski**

Comment 273: While this may be safe for the healthy segment of our population, it is not safe for children with asthma. My son had an attack, and I had one right after him. I have bronchitis, which is a much milder form, and never have had an attack in the summertime, only in the wintertime. It's not safe for the people with upper respiratory problems. It's not safe for people with immune deficiencies. It's not safe for the elderly. It's not safe for infants. **Klumb**

Comment 274: I was not sprayed directly. I was wise enough to stay in. I went out the next day. I had an experience that I was going to die and it lasted for about three weeks. My thyroid was so abnormal six months after the spraying when I had my first test that I was really in danger of not surviving spraying. And I was not directly sprayed. **Friedman**

Comment 275: I have suffered too much neurological impairment that is progressing and will not survive in your created toxic wasteland. My immune system is severely damaged as well as my entire hormonal system, including my thyroid function and every other body organ function and am unable to find proper housing free of pesticide contaminants and continue to be poisoned daily. **Reilly**

Comment 276: I had heavy nose bleeding - things that I never had before - it was like a faucet. I couldn't stop it. I had bloodshot eyes one day. For the first few months or so, I had extreme insomnia, which turned into extreme fatigue now, and terrible things that I never had before. My sinus headache -- normally, sometimes occasionally I had once or twice a year sinus headache. Now it became almost daily. And sometimes it's also to the right side of my forehead, which is not the place I used to get it. Terrible headaches and a burning sensation at the top of the head which I never had before. Twitching of the eyes, nervousness, sensation on my thumbs, things like that, which I never had in my life. **Enterman**

Comment 277: I am writing to urge you to cease mass aerial pesticide spraying on human population. I am 77-year old woman; I don’t have the strength to resist this repeated assault on my immune system and health. Last summer after each spraying I became very sick. I developed moderate respiratory difficulties, terrible headaches and

weakness and lassitude. All these symptoms would remit when I left New York City to Suffolk County, East Hampton. You have no right to make me sick and shorten my life span. This is being done without my consent. I am not afraid of virus. Only 1 person died in population of 9 million. This is not a dangerous virus. These pesticides have never been approved for mass aerial spraying over human population. Pesticides are intended to terminate life and interfere with DNA synthesis or replication. They are serious poisons. They are neurotoxins and DNA terminators. **M. Krumholz**

Comment 278: Please be advised that I became physically sick each time mass pesticide spraying was done in Queens, last year and 2 yrs ago. I reported it to poison control. I had severe headaches, tinnitus and confusion with an inability to concentrate or think clearly. I had a red rash with severe itching over my chest and upper arms. I also had some respiratory difficulties and a bitter taste in my mouth. I could taste it and my mind would start racing when I was exposed. It was impossible to work, concentrate and make decisions. I had mental confusion and depression. I felt helpless and powerless about the pesticide spraying and this increased my despair. This reaction was not an allergy or an allergic reaction. I have never had an allergy in my life. This was a toxic reaction to a known poison. Pesticides are known poisons. They interfere with the DNA in nucleus. This reaction was my body's healthy adaptation in an attempt to eliminate a poison or toxin from my body. It is basically a discharge reaction. My body and my immune and my central nervous system cannot endure this continuous and repeated assault of pesticides on its integrity. You are seriously harming the immune system and central nervous system of 9 million people in NYC. You are doing this in flagrant disregard for their health. Do you have any idea of damage you are doing to unborn fetus of pregnant woman, infants and young children, and people who already have CNS disorder? All this is done in name of protecting us from a "supposedly dangerous virus" which killed one person in NY in year 2000. Our bodies can handle a virus but we are not genetically programmed to protect ourselves from highly toxic, synthetic poisons. **W. Krumholz**

TIME-WEIGHTED EXPOSURES – DETAILED RESPONSE TO COMMENT 194

Non-Cancer Hazards

It is possible that an individual who is accidentally exposed to mists or drift from adulticide spraying may also be exposed over a longer timeframe to the residues of the spraying that remain in the environment. These two scenarios (short-term or acute, and long-term or chronic) are evaluated independently in the EIS. However, the same individual may have both short- and long-term exposures. Therefore, the acute exposures have been averaged, or time-weighted, over the chronic exposure duration. The results of the time-weighted exposures are then used to calculate non-cancer hazard indices due to acute exposures. These non-cancer hazard indices for the time-weighted acute exposures are then added to the hazard indices due to chronic exposures in order to calculate a total risk derived from accidental acute exposure combined with chronic exposure to adulticides.

