

*Suffolk County Vector Control &
Wetlands Management Long Term
Plan & Environmental Impact
Statement*



Steve Levy, County Executive

**FINAL GENERIC
ENVIRONMENTAL IMPACT
STATEMENT**

**Volume 2 of 5
Appendices 1 thru 4**

Prepared for:

**Suffolk County Department of
Environment and Energy**

Suffolk County Department of Health Services

Suffolk County Department of Public Works

Suffolk County, New York

Prepared by:

CASHIN ASSOCIATES, P.C.
1200 Veterans Memorial Highway, Hauppauge, NY

October 2006

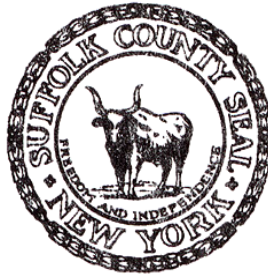


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**SUFFOLK COUNTY VECTOR CONTROL AND WETLANDS MANAGEMENT
LONG - TERM PLAN AND ENVIRONMENTAL IMPACT STATEMENT**

PROJECT SPONSOR

Steve Levy
Suffolk County Executive



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Christopher Gobler, PhD & Laboratory	Southampton College, NY
Jerome Goddard, PhD	Mississippi Department of Health, Jackson, MS
Sergio Sanudo, PhD & Laboratory	Stony Brook University, Stony Brook, NY
Robert Cerrato, PhD	Stony Brook University, Stony Brook, NY
Suffolk County Department of Health Services, Division of Environmental Quality	Hauppauge, NY



APPENDIX 1

Annotated Written Comments
Received by CEQ

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRANKLIN WILDLIFE MANAGEMENT AREA
 391 ROUTE 32
 NORTH FRANKLIN, CT 06254
 PHONE: 860-642-7239
 FAX: 860-642-7964

RECEIVED
 S.C. PLANNING DEPT.
 2006 JUN 30 AM 9:30



June 19, 2006

James Bagg
 Chief Environmental Analyst
 Department of Planning
 H. Lee Dennison Bldg
 Hauppauge, NY 11788

RE: Suffolk County Vector Control and Wetlands Management Long Term Plan
 Draft Generic Environmental Impact Statement

Dear James Bagg:

This letter is in regards to the Suffolk County Vector Control and Wetlands Management Long Term Plan, Draft Generic Environmental Impact Statement. In the State of CT, the Wildlife Division's Wetlands Habitat and Mosquito Management (WHAMM) Program uses a Steering Committee to do water management changes called Integrated Marsh Management. Suffolk County Vector Control Wetlands Management Long Term Plan will be a leader in addressing the water management strategy for Long Island and beyond. All of your tools in the Best Management Practices will be useful throughout the Atlantic seaboard. Our state has been using these same BMP's with "no to little impact" or "minor impact" for the last twenty years. The goals are the same in both Connecticut and in Suffolk County and that is to reduce mosquito populations utilizing methods that minimizes potential environmental change or maximizes the enhancement of a particular natural resource values. Reducing the need for larviciding and adulticiding to control mosquitoes while protecting the health of the citizens of Long Island will result in healthier, better functioning wetlands throughout Suffolk County.

Please feel free to contact me (860-642-763) if you have additional questions.

Sincerely,

Paul Capotosto
 Paul Capotosto
 DEP Wetland Restoration Biologist
 860-642-7630
 paul.capotosto@po.state.ct.us

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Eastern Long Island Audubon Society

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2006 JUL -3 AM 9:17

Formerly Moriches Bay Audubon Society established 1972
PO Box 205, East Quogue, NY 11942-0206
easternlongislandaudubon.homestead.com

June 26, 2006

James Bagg
Chief Environmental Analyst
Department of Planning
H. Lee Dennison Bld.
Hauppauge, NY 11788

Dear Mr. Bagg,

We are writing to express our concerns and dismay about Suffolk County Vector Control's (and Department of Health's) long-term salt marsh management "restoration" plans. This project is also known as Open Marsh Water Management (OMWM). This project is certainly not a restoration plan but a total degradation marsh plan that will dramatically increase salt water levels into the high marsh, which, in turn, will destroy nesting populations of rare and declining species of salt marsh birds, destroy rare plants and their habitats, and increase water levels into adjoining forests and property owners lands. Salt marshes are one of the first natural communities to hold back storm and tidal surges. With recently proven rapid rises in sea level, salt marshes are invaluable ecosystems to mitigate rising water levels. Any interference in these natural marsh communities will have devastating impact on sea level rise onto the landmass of Long Island, where people have property and homes. Digging in the marshes, taking away preexisting high marshland mass, and creating new channels and artificial creeks does not increase biodiversity. To the contrary, it destroys it by eliminating all the upper marsh plants and birds that nest and forage there. Marshes also act as a filtering agent for pollutants that wash off of the land. Less marsh, which is what OMWM proposes, means less filtering of pollutants, and an immediate increase of pollution going into the bays will occur.

Eastern Long Island Audubon Society very strongly opposes the OMWM project and sees it as a further reduction and degradation of a valuable and so important ecological community. Please do not endorse the devastating OMWM project.

**Eastern Long Island Audubon Society
Board of Directors**

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John McNeil
Evelyn Voulgarelis
Mary Laura Lamont
Robert Adamo

ELIAS - A Chapter of the National Audubon Society
From the Barrens to the Bays

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C

From: Richard Mendelman [mailto:richardmendelman@harbormarina.com]
Sent: Monday, June 26, 2006 3:40 PM
To: Kim Shaw
Subject: Mosquito remedy

Thank you for the DEIS on VC. I have been trying to email you some rough comments.

Please look over the attached remedy. It seems so simple. I haven't tried it because I am a friend with the barn swallows and bats. When the barn swallows come back in the spring, we make a deal. They are to eat as many mosquitoes, nats as they can and we won't chase them off the boats even though they might leave their calling cards. We also allow them to build their mud nests under our travelift piers. The mud that the swallows needs to build their nests is going to be in short supply, if we continue to take all the storm water runoff and make it immediately go into underground cisterns instead of allowing evolutionary runoff that allows some mud to remain for Mr. And Mrs. Swallow. We are also looking for blue martin birdhouses that are 'affordable'. Blue martin birdhouses could be in plentiful supply, if we used the money that one spraying costs and diverted it to buying low cost mass-produced blue martin apartments. Bat houses should also be given away free as part of VC.

1
2
3

The notes attachment is some comments on the vc DEIS. It is tough comment on VC at this busy time.

Richard Mendelman, President
Seacoast Enterprises Associates, Inc.
423 Three Mile Harbor HC Rd.
East Hampton, NY 11937
email: richardmendelman@harbormarina.com
631 324 5666 X 101
631 324 3366 fax

> Here is a tip I received from Richard Bonhart, a grad from N. TX
State,
Landscape, and respected Garden Specialist in N. TX.
> Jim
> -----

>
>
>
> Mosquito Remedy :
> Pass this on to anyone who likes sitting out in the evening or when
they're having a cookout So you don't like those pesky mosquitoes,
especially now that they have the potential to carry the West Nile
Virus?
>
> Here's a tip that was given at a recent gardening forum.
>
> Put some water in a white dinner plate and add a couple drops of
Lemon
Fresh Joy dish detergent. Set the dish on your porch, patio, or other
outdoor area. Not sure what attracts them, the lemon smell, the white
plate color, or what, but mosquitoes flock to it, and drop dead
shortly
after drinking the Lemon Fresh Joy/water mixture, and usually within
about 10 feet of the plate.
>
> Check this out---it works just super! May seem trivial, but
it may
help control mosquitoes around your home, especially in the South and
elsewhere where the West Nile virus is reaching epidemic proportions in
mosquitoes, birds, and humans.