The child and adult residents exposure pathways were selected for this modeled analysis because these are the individuals with the greatest amount of potential exposures to the active ingredients (*e.g.* low body weight for the young child, exposed every day to the adulticides' active ingredients on surfaces, food, soil). The following tables show the results of the calculations.

Table 6-1
Hazard Quotients for Time -Weighted Inhalation of Spray Drift
Young Child Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Daily Exposure (AE) (mg-day/L)	TWA Exposure (TWAE) (mg/L)	Chronic Toxicity Criteria (RfC) (mg/L)	Hazard Quotient (HQ) Unitless
Malathion	57.1	0.000014	0.0000000065	0.0001	0.000065
Naled	18.4	0.0000046	0.0000000021	0.0000023	0.00091
Permethrin	22.1	0.0000055	0.0000000025	0.00025	0.000010
Resmethrin	7.4	0.0000018	0.00000000084	0.00001	0.000085
Sumithrin	3.8	0.00000095	0.00000000043	0.00029	0.0000015
Piperonyl Butoxide	22.1	0.0000055	0.0000000025	0.00007	0.000036

AE = ([air]*ET*CF), where ET =exposure time (0.25 day), CF = conversion factor (0.000001 m^3/L-mg/ug)
TWAE = AE/$AT_{chronic,}$ where $AT_{chronic}$ = chronic averaging time (2190 days; 365 day/year * 6 year)
HQ = TWAE/RfC where RfC = reference concentration

Table 6-2
Hazard Quotients for Time -Weighted Ingestion of Spray Drift
Deposited on Surfaces and Transferred to hands
Young Child Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Daily Exposure (AE) (mg/kg)	TWA Exposure (TWAE) (mg/kg-day)	Chronic Toxicity Criteria (RfD) (mg/kg-day)	Hazard Quotient (HQ) (unitless)
Malathion	57.1	0.075	0.000034	0.24	0.00014
Naled	18.4	0.024	0.000011	0.002	0.0055
Permethrin	22.1	0.029	0.000013	0.05	0.00027
Resmethrin	7.4	0.0097	0.0000045	0.03	0.00015
Sumithrin	3.8	0.0050	0.0000023	0.071	0.000032
Piperonyl Butoxide	22.1	0.029	0.000013	0.0175	0.00076

AE = ([air]*CF1*CF2*SA_{child})/BW_{child} where CF1 =conversion factor (0.4387 mg-m/ug), CF2 = Conversion factor (0.0001 m^2/ cm^2), SA_{child} = skin surface area for child's hands (450 cm^2), Bw_{child} = body weight for child (15 kg)
TWAE = AE/$AT_{chronic}$ where $AT_{chronic}$ = chronic averaging time (2190 days; 365 day/year * 6 year)
HQ = TWAE/RfD where RfD = reference dose

Table 6-3
Hazard Quotients for Time-Weighted Dermal Contact with Deposited Spray Drift
Young Child Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Daily Exposure (AE) (mg/kg)	TWA Exposure (TWAE) (mg/kg-day)	Chronic Toxicity Criteria (RfD) (mg/kg-day)	Hazard Quotient (HQ) (unitless)
Malathion	57.1	0.47	0.00021	0.24	0.00089
Naled	18.4	0.15	0.000069	0.002	0.034
Permethrin	22.1	0.18	0.000083	0.05	0.0017
Resmethrin	7.4	0.061	0.000028	0.03	0.00092
Sumithrin	3.8	0.031	0.000014	0.071	0.00020
Piperonyl Butoxide	22.1	0.18	0.000083	0.0175	0.0047

AE = ([air]*CF1*CF2*SA_{child})/BW_{child} where CF1 =conversion factor (0.4387 mg-m/ug), CF2 = Conversion factor (0.0001 m^2/ cm^2), SA_{child} = skin surface area for child's hands lower legs and forearms (2800 cm^2), Bw_{child} = body weight for child (15 kg)
TWAE = AE/$AT_{chronic}$ where $AT_{chronic}$ = chronic averaging time (2190 days; 365 day/year * 6 year)
HQ = TWAE/RfD where RfD = reference dose

Table 6-4
Hazard Quotients for Time-Weighted Inhalation of Spray Drift
Adult Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Daily Exposure (AE) (mg-day/L)	TWA Exposure (TWAE) (mg/L)	Chronic Toxicity Criteria (RfC) (mg/L)	Hazard Quotient (HQ) (unitless)
Malathion	57.1	0.000014	0.0000000016	0.0001	0.000016
Naled	18.4	0.0000046	0.00000000053	0.0000023	0.00023
Permethrin	22.1	0.0000055	0.00000000063	0.00025	0.0000025
Resmethrin	7.4	0.0000019	0.00000000021	0.00001	0.000021
Sumithrin	3.8	0.00000095	0.00000000011	0.00029	0.00000037
Piperonyl Butoxide	22.1	0.0000055	0.00000000063	0.00007	0.0000090

AE = ([air]*ET*CF)/AT_{acute} where ET =exposure time (0.25 day), CF = conversion factor (0.000001 m^3/L-mg/ug)
TWAE = AE/$AT_{chronic}$ where $AT_{chronic}$ = chronic averaging time (8760 days; 365 day/year * 24 year)
HQ = TWAE/RfC where RfC= reference concentration

Table 6-5
Hazard Quotients for Time-Weighted Ingestion of Spray Drift Deposited on Surfaces and Transferred to hands
Adult Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Daily Exposure (AE) (mg/kg)	TWA Exposure (TWAE) (mg/kg-day)	Chronic Toxicity Criteria (RfD) (mg/kg-day)	Hazard Quotient (HQ) (unitless)
Malathion	57.1	0.036	0.0000041	0.24	0.000017
Naled	18.4	0.012	0.0000013	0.002	0.00066
Permethrin	22.1	0.014	0.0000016	0.05	0.000032
Resmethrin	7.4	0.0046	0.00000053	0.03	0.000018
Sumithrin	3.8	0.0024	0.00000027	0.071	0.0000038
Piperonyl Butoxide	22.1	0.014	0.0000016	0.0175	0.000090

AE = ([air]*CF1*CF2*SA_{adult})/BW_{adult} where CF1 =conversion factor (0.4387 mg-m/ug), CF2 = Conversion factor (0.0001 m^2/ cm^2), SA_{adult} = skin surface area for adult's hands (1025 cm^2), Bw_{adult} = body weight for adult (72 kg)
TWAE = AE/$AT_{chronic}$ where $AT_{chronic}$ = chronic averaging time (8760 days; 365 day/year * 24 year)
HQ = TWAE/RfD where RfD = reference dose

Table 6-6
Hazard Quotients for Time-Weighted Dermal Contact with Deposited Spray Drift
Adult Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Daily Exposure (AE) (mg/kg)	TWA Exposure (TWAE) (mg/kg-day)	Chronic Toxicity Criteria (RfD) (mg/kg-day)	Hazard Quotient (HQ) (unitless)
Malathion	57.1	0.198	0.000023	0.24	0.000094
Naled	18.4	0.064	0.0000073	0.002	0.0037
Permethrin	22.1	0.077	0.0000088	0.05	0.00018
Resmethrin	7.4	0.026	0.0000029	0.03	0.000098
Sumithrin	3.8	0.013	0.0000015	0.071	0.000021
Piperonyl Butoxide	22.1	0.077	0.0000088	0.0175	0.00050

AE = ([air]*CF1*CF2*SA_{adult})/BW_{adult} where CF1 =conversion factor (0.4387 mg-m/ug), CF2 = Conversion factor (0.0001 m^2/cm^2), SA_{adult} = skin surface area for adult's hands, lower legs, and forearms (5700 cm^2), Bw_{adult} = body weight for adult (72 kg)
TWAE = AE/$AT_{chronic}$ where $AT_{chronic}$ = chronic averaging time (8760 days; 365 day/year * 24 year)
HQ = TWAE/RfD where RfD = reference dose

The calculated hazard quotients for the young child and adult resident accidentally exposed to spray mists and/or drift, are added to the total non-cancer risks associated with chronic exposures (reasonable maximum exposures under chronic conditions; see Table 3.C-9) to estimate the potential non-cancer risks from chronic exposures and a time-weighted acute exposure. These risks are presented in the tables below for both the young child and adult resident.

Table 6-7
Total Hazard Indices for Chronic and Time-Weighted Acute Exposures
Young Child Resident

	Malathion	Naled	Permethrin	Resmethrin	Sumithrin	Piperonyl Butoxide
Chronic Exposures	0.011	0.067	0.02	0.00023	0.00098	0.11
TWA Inhalation	0.000065	0.00091	0.000010	0.000085	0.0000015	0.000036
TWA Ingestion	0.00014	0.0055	0.00027	0.00015	0.000032	0.00076
TWA Dermal Contact	0.00089	0.034	0.0017	0.00092	0.0002	0.0047
Total Hazard Indices	0.0121	0.107	0.0220	0.00139	0.00121	0.115

TWA: Time-Weighted Average

Table 6-8
Total Hazard Indices for Chronic and Time-Weighted Acute Exposures
Adult Resident