BMP 14 has to define “filling” as to what is acceptable. This “filling” description or assay would have to be part of the permit process. However a complete description of the material to be dredged or filled should also be a PEP “Policy” or “Guide” as part of the dredging criteria for the Peconic Estuary.

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When reviewing the BMP 15 on Page 61, I find the word ‘spoil’ used but ‘spoil’ is not defined and is a verb not a noun. Therefore take out the word ‘spoil’ in this draft and refer to the material by an actual assay. The official assay determines what is going to be the resultant of the filling or dredging operation. If the material to be dredged is from underwater then proceed to deposit the material somewhere for the benefit of the environment. If the material comes from upland then the material is not ‘spoil’ or fill. It is the material that will be taken and used for a project. There is also no such word as ‘disposal’ because disposal means to change the actual character of the stuff we are talking about. If it is garbage, it can no longer be dumped. Landfills are being closed. If we are to make a policy of dredging than we have to take the material and deposit it somewhere or relocate it. If the material has to be dewatered, than the material is the same but the state of the material is different. It is important to mean the same as we say or write and therefore I have asked for a PE dredging policy.

6

In the VC DEIS it seems to be assumed that the materials used for filling or for removal are a liability. Instead the material should be viewed as an asset. The foregoing is why I firmly believe that the Peconic Estuary must have an official ‘Dredging Policy’ and SCVC has to conform to the PE’s unique dredging Policy. The SSE should either conform to the PE policy or rewrite the SSE dredging policy to conform to those regions’ unique character and LWRP inventory, analysis, and recommendations.

7

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The VC has to tie in with circulation and flushing. I look forward to the time we have a GIS in 3D for the PE. The result of a 3D virtual image with supporting database would allow the stakeholders to determine the proper flushing characteristics including the historical data for any particular site. Circulation has to be properly defined for any site selected. If through violent hydrological habitat modifications a site is changed, the PE site database would allow for easy comparison of underwater changes for normal fail and fix projects. The real problem is that PE and other estuaries still operate under crisis management. This can be changed with proper information. The PE dredging policy or guide is necessary. Navigation is important and is compatible with flushing and circulation. If channels do not have the proper historic circulation then I would doubt that the navigation characteristics would be proper. In conclusion we need a VC that is compatible with the PE

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*Individuals enhancing the health and quality of life
through the suppression of mosquitoes, other vectors
and pests of public health importance.*



A Partner in the EPA's Pesticide Environmental Stewardship Program

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To Whom It May Concern,

The American Mosquito Control Association (AMCA) has thoroughly reviewed the draft Suffolk County Environmental Impact Statement (EIS) and has found it to comprise a singularly admirable effort, easily the most comprehensive of its kind in the United States today. It successfully addresses sensitive human health and environmental issues in a robust risk/benefit context that should serve as a template for future environmental impact evaluations. Particularly gratifying was the effort put forth to ensure that actual usage practices and mitigation strategies received full consideration in the impact analysis.

Historically, the Suffolk County Vector Control program has advocated the development and implementation of specific use/risk reduction strategies that include reliance on biorational pesticides and other approaches to vector control that minimize the requirement for chemical methodologies. The program uses a combination of resource management techniques such as source reduction, larviciding and adulticiding to control mosquito populations with control decisions being based on surveillance data. This has placed Suffolk County squarely in the vanguard of mosquito management programs whose practices are fully emblematic of the pesticide reduction goals set forth in the EPA Pesticide Environmental Stewardship Program (PESP). The Suffolk County Vector Control and Wetlands Management Long Term Plan and EIS have thus codified and reaffirmed integrated mosquito management strategies already in place.

Fortunately, the project scope required a number of environmental fate and deposition studies that provide excellent information of potential use to vector control programs elsewhere. Indeed, this document will encourage further research that will help vector control agencies nationwide to more effectively target vector species while minimizing pesticide use and nontarget impacts.

I can think of no other active mosquito management program that has documented their full scope of operations in terms of its efficacy, efficiency and environmental impacts to such an extraordinary extent. The citizens of Suffolk County can be assured that both the public and environmental health within their jurisdiction are being served remarkably well by a vector control program of which they can be justifiably proud.

AMCA – American Mosquito Control Association
15000 Commerce Parkway, Suite C – Mt. Laurel, New Jersey 08054

• Phone: 856-439-9222 • Fax: 856-439-0525 • E-mail: amca@mosquito.org • <http://www.mosquito.org>



Individuals enhancing the health and quality of life through the suppression of mosquitoes, other vectors and pests of public health importance.



A Partner in the EPA's Pesticide Environmental Stewardship Program

On behalf of the 1,700 members of the AMCA, allow me to congratulate all involved in this landmark project for a job well done. The resource expenditure this entailed was notable and worthy, the result of which will redound positively for years to come far beyond the Suffolk County claimancy. Indeed, the beneficial impact the studies involved in the risk assessment alone will have on mosquito management cannot be overestimated. The vector control community can look forward with great pride to our profession's continuing efforts to reduce pesticide risk, while recognizing that the environmentally sound use of chemical pesticides will remain an important component of integrated mosquito management programs for the foreseeable future. The Suffolk County Vector Control Program will remain at the forefront to meet that critical challenge – its citizens deserve no less.

6

Highest regards,

Joseph M. Conlon
Technical Advisor
American Mosquito Control Association

SUFFOLK COUNTY LEGISLATURE



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2006 JUL -3 AM 9:17

EDWARD P. ROMAINE
LEGISLATOR 1ST DISTRICT

June 29, 2006

James Bagg, Chief Environmental Analyst
Department of Planning
H. Lee Dennison Building
Hauppauge, NY 11788

Dear Mr. Bagg,

Due to a scheduling conflict, I am unable to attend today's Public Hearing on the Suffolk County Vector Control and Wetlands Management Plan and Draft Generic Environmental Impact Statement, however, wish to provide the following comments for the record.

The use of chemical pesticides poses a negative health risk to humans as well as the ecology of Long Island. It has been established by the U.S. Environmental Protection Agency that pesticides are not to be considered safe, and the NYS Department of Health also reports that the use of chemical pesticides provides risk to human health. The plan should provide a distinction between nuisance control and disease control, and the spraying of chemical pesticides should only be implemented when there is evidence of disease. The alteration and/or modification to our wetlands for mosquito control should only be exercised when fixing past wetland ditching projects and the restoration of marsh health. I cannot stress enough the importance of heightened public awareness of the adverse affects the use of chemical pesticides impose and the need for educating the public on ways in mosquito control and tolerance.

I have grave concerns that the Open Marsh Water Management (OMWM) plan may have a detrimental impact on the 17,000 acres of salt marsh. The OMWM will suddenly change the marsh's hydrology with the digging of several ponds and the introduction of artificial creeks that could have a negative ecological impact while not substantially reducing the mosquito population. As we know, marshes take centuries of depositional sediments to form. Over time the build up of sand, sediment and dead plants form a unique composition whose nutrients, along with marsh grasses, effectively filter out pollutants. In fact, marshes act like natural sponges, absorbing water from heavy rains and road run-off. Marshes also act as a natural protector if a major storm hits.