	Malathion	Naled	Permethrin	Resmethrin	Sumithrin	Piperonyl Butoxide
Chronic Exposures	0.0053	0.031	0.012	0.00013	0.00066	0.061
TWA Inhalation	0.000016	0.00023	0.0000025	0.000021	0.00000037	0.0000090
TWA Ingestion	0.000017	0.00066	0.000032	0.000018	0.0000038	0.00009
TWA Dermal Contact	0.000094	0.0037	0.00018	0.000098	0.000021	0.0005
Total Hazard Indices	0.00543	0.0356	0.0122	0.000267	0.000685	0.0616

TWA: Time-Weighted Average

Although the total hazard indices increase slightly with the addition of the three acute exposure pathways, the overall total hazard indices for both the young child and adult resident are still below the regulatory limit of 1.0 recommended by the USEPA. Thus, an accidental exposure to adulticide spray mists or drift would not result in adverse effects under chronic exposure conditions.

Cancer Risks:

It is possible that an individual who is accidentally exposed to mists or drift from adulticide spraying may also be exposed over a longer timeframe to the residues of the spraying that remain in the environment. These two scenarios (short-term or acute, and long-term or chronic) are evaluated independently in the EIS. However, the same individual may have both short- and long-term exposures. Therefore, the acute exposures have been averaged, or time-weighted, over the chronic exposure duration. The results of the time-weighted exposures are then used to calculate cancer risks due to acute exposures. These cancer risks of the time-weighted acute exposures are then added to the cancer risks due to chronic exposures in order to calculate a total risk derived from accidental acute exposure combined with chronic exposure to adulticides.

The child and adult residents exposure pathways were selected for this analysis because these are the individuals with the greatest amount of potential exposures to the active ingredients (*e.g.* low body weight for the young child, exposed every day to the adulticides' active ingredients on surfaces, food, soil). The following tables show the results of the calculations.

Table 6-9
Cancer Risks for Time-Weighted Inhalation of Spray Drift
Young Child Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Daily Exposure (AE) (ug-day/m^3)	TWA Exposure (TWAE) (? g/m^3)	Unit Risk Factor (UR) (ug/m^3)$^{-1}$	Cancer Risk (CR) Unitless
Malathion	57.1	14.28	0.00056	0.000000434	0.0000000002
Permethrin	22.1	5.5	0.00022	0.00000526	0.0000000011

AE = ([air]*ET) where ET =exposure time (0.25 day)
TWAE = AE/$AT_{chronic}$ where $AT_{chronic}$ = chronic averaging time (25,550 days; 365 day/year * 70-year lifetime)
CR = TWAE*UR where UR = Cancer Unit Risk

Table 6-10
Cancer Risks for Time-Weighted Ingestion of Spray Drift
Deposited on Surfaces and Transferred to Hands
Young Child Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Daily Exposure (AE) (mg/kg)	TWA Exposure (TWAE) (mg/kg-day)	Cancer Slope Factor (CSF) (mg/kg-day)$^{-1}$	Cancer Risk (CR) (unitless)
Malathion	57.1	0.075	0.0000029	0.00152	0.0000000044
Permethrin	22.1	0.029	0.0000011	0.0184	0.00000002

AE = ([air]*CF1*CF2*SA_{child})/BW_{child} where CF1 =conversion factor (0.4387 mg-m/ug), CF2 = Conversion factor (0.0001 m^2/ cm^2), SA_{child} = skin surface area for child's hands (450 cm^2), BW_{child} = body weight for child (15 kg)
TWAE = AE/$AT_{chronic}$ where $AT_{chronic}$ = chronic averaging time (25,550 days; 365 day/year * 70-year lifetime)
CR = TWAE*CSF where CSF = Cancer Slope Factor

Table 6-11
Cancer Risks for Time-Weighted Dermal Contact with Deposited Spray Drift
Young Child Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Daily Exposure (AE) (mg/kg)	TWA Exposure (TWAE) (mg/kg-day)	Cancer Slope Factor (CSF) (mg/kg-day)$^{-1}$	Cancer Risk (CR) (unitless)
Malathion	57.1	0.47	0.000018	0.00152	0.000000027
Permehrin	22.1	0.18	0.000007	0.0184	0.0000001

AE = ([air]*CF1*CF2*SA_{child})/BW_{child} where CF1 =conversion factor (0.4387 mg-m/ug), CF2 = Conversion factor (0.0001 m^2/ cm^2), SA_{child} = skin surface area for child's hands lower legs and forearms (2800 cm^2), BW_{child} = body weight for child (15 kg)
TWAE = AE/$AT_{chronic}$ where $AT_{chronic}$ = chronic averaging time (25,550 days; 365 day/year * 70-year lifetime)
HQ = TWAE/RfD where RfD = reference dose