The marshes are like the kidneys of the bay. Since the 1930's, Suffolk County has lost 35% of its wetlands in the South Shore Estuary. The OMWM may reduce the wetlands ability to reduce pollutants. Using machines to carve these ponds from the marsh peat means that the marsh won't heal itself for quite sometime. Currently, there is no compelling body of evidence to

suggest that the OMWM technique will restore the marsh, better allow the marsh to absorb pollutants or waters from heavy rains and storms or adequately control the mosquito population. In fact, OMWM may negatively affect many species currently dependent on the marsh.

Accordingly, I would urge you to postpone the acceptance of the DEIS concerning the OMWM. Thank you for the opportunity to provide testimony.

Sincerely,

A handwritten signature in black ink that reads "Edward P. Romaine". The signature is written in a cursive style and is placed on a light blue rectangular background.

Edward P. Romaine
County Legislator, First District

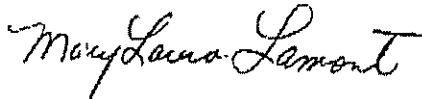
EPR:lk

July 2, 2006
James Bagg, Chief Environmental Analyst
Larry Swanson, Chairperson of Committee on Environmental Quality
All Suffolk Co. Legislators

To All,

I am writing to inform you that the ad in the Suffolk Life newspapers, taken out recently by the Citizens Advisory Committee for Vector Control and Wetlands Management Long Term Plan (Wed. June 28) 1 day before the hearing in Riverhead on this long term project was indeed misleading and a scare tactic to let the Vector Control have its way. The article makes it appear that all mosquitoes carry EEE and WNV and unless Vector Control manages salt marshes we will all get these diseases. Nothing is further from the truth. Fresh water mosquitoes carry those diseases, not salt marsh ones. Salt marshes should not be managed by Vector Control and salt marshes should be left intact and not managed for nuisance mosquitoes. These marshes are valuable ecosystems to hold back storm surges and tides and with the Vector Control wanting to destroy the high marsh in an effort to kill nuisance mosquitoes is wrong. A clear distinction needs to be made between nuisance mosquitoes and illness carrying mosquitoes, and the ad and the DEIS that was prepared for Vector control does not make any distinction between them. The OMWM project that Vector Control proposes will damage the high marsh and flood more of Long Island. This is a bad project and Vector Control is trying to "hoodwink" the public into supporting them by destroying marsh lands.

MaryLaura Lamont
Riverhead, N.Y.



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Great South Bay Audubon Society, Inc.

S.C. PLANNING DEPT.
Chapter of National Audubon

2006 JUL 12 AM 9:14

July 10, 2006

Mr. James Bagg,
Chief Environmental Analyst,
Dept. of Planning,
H. Lee Dennison Bldg.,
Hauppauge, New York 11788

Dear Mr. Bagg:

Attached is a copy of the comments I presented at both CEQ meetings held at the Evan K. Griffing Bldg. in Riverhead, and at the William H. Rogers Suffolk County Legislature Bldg. in Smithtown concerning the Suffolk County Vector Control & Wetlands Management Long Term Plan.

In addition I would like to add to these comments by saying that I believe that there is scant evidence, or no evidence at all, that salt marsh mosquitoes spread West Nile Virus. Vector Control appears to be trying to convince everyone that this is being done to protect their health. For the County to proceed with this experimental marsh manipulation in an attempt to reduce mosquito populations seems to be a wrong headed approach. This project will dig up areas of salt marsh peat that have taken centuries to develop. Salt water wetlands are the sponges or kidneys that filter contamination from runoff, and breaking up high marsh habitat by digging destructive holes will produce less filtering of runoff into our bays and estuaries. This diminishment of marsh filtration will also cost County taxpayers millions of dollars.

The efficacy of OMWMI controlling mosquitoes is clearly unknown, and as the representative of the Long Island Audubon Council, I respectfully request that the Suffolk County Vector Control & Wetlands Management Long Term Plan with its OMWMI provisions be turned down by the CEQ.

Thank you for your time and patience in reading our Audubon objections to this plan. If you have any further questions, I can be reached at my email address - hawkauk7@optonline.net.

Sincerely,

Lawrence A. Merryman

Conservation Chair &
Past President

Great South Bay Audubon Society
Representing the Long Island Audubon Council

AUDUBON COMMENTS ON THE SUFFOLK COUNTY
MOSQUITO CONTROL & WETLANDS MANAGEMENT
LONG TERM PLAN.

- Good evening and thank you for allowing me to present my
remarks before this Council.

- My name is Lawrence A. Merryman and I am the Conservation
Chair and Past President of the Great South Bay Audubon Society.
- In this matter I also represent the Long Island Audubon Council
(LIAC) consisting of all 7 Long Island Chapters comprising
approximately 7,000 members. These chapters are: South Shore,
Four Harbors, North Shore, Huntington, Eastern Long Island,
North Fork & Great South Bay Audubon Societies. These chapters
have unanimously approved their opposition to Suffolk County's
Mosquito Control and Wetlands Management Long Term Plan for
the following reasons:

- Concerning that part of the plan that includes the Open Marsh
Water Management, or OMWM aspect of digging ponds and
creeks in the high marsh areas of our salt water wetlands - we
cannot accept this OMWM ponding procedure as there exists no
scientific evidence or support that it restores wetlands and controls
salt marsh mosquito populations. On June 22nd, I was given a tour
of two areas of the Wertheim National Wildlife Refuge that have
been the subject of the experimental OMWM ponding. There was
no significant amount of mosquitoes present in the salt marsh that
day; however, this may have been because it was a windy day. In
addition, it was pointed out to me that some areas that we traversed
were not subject to OMWM techniques, but were normal non
treated high marsh areas, and there were also no significant
mosquitoes present in the se non OMWM treated areas. All of the

evidence of mosquito reduction presented appeared to be anecdotal – not scientific. In the opinion of the Long Island Audubon Council, the OMWM ponding procedures do not promote restoration, but further disturbance to the marsh. One of the points made by the proponents of OMWM ponds is that the ponds encourage avian species diversity. However, in order to prevent wading birds from feeding on the ponds' killifish, these ponds are dug deeply enough to discourage use by wading birds. The advocates of OMWM ponding also indicate that the spoil from the ponds that were recently dug has been used to fill the existing grid ditches that were created many years ago in a futile attempt to drain the marshes and reduce mosquito populations. It was further indicated that by filling these old grid ditches, the total amount of high marsh taken by digging the ponds and creeks has been replaced. I doubt if that can be substantiated, as the new ponds, enlarged creeks and the connector channels to the ponds appeared to be a substantial area.

- We have been assured that before any OMWM work will be done in Suffolk County Wetlands, a Screening Committee will undertake a review of the project and vote on its feasibility. However, the content of the Screening Committee appears to be heavily weighted towards governmental, rather than conservationist participation. In addition, the Screening Committee will only have to pass on OMWM designs over 15 acres. This loophole can allow for many abuses.

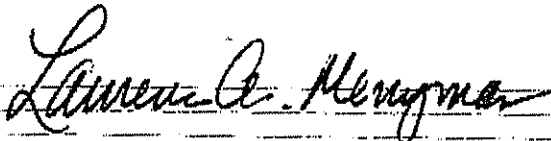
- I would also like to point out to the Council that Audubon New York, representing approximately 50,000 members has passed the following resolution:

WHEREAS, controversial alternative methods of vector control that are under consideration in Suffolk County Vector Control Plan, such as Open Marsh Water Management which advocates the digging of ponds in salt marshes, have not been proven effective; and RESOLVED, that Audubon New York

supports the exploration of alternative means of establishing disease vector control and response practices that are proven effective based on the best available science, and that will not negatively affect habitat or vulnerable bird populations.