Table 6-12
Cancer Risks for Time-Weighted Inhalation of Spray Drift
Adult Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Daily Exposure (AE) (ug-day/m^3)	TWA Exposure (TWAE) (? g/m^3)	Unit Risk Factor (UR) (ug/m^3)$^{-1}$	Cancer Risk (CR) (unitless)
Malathion	57.1	14.28	0.00056	0.000000434	0.0000000002
Permehrin	22.1	5.5	0.00022	0.00000526	0.0000000011

AE = ([air]*ET) where ET =exposure time (0.25 day)
TWAE = AE/$AT_{chronic}$ where $AT_{chronic}$ = chronic averaging time (25,550 days; 365 day/year * 70-year lifetime)
CR = TWAE*UR where UR = Cancer Unit Risk

Table 6-13
Cancer Risks for Time-Weighted Ingestion of Spray Drift
Deposited on Surfaces and Transferred to Hands
Adult Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Exposure (AE) (mg/kg)	TWA Exposure (TWAE) (mg/kg-day)	Cancer Slope Factor (CSF) (mg/kg-day)$^{-1}$	Cancer Risk (CR) (unitless)
Malathion	57.1	0.036	0.0000014	0.00152	0.0000000021
Permehrin	22.1	0.014	0.0000005	0.0184	0.00000001

AE = ([air]*CF1*CF2*SA_{adult})/BW_{adult} where CF1 =conversion factor (0.4387 mg-m/ug), CF2 = Conversion factor (0.0001 m^2/ cm^2), SA_{adult} = skin surface area for adult's hands (1025 cm^2), BW_{adult} = body weight for adult (72 kg)
TWAE = AE/$AT_{chronic}$ where $AT_{chronic}$ = chronic averaging time (25,550 days; 365 day/year * 70-year lifetime)
CR = TWAE*CSF where CSF = Cancer Slope Factor

Table 6-14
Cancer Risks for Time-Weighted Dermal Contact with Deposited Spray Drift
Adult Resident

Active Ingredient	Max. 1-hr concentration [air] (ug/m3)	Acute Exposure (AE) (mg/kg)	TWA Exposure (TWAE) (mg/kg-day)	Cancer Slope Factor (CSF) (mg/kg-day)$^{-1}$	Cancer Risk (CR) (unitless)
Malathion	57.1	0.198	0.0000077	0.00152	0.000000012
Permehrin	22.1	0.077	0.000003	0.0184	0.000000055

AE = ([air]*CF1*CF2*SA_{adult})/BW_{adult} where CF1 =conversion factor (0.4387 mg-m/ug), CF2 = Conversion factor (0.0001 m^2/cm^2), SA_{adult} = skin surface area for adult's hands, lower legs, and forearms (5700 cm^2), BW_{adult} = body weight for adult (72 kg)
TWAE = AE/$AT_{chronic}$ where $AT_{chronic}$ = chronic averaging time (25,550 days; 365 day/year * 70-year lifetime)
CR = TWAE*CSF where CSF = Cancer Slope Factor

The calculated cancer risks for the young child and adult resident accidentally exposed to spray mists and/or drift under are added to the total cancer risks associated with chronic exposures (Table 3.C-11) to estimate the potential cancer risks from chronic exposures and a time-weighted acute exposure. These risks are presented in the tables below for both the young child and adult resident.

Table 6-15
Total Cancer Risks for Chronic and Time-Weighted Acute Exposures
Young Child Resident

	Malathion	Permethrin
Chronic Exposures	0.0000000323	0.00000144
TWA Inhalation	0.0000000002	0.0000000011
TWA Ingestion	0.0000000044	0.00000002
TWA Dermal Contact	0.000000027	0.0000001
Total Cancer Risk	0.0000000639	0.00000156

TWA: Time-Weighted Average

Table 6-16
Total Cancer Risks for Chronic and Time-Weighted Acute Exposures
Adult Resident

	Malathion	Permethrin
Chronic Exposures	0.0000000629	0.00000346
TWA Inhalation	0.0000000002	0.0000000011
TWA Ingestion	0.0000000021	0.00000001
TWA Dermal Contact	0.000000012	0.000000055
Total Cancer Risk	0.0000000772	0.00000353

TWA: Time-Weighted Average

Although the total cancer risks increase slightly with the addition of the three acute exposure pathways, the overall total cancer risks for both the young child and adult resident are still within or below the target cancer risk range of 0.0000001 to 0.0001 (1 in 1 million to 1 in 10,000) recommended by the USEPA. Thus, an accidental exposure to adulticide spray mists or drift would not result in adverse effects under chronic exposure conditions. ☞