- At a time of our heightened concern about the possibility of rising sea levels, high tides and storm surges that could occur from anticipated hurricane activity, it seems foolhardy to be experimenting with and reducing our salt water wetlands. This experimental project will dig up areas of salt marsh peat that have taken centuries to develop and therefore, the collective Audubon Societies of Long Island believe that the OMWM techniques proposed in the Long Term Plan are unproven at best, and damaging at worst.

- Thank you for your time and patience.



Lawrence A. Merryman - Conservation Chair & Past President, Great South Bay Audubon Society; also representing the Long Island Audubon Council.

Town of Babylon

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Dept. of Environmental Control

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e-mail: dec@townofbabylon.com



2006 JUL 13 AM 9:41

STEVEN BELLONE
SUPERVISOR

July 11, 2006

Mr. James Bagg
Suffolk County Planning Department
Chief Environmental Analyst
Council on Environmental Quality
H. Lee Dennison Building
Veterans Memorial Highway
Hauppauge, New York 11788

**RE: TOWN OF BABYLON COMMENTS – SUFFOLK COUNTY VECTOR CONTROL
WETLANDS MANAGEMENT LONG TERM PLAN AND DRAFT GENERIC
ENVIRONMENTAL IMPACT STATEMENT**

Dear Mr. Bagg:

I would first like to commend the County of Suffolk, especially Vector Control, and all of the committees and interested parties involved in preparing this document. I can appreciate the amount of effort expended in implementing a project of this magnitude.

The Town of Babylon supports and recognizes the need for mosquito control in our combined suburban and natural environment here on Long Island. Suffolk County Vector Control has continuously demonstrated a sound scientific approach to mosquito control at all life cycle stages in order to prevent nuisance occurrences and threats to public health.

The Town of Babylon has many miles of salt marsh on its barrier islands, wetlands abutting its many south shore watersheds/creeks and a multitude of man-made features that have the potential to impact its residents with mosquito infestation. The Town is also home to many residents that maintain concerns with respect to the use of pesticides. For those reasons Babylon has a vested interest in the County's Vector Control Program and the outcome of the recently released DGEIS/Long Term Plan.

Upon reviewing the document(s), the Town of Babylon offers the following comments:

- The approach to prepare the plan which included a comprehensive literature review, the selection of subsections of the County for risk assessment of pesticides and the use of scientific experiments to support development of the Plan is sound.

Ellen T. McVeety
Councilwoman
Deputy Supervisor

David Bishop
Councilman

Lindsay Patrick Henry
Councilman

Carol A. Quirk
Councilwoman

Corinne DiSomma
Receiver of Taxes

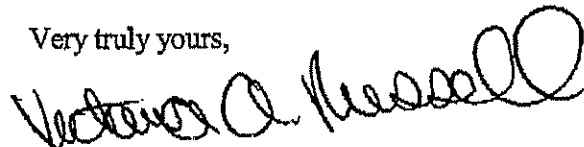
Janice E. Tinsley-Colbert
Town Clerk

- Babylon concurs with the Long Term Plan's primary goal of protecting the public health and welfare from mosquitoes and mosquito borne disease while at the same time reducing the use of pesticides.
- Babylon concurs that control methods to avoid the use of adulticides is preferred and the need for adulticide application signals inadequate efforts in earlier efforts for vector control.
- The hierarchal approach proposed for mosquito management is comprehensive and well reasoned.
- The Long Term Plan supports many aspects of the current SCVC Program and identifies areas where improvements can be made.
- Many aspects of the Long Term Plan are labor intensive. The Suffolk County Legislature must continue to fund the program for the Plan mandates to function.
- The Long Term Plan's components which include public education, surveillance, source reduction, biocontrols, larval controls and adult controls as a last resort is logical.
- The County must remain vigilant in screening for mosquito borne viruses. The County should pursue improvements discussed in the Plan that would decrease the amount of time to obtain laboratory results.
- One of the Town of Babylon's concerns with the plan is its emphasis on labor. Should staffing levels decrease in the future, it is unlikely the Plan in its current form could be continued. The result would likely be an increase in pesticide usage or substantial increase in mosquito population.
- The proposed buffer zones to wetland areas for adulticide spraying may require future evaluation. Many of these areas have been disturbed and may have the highest concentrations of mosquitoes. The caged fish study and risk assessment demonstrates no elevated risks to humans and minimal impacts to the environment whereby the limited use and rapid breakdown of the pesticides mitigate such impacts.
- The document allays concerns associated with pesticide usage in the program.

The process to produce this document included substantial public outreach in an effort to include all groups and all issues of interest. Committees were formed that included all interested parties. These groups met throughout the preparation of the document. Therefore all interested parties were supplied ample opportunity to comment before and during the preparation of the document.

The document was prepared by a team of experts, examines a variety of alternatives, adequately addresses the issues of concern, and meets the requirements of SEQRA. The Long Term Plan provides the framework for the future program and balances the need to protect public health while reducing the usage of pesticides. Please don't hesitate to contact this office if you have any questions.

Very truly yours,



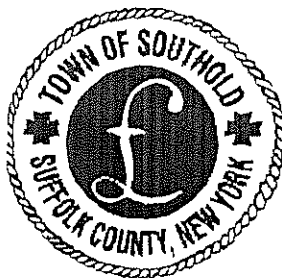
Victoria A. Russell
Commissioner

VAR:ch

cc: Steven Levy, Suffolk County Executive
Steven Bellone, Supervisor, Town of Babylon
Ronald C. Kluesener, Chief of Staff, Town of Babylon
Louis D'Amaro, Suffolk County Legislator
Wayne Horsley, Suffolk County Legislator
Elie Mystal, Suffolk County Legislator
Dominick Ninivaggi, Suffolk County Vector Control
Thomas Iwanejko, Suffolk County Vector Control

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James F. King, President
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 Peggy A. Dickerson
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 Southold, New York 11971-0959

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BOARD OF TOWN TRUSTEES
 TOWN OF SOUTHDOLD

July 12, 2006

Mr James Bagg
 Chief Environmental Analyst
 Council on Environmental Quality
 H. Lee Dennison Building
 Hauppauge, New York 11787

Re: Suffolk County Vector Control - Draft EIS- June 2006

Dear Mr. Bagg:

The following comments are concerns of the Southold Board of Trustees regarding the Suffolk County Vector Control and Wetlands Management DGEIS.

We support the overall plan to restore marshes where ditching has occurred and to reduce the use of pesticides. There are many parts of the DGEIS that are a thorough overview of the mosquito problem.

However, the marsh alteration proposed in the Plan to decrease the need for pesticides, creating ponds in the wetlands 3 feet deep to increase the mosquito eating fish does not preserve the integrity of the wetlands. This "Open Marsh Water Management", requires the digging of ponds throughout the marsh. These ponds remove wetland vegetation, increase the impact on the marsh during construction, disturbances may bring in Phragmites, and they decrease existing bird habitat for marsh birds. There also is not enough hard evidence that the ponds do decrease mosquitoes. They may cause more problems as the ditching in the 1930s did. Another problem is that they break up or fragment the high marsh habitat that is important for many species. These are not a good solution for Southold's marshes.

There has been a great deal of loss of wetlands and bog over the past several years. The cause has not been definitively identified; it may be the rise of sea level, storms or boats causing erosion and peat slough off, pollutants changing water chemistry and allowing a fungus to form that destroys the Spartina or other factors. The Vector Control Plans may

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decrease mosquito breeding habitat but the changes and possible damage to the marsh are not justified.

The consensus in Southold is that the following be included for the tidal marshes of the Town:

Marsh restoration projects, which have been successful in East Hampton, to include the following:

1. Ditch plugging, to allow for retention of water, and reestablishment of *Spartina alterniflora*.
2. Culvert enlargement
3. Removal of dredge spoil along ditches and on the marshes
4. Natural reversion of ditches
5. Removal of *Phragmites*

The main concern with mosquitoes is the diseases that they carry. There have been no cases of West Nile Virus in salt marsh mosquitoes since 1999. It is found in the fresh water mosquitoes. West Nile Virus has been decreasing over the past several years. Decrease the use of pesticides and increase testing for numbers of mosquitoes and for the diseases.

The DEIS also does not clarify the difference between a health/disease problem and a nuisance. These are clearly not the same thing. A nuisance does not justify the harmful affects of the pesticides and the marsh impacts.

The main pesticide that is used is Methoprene. It is a hormone inhibitor that stops the larval stage from maturing to adult. It also impacts the larval stage of other insects, some mosquito predators, and crustaceans, including dragonflies, a variety of beetles, ladybugs, crabs, and grass shrimp. Other natural predators of mosquitoes include bats, birds, frogs, and fish. There is much evidence that the pesticides have been impacting the development of frogs that have been found to have various defects.

The DEIS does not specify the use of Integrated Pest Management. They need to be more detailed as to how effective the pesticides are and exactly how much pesticide is used each time it is sprayed. They need to use the same standards that the farmers are kept to by the DEC. This also will show the resistance to the chemicals.

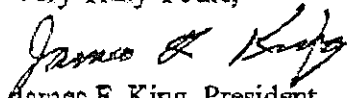
The placement of wetland experts/conservationists (Audubon or Nature Conservancy) and Trustees/Towns on the steering committee would improve the Plan.

Additional educational components would improve the plan. The Vector Control flyer could go to Town Halls, schools, and stores in addition to libraries. The majority of mosquitoes breed in fresh water. There are many things that homeowners can do to decrease mosquito breeding in their yards, including time of day of watering, avoiding collection of water in containers and pooling, building of fish ponds, bat boxes, and

plantings and habitats that encourage mosquito predators, namely dragonflies and swallows.

Thank you for considering this information. We ask that they be incorporated into the DGEIS.

Very Truly Yours,


James F. King, President
Southold Town Board of Trustees

JFK/hkc

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COASTAL RESOURCES

PAGE 02
PAGE 02/02



STATE OF NEW YORK
DEPARTMENT OF STATE
41 STATE STREET
ALBANY, NY 12231-0001

George E. Pataki
Governor

Christopher L. Jacobs
Secretary of State

July 14, 2006

James Bagg, Chief Environmental Analyst
Council on Environmental Quality
H. Lee Dennison Building
100 Veterans Highway
Hauppauge, NY 11787

Dear Mr. Bagg:

The Department of State, as a member of the Suffolk County Vector Control and Wetlands Management Long-term Plan Steering Committee, and in its role as chair of the South Shore Estuary Reserve Council, appreciates the opportunity to provide the following comments on the Suffolk County Vector Control and Wetlands Management Long-term Plan and Draft Generic Environmental Impact Statement.

After careful review of the wetlands management plan and the salt marsh best management practices manual (Task 10), the Department continues to have concerns with the real ecological risks associated with Class II BMP 8 (*Back-blading and/or Sidecasting Material into Depressions*) and most if not all Class III best management practices. The Department does not concur with use of these practices given the absence in the plan of baseline data regarding their effectiveness and ecological risks, and the absence of any substantive details relating to how projects will be considered, designed, implemented, and monitored beyond the fact that such will happen as part of future development of Annual Strategy Plans. The burden is on Suffolk County Vector Control to be sure that project designs, during both development and assessment by the County and the wetlands subcommittee, receive due diligence in terms of exploring the ecological risks associated with the more progressive Class II and Class III water management practices.

The Department's Division of Coastal Resources looks forward to active participation on the wetlands subcommittee and the screening committee to ensure that the Department's concerns are adequately addressed.

Please contact me at (518) 474-6000 if I can be of further assistance.

Sincerely,

Fred J. Anders

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COMMENTS
DRAFT DGEIS FOR THE SCVC &
WETLAND MANAGEMENT LONG TERM PLAN
Volume 1 of 7

Jack Mattice

Glossary – Consistently include acronyms before the definitions where they apply, e.g.,
EEE. | 1

PES-48ff – Not clear when these biocontrols will be used “only be used when source
reduction is not possible.” Why are we proposing non-native fish whether or not they are
considered ‘invasive’. Are they already “widespread in County waters”? If not, we
should not be suggesting introducing them. | 2,3,4

PES-49ff -Larval triggers and ‘If, then’ scenarios are so generic as to be useless for
purposes of evaluating the program. How about grouping species, habitats stage of
larvae and efficacy of considered treatment in a matrix like Table ES-6, but which has
some real decision triggers - ES-6 has none. Perhaps using a narrative to discuss
scenarios as is done with the adulticides is the way to go. | 5

PES-56 - Presence/absence versus numbers of larvae per scoop are cited several times,
but it needs to be clear what is really being promised without further technique
development. Or, if technique development is required, who is going to do it and pay for
it? | 6
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PES-57, 61 - The ‘if, then’ scenario treatment for adults seems quite reasonable (vs the
larval one), but it’s not clear which program managers do the risk determination and how.
And how does the community preference factor into the decisions? For example, if one
community’s decisions can affect another community’s problems how is this factored
into decisions?? | 8,9
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PES-62 – Who makes up the QA/QC team? What expertise do they bring to the
decisions? What would be the minimum complement of the team that could make a
decision? | 12
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PES-63 – Can the County ever drop back to the full 4-tiered WNV response strategy? | 14

PES- 64 – Second paragraph – When will the County make decisions about the need for
more CDC traps? | 15

PES-66 – Cycling Center and Amplification Area definitions? I don't remember seeing these before. Add to Glossary? | 16

ES-68 – Malathion is used only “where the other pesticides would not be effective?” | 17
Where or when or under what conditions is that?

Application methods – Need these limits earlier in the document. They proscribe any application decisions and should therefore come at the beginning of the sections on decisions about progressive water management, application of pesticides, etc. | 18

ES-69 – Line 9 – Operator judgment suggests that the best laid plans may be superceded by the person in the field. That might be necessary, but what are the limits on such decisions? What are the criteria for making changes, i.e., how far can the setback rules be shifted, etc.? | 19

ES-70 – Line 18, Whose decision? Same question re P 71 bottom. | 20,21

ES-72 – Can the ‘areas that are not worthwhile to use pesticides’ be put on a map so that it's clear where pesticides will not be used? | 22

Table ES-10 Isn't pathway the only decider that is really used in this table? | 23

General Comment – When a decision point is given, indicate who will make the decision and how/ | 24

L



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
& ENVIRONMENTAL CONTROL
DIVISION OF FISH & WILDLIFE
89 Kings Highway
Dover, Delaware 19901

OFFICE OF THE
DIRECTOR

July 14, 2006

Dominick V. Ninivaggi
Division of Vector Control
Suffolk County Dept. of Public Works
335 Yaphank Avenue
Yaphank, NY 11980

Re: Use of Open Marsh Water Management (OMWM) for saltmarsh mosquito control and tidal wetlands habitat restoration in Delaware (relative to Suffolk County’s draft Mosquito Control and Wetlands Management Long-Term Plan/EIS)

Dear Mr. Ninivaggi:

We recently became aware that the Open Marsh Water Management (OMWM) program being initiated by Suffolk County’s Division of Vector Control for purposes of good mosquito control is being questioned and seemingly criticized by some environmental interest groups, with these groups having concerns about the mosquito control effectiveness of OMWM, plus concerns about potential damage to high tide marsh (irregularly-flooded) vegetation communities caused by OMWM excavations, and by the deposition of excavated spoil on salt marsh surfaces.

Kindly be aware that OMWM has been practiced in the State of Delaware since 1979, and some of the concerns now being raised by some environmental interest groups in Suffolk County are similar to some environmental concerns raised in Delaware over 25 years ago. Over the course of time, through quantitative scientific investigations and qualitative field observations, our staff scientists have determined that OMWM is the most effective agent for controlling saltmarsh mosquitoes. Typically, mosquito populations are reduced by >95% on salt marshes treated with OMWM, and these good effects last over the typical 15-25 year functional longevity of an OMWM system (an OMWM system’s lifespan depends upon local geo-physical and biological conditions, after which some additional maintenance might be required).

OMWM features alter or usurp ovipositioning sites for aedine mosquitoes, while creating habitat and promoting access for native larvivorous fishes. As a result of this mosquito suppression in mosquito production, properly designed and installed OMWM systems require no or only very little additional chemical treatments for mosquito control, so the need to larvicide is then eliminated, or if still needed has to then be done only very infrequently. For example, upon recent completion of several large OMWM projects in Delaware (at >300 acres per project), local saltmarsh mosquito populations and mosquito complaints from area residents drastically declined, the need to larvicide was essentially eliminated, and our need to have to adulticide nearby residential areas dropped to nearly zero, with all this occurring almost immediately upon OMWM completion. Please be aware that prior to OMWM treatments, these

Delaware’s good nature depends on you!

areas had a long and intensive history of saltmarsh larviciding (from 4-8 times per year), plus often the need to adulticide too in nearby residential areas (from 2-4 times per year) even after larviciding.

Another benefit for using OMWM is one of cost-effectiveness for mosquito control purposes, although this economic benefit is by no means the driving force behind choosing to use OMWM in any salt marsh. We have found that given a typical longevity for an OMWM system of about 20 years, during which as an alternative to OMWM a marsh would have typically been larvicided about 6 times per year, that within about a 7-year span from completion of an OMWM project the initial relatively higher start-up costs of performing OMWM have by then matched what would have been our total larviciding costs during this period, and that from years 8-20 we're then realizing some pretty substantial savings each-and-every year in our not having to larvicide. | 10

While OMWM's effectiveness is easily demonstrable (for controlling saltmarsh mosquitoes and reducing chemical applications), special care must be given such that OMWM does not undesirably alter or adversely affect saltmarsh vegetation communities (e.g. the conversion of salt hay habitats to areas dominated by marsh shrubs or phragmites). Changes in vegetation patterns can sometimes result from excessive salt marsh de-watering, and are generally linked to the inappropriate use or overuse of "fully-open" tidal ditches within OMWM systems in some high marsh areas, where these open tidal ditches might then excessively lower the marsh's subsurface water table. Additionally, depositing excavated spoil too deeply over marsh surfaces can hinder vegetation recovery, or cause an excessive increase in marsh surface elevation that then leads to vegetation changes; however, such impacts can be avoided by careful handling of marsh spoil, either by using spoil to help fill-in nearby breeding depressions up to marsh surface level, or by broadcast spraying of spoil as a crude slurry that thinly deposits over marsh surfaces (using a rotary cutting head to do this), or by carefully blading/spreading deposited spoil over marsh surfaces to suitably low heights, using low-ground-pressure equipment to accomplish all of this. When care is used in handling and depositing excavated OMWM spoil, the original type and density of vegetation fully returns within only 1-2 growing seasons. Appropriately trained OMWM biologists can easily avert system design or installation problems; and if any undesirable vegetative changes still unexpectedly occur, these changes can be corrected by blocking or filling-in any OMWM open tidal features that might have been overdone, or by further blading/spreading any excessive spoil deposition, and then in either situation allowing a little more time for further vegetation recovery. | 11 | 12 | 13 | 14 | 15 | 16 | 17

Some critics apparently claim that OMWM excavations will exacerbate salt marsh erosion and wetland loss due to rising sea levels. As wetland biologists who spend a great deal of time on salt marshes and who are often the first to notice wetland changes, kindly be aware that we have never seen or documented such phenomena as occurring in association with OMWM features. Generally, the surface areas of our OMWM excavations (which consist primarily of shallow ponds from about 0.05-0.25 acres in size, plus associated narrow spur ditches) account for no more than about 3-5% of the total surface area of an OMWM-treated salt marsh; as such, these newly created bodies of open water are relatively small within a bigger geographic perspective. We know of no evidence showing that small, shallow bodies of water (i.e. OMWM ponds) located on the high salt marsh, typically well removed from the high tidal energy regimes of larger creeks, rivers, bays or oceans, contribute in any way to salt marsh erosion. | 18 | 19 | 20

We also don't view the conversion of some wetland grassy habitats to wetland open water habitats (the latter in the form of small, shallow OMWM ponds) as being any type of wetlands "loss," but rather as simply a planned, acceptable, very localized conversion from one type of wetlands to another type of wetlands. This type of wetlands conversion can be particularly beneficial in marshes that were altered by the effects of open, fully-tidal parallel-grid-ditches that were first installed back in the 1930s, and which might have then been maintained into the 1960s or later [parallel-grid-ditches were first installed by the Civilian Conservation Corps in the 1930s for both mosquito control purposes (that were often never fully realized) and to help put people to work during the Great Depression]. Parallel-grid-ditches often | 21

excessively dewatered marsh surfaces at the expense of good fish-and-wildlife habitat, and in particular were detrimental in their draining of larger natural ponds. The use of OMWM systems retrofitted over parallel-grid-ditched networks helps to restore valuable shallow water habitats on marsh surfaces, benefiting waterfowl, shorebird and wading bird populations, plus creates good aquatic nursery habitats for estuarine fishes and invertebrates. Conversion of some wetland grassy habitats to wetland open water habitats is actually a restoration of an important wetlands habitat type that was lost in many areas due to the effects of parallel-grid-ditching, and certainly not a “loss” of wetlands habitat. When OMWM systems are carefully planned and installed, OMWM-treated sites following 1-2 growing seasons of vegetation recovery can be quite natural looking and aesthetically pleasing.

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Delaware has a total of about 95,000 acres of tidal wetlands, and starting in 1979 the State targeted a statewide universe of about 9000 acres for eventual OMWM treatment, confined primarily to areas of the high marsh where saltmarsh mosquito production is greatest and thus most problematic to people. To date we have successfully treated about 7000 of these targeted acres with OMWM, and are proceeding to treat the remaining target acres too. Several hundred of our already treated OMWM acres are in Prime Hook National Wildlife Refuge (involving previously parallel-grid-ditched marshes), and we have also made extensive use of OMWM in State Wildlife Areas and State Parks, plus on many private lands too (private land OMWM sites in Delaware include marshes owned by The Nature Conservancy or by the Delaware Nature Society). Originally back in 1979 we had also targeted for OMWM treatment about 6000 acres of high marsh breeding habitat in Bombay Hook National Wildlife Refuge, but by the late 1980s the U.S. Fish and Wildlife Service had made a policy decision not to allow OMWM on this particular Refuge, since a large portion of this Refuge’s marshland had never been parallel-grid-ditched and thus remained visibly unaltered – given how very little coastal marsh in the Northeast has not been parallel-grid-ditched and hence might still remain visibly unaltered, the Service felt that it was desirable to try to maintain whatever is currently left of visibly unaltered marsh. From a philosophical standpoint, a strong case can be made that this certainly makes good sense. However, in so doing and given how close this Refuge is to people living in the Dover-Smyrna area (within easy flight range of the Refuge’s saltmarsh mosquitoes), then as a corollary and a modern fact-of-life the Service has now also committed in perpetuity (without actually saying this) to larvicide treatments for Bombay Hook’s breeding marshes. Overall, the **Delaware Division of Fish and Wildlife**, of which the Mosquito Control Section is an integral component, is very pleased with and heartily endorses the judicious, appropriate use of OMWM.

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In summary, OMWM does present some environmental risks in terms of possibly causing some undesirable vegetation community changes, but these risks can be greatly minimized or fully eliminated with appropriate care for the siting, design, construction and management of OMWM systems. The benefits of using OMWM are very significant, yielding excellent mosquito control, reduced threats of mosquito-borne diseases, reduced or eliminated insecticide applications, and in many areas restored or enhanced fish-and-wildlife habitats. Appropriately employed, an OMWM program at the county or state level can be a “win-win” situation all around, both for the public’s health and well-being and for the environment too.

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Sincerely,

William H. Meredith, Ph.D.
Environmental Program Administrator
Delaware Mosquito Control Section
office phone: 302-739-9917

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Long Island National Wildlife Refuge Complex
360 Smith Road, P.O. Box 21
Shirley, New York 11967



July 16, 2006

Mr. James Bagg
Chief Environmental Analyst
Council on Environmental Quality
H. Lee Denison Building
Hauppauge, NY 11787

Dear Mr. Bagg:

The U.S. Fish and Wildlife Service's Long Island National Wildlife Refuge Complex (Refuge) has reviewed the Draft Generic Environmental Impact Statement (DGEIS) for the Suffolk County Vector Control and Wetlands Management Long Term Plan dated May 3, 2006. The DGEIS describes the impacts associated with the implementation of vector control activities such as pesticide application, source reduction, marsh management, and public education, as well as creating a Wetlands Screening Committee to review and advise the County on future wetland management activities. The Refuge will restrict our comments to those aspects of the plan that relate to National Wildlife Refuges in Suffolk County, New York. Other comments may be provided by the Fish and Wildlife Services Ecological Services branch under a separate cover.

As stated in the DEGEIS, mosquito management activities such as mosquito monitoring and/or mosquito larval control by the aerial application of BTI and Altosid are conducted by Suffolk County Vector Control (SCVC) within the tidal saltmarshes of the Wertheim NWR. In 2005, the Service developed Interim Mosquito Guidance that states, "when necessary to protect human, wildlife, or domestic animal health, the Service will reduce mosquitoes associated health threats using an integrated pest management (IPM) approach, including when practical compatible, non-pesticide actions that reduce mosquito production. Except in officially determined health emergencies, any procedure the Service use to reduce mosquito production will meet compatibility requirements as found in 603 FW 2 and must give full consideration to the safety and integrity of non-target organisms and communities, including federally listed threatened and endangered species." (Interim Mosquito Guidance 2005). The Refuge will continue to work with the County as the Vector Control and Wetlands Management Long Term Plan is developed to implement the Interim Mosquito Guidance and protect human and wildlife health.

As is also stated in the DGEIS, the County has partnered with the Refuge to implement Open Marsh Water Management (OMWM) on two formerly grid-ditched salt marsh areas on the Wertheim National Wildlife Refuge in the Town of Brookhaven. Grid ditches were constructed in these marshes in the 1930's prior to the establishment of the Refuge. The project goals include restoration of natural hydrology, reductions in the need for pesticide applications, and increasing habitat diversity to benefit fish and

wildlife species. The total size of the two areas is approximately 80 acres although the actual total project footprint is closer to 20 acres including temporary and permanent features such as construction areas, staging sites, and access areas.

The recent OMWM activities at the Refuge have included the following: 1) dredging small, irregularly shaped tidal ponds in areas where the highest mosquito breeding was formerly recorded, 2) constructing sinusoidal creek channels to mimic natural tidal creeks and maintain tidal flow into the ponds, 3) filling in and grading the grid ditch system to restore a more natural hydrology to the marshes, and 4) grading small areas where the existing high marsh was in decline.

Initial OMWM Assessment

The County has collected pre- and post-construction data within the two OMWM construction areas and within two control sites where construction has not occurred, to evaluate the effects of OMWM on the Refuge marshes. This study design allows the County and the Refuge to compare impacted vs. non-impacted marshes and also evaluate site-specific effects using pre- and post-construction data. In addition, the County collects data on the location and abundance of mosquito larvae production on Refuge marshes. The pre-construction data and mosquito larvae data are important both in developing the management plans for Refuge marshes and evaluating the impacts of management actions.

Construction of OMWM Area 1 took place in March 2005 and in OMWM Area 2 in February to March 2006. Some minor work to adjust marsh surface elevations to design specifications was also done in March 2006 in Area 1. Revegetation of the disturbed areas has progressed well and all but the most disturbed sites support salt marsh vegetation such as *Spartina patens* and *Distichlis spicata*, or brackish marsh plants such as *Scirpus americanus*, *Juncus effusus*, and *Spartina cynosuroides*. Coverage of the invasive plant species *Phragmites australis* has also been reduced, particularly in Area 1.

Prior to construction, Areas 1 and 2 were regularly treated with larvicides up to 10 applications per year. Mosquito larvae production and the need for larvicide treatment has been reduced following construction.

The project impact areas also support fish and wildlife species. Fish sampling efforts and incidental observations have confirmed the presence of large numbers of mummichogs (*Fundulus heteroclitus*) in the ponds and mummichogs, sheepshead minnows (*Cyprinodon variegatus*), and silversides (*Menidia* spp.) in the tidal creeks.

Bird surveys have identified numerous wading birds, waterfowl, and shorebird use of Areas 1 and 2 following construction. In addition, the following state listed endangered, threatened, and special concern species have been observed following construction: black rail (*Laterallus jamaicensis*), northern harrier (*Circus cyaneus*), short-eared owl (*Asio flammeus*), and black skimmer (*Rynchops niger*).

The County has committed to long-term monitoring of the project impact areas and the control sites as required by the New York State Department of Environmental Conservation and is necessary to evaluate the effects of OMWM on Refuge marshes and the associated fish and wildlife resources. This long-term monitoring may also be of use to other land managers who are looking to eliminate grid ditches to restore a more natural hydrology and/or reduce the use of pesticides.

Summary

The preliminary sampling data and incidental observations following construction of Areas 1 and 2 indicate that the OMWM project areas are supporting salt marsh or brackish marsh vegetation, providing habitat for a variety of fish and wildlife species, and reducing the production of mosquito larvae which has resulted in reductions in pesticide application. The proposed on-going monitoring of the construction areas and the control areas will provide information on the long-term effects of the OMWM project.

The above comments also do not preclude the separate evaluation and comments by the Service that may be necessary pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) or the Endangered Species Act of 1973.

If you require additional information please contact myself or Alex Chmielewski at 631-286-0485.

Sincerely,



Deborah Long
Refuge Manager

cc: USFWS, LIFO (Islip, NY)

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July 17, 2006

Mr. James Bagg
Chief Environmental Analyst
Council on Environmental Quality
H. Lee Dennison Building
Hauppauge, NY 11787
James.Bagg@suffolkcountyny.gov

Re: Suffolk County Vector Control
DGEIS & Long Term Plan

Dear Mr. Bagg:

Peconic Baykeeper joins in the comments submitted by a coalition of organizations concerned with various aspects of the DGEIS, but writes separately to voice our concern with the adequacy of the documents under review.

Submitted peer reviews and our previous comments identify greater than disclosed adverse impacts associated with present and proposed adulticiding, larviciding, and water management activities. Furthermore, the purported benefits arising from this program are overstated. As a consequence, it is our belief that the DGEIS does not adequately perform its function of informing the decision maker of the facts upon which a determination of policy may be made.

For example, the DGEIS estimates adult control through adulticides is over 90% effective while Dr. Pimentel estimates effectiveness at less than half that rate by truck ULV, citing the limited studies that actually exist. Likewise, the DGEIS assumes that there shall be no adverse impacts from the use of the proposed adulticides, an assumption disputed by the Reviewer #2 of the risk assessment and Dr. Pimentel.

Another "policy pre-emption" is the zero percent risk standard used for mosquito borne disease prevention while using EPA derived numerical limits to assess human health risks from pesticides. Exec. Summary ES-6, 136-37. This introduces an unjustified bias in favor of incurring risk from pesticides over the risk of mosquito borne disease. Since the emphasis of the larviciding, adulticiding, and water management is upon the control of salt water mosquitoes, from which there is only a slight risk of infection, the zero percent risk factor is emblematic of the conflation of disease with nuisance control that informs these documents throughout. The West Nile Virus culprit, both for amplification of the disease and its transmission, are the predominantly stagnant artificial container breeding mosquitoes of the Culex species. This information comes from Suffolk County Department of Health Services' own analyst, Dr. Scott Campbell. See Kilpatrick et al., West Nile Virus Risk Assessment and the Bridge Vector Paradigm, Emerging Infectious Diseases, Vol. 11, No. 3 (March 2005). The risks from other mosquito borne diseases are trivial, albeit greater than zero.

As a matter of policy, or politics, Suffolk County might elect to ineffectively control adult mosquitoes with potentially dangerous chemicals purely for nuisance control. However, such a determination needs to be made in the light of day and not under the DGEIS as presented. It is essential that the CEQ reject agency responses to the substantive comments to the DGEIS that do not acknowledge, at the very least, the controversy over the harms and benefits arising from the contemplated activities. A review of other jurisdictions underscores how politically driven are mosquito control decisions. Westchester, for example, only has a WNV response program, and otherwise does not seek to control mosquitoes at all. DGEIS p. 43.

The second structural deficiency is the failure of the DGEIS to articulate rational alternatives. This failure stems from the skewed review of benefits and impacts. To the extent that the DGEIS responses to comments identify adverse impacts and limited benefits, the alternatives shall also need to be reweighed. For example, water management alternatives to the proposed Open Marsh Water Management ("OMWM") are limited to no water management, selective ditch maintenance, or maintenance of all ditches. *Id.* at 1190. No water management is, of course, irrational. There are numerous structures maintained by Vector Control that are essential to maintain tidal connections and reduce flooding. Most of these structures are necessary to mitigate impacts resulting from human development. The maintenance of all ditches as an alternative is also a diversion - the general grid and parallel ditching as a means of mosquito control is debunked, even within the section that describes it. *Id.* at 1196. Selective ditch maintenance, represented as the current program, is presented vaguely as a beneficial practice to water quality, mosquito control, and fish habitat, though it also has unspecified "other impacts" that are presumably adverse. The pros and cons of the present program, and its extent, need to be fully articulated in order to be compared with OMWM.

The determination that OMWM is the only appropriate alternative assumes beneficial mosquito control can be joined with wetlands restoration. Connecticut is cited for this principal. *Id.* at 538. However, one architect of tidal wetlands restoration in Connecticut, Ron Roza, does not agree with such a conflation. See attached e-mail from Roza to McAllister, June 16, 2004. Indeed, I understand that other comments have been submitted that question OMWM altogether, and yet it is presented as a panacea and directly analogous to restoration.

When the CEQ accepted the DGEIS as complete, it pointedly did not accept the content. Indeed, some members of CEQ admitted that they had not read the documents, but had relied on the subcommittee to confirm the DGEIS conformity with scoping. I urge the CEQ to insist that the DGEIS reflect the body of opinion in the scientific community before recommending the acceptance of a DGEIS. As for the proposed plan of work, it cannot be reviewed coherently without the benefit of an objective EIS.

Peconic Baykeeper believes that there is a spectrum of mosquito control activities - of varying degrees of control, as well as public education, artificial source reduction, and surveillance - that a rational and informed public might embrace. The proposed plan

argues that there is only one shade in that spectrum that could be rationally adopted, suggesting that community preference is pre-determined and that there are no interests to be weighed. The plan argues too much.

As a final matter, I ask the CEQ to provide public access to all comments it has received throughout this process. Thank you for your consideration of these comments.

Sincerely,

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Kevin McAllister

From: "Ron Rozsa" <ron.rozsa@po.state.ct.us>
To: <mac@peconicbaykeeper.org>
Cc: <rswar@conncoll.edu>; <Tom_Halivolk@fws.gov>; "Harry Yamalls"
<harry.yamalls@po.state.ct.us>; "Lori Benoit" <lori.benoit@po.state.ct.us>; "Paul Capotosto"
<paul.capotosto@po.state.ct.us>; "Roger Wolfe" <roger.wolfe@po.state.ct.us>
Sent: Wednesday, June 16, 2004 8:16 AM
Subject: Re: marsh restoration

If you examine the origins of OMWM - it comprises a series of techniques that have a primary goal of controlling mosquito breeding. One key difference between OMWM and mosquito ditching is an attempt to not change the hydrology of the marsh with OMWM - ditches connected to estuarine waters rise and fall with the tide and promote draining of the marsh and loss of pools and pannes.

OMWM techniques - ponds plus various non-tidal ditches are designed to control mosquitoes.

OMWM is not marsh restoration - for restoration endeavors to restore the pre-disturbance (man-caused) to the extent feasible. So in Connecticut, having documented that ditching caused the loss of pools and ponds - part of our restoration strategy is restore pools and ponds. We are seeing that with tidal flow restoration to diked and drained marshes or even impounded marshes - there is a gradual return of pannes and we are still assessing the return of ponds (this may be happening on a multi-decadal time frame and if we are patient -we may still see the return of ponds).

Wherever possible we look for historic aerial photography to advise us on how many ponds, pond size etc. Susan Adamowicz with the USFWS recently completed her PhD - the first study to examine the characteristics of natural ponds in salt marshes throughout New England.

Connecticut is EXPERIMENTING with an approach to - in the absence of historic photography - to develop a design wherein ponds are excavated (to restore this habitat lost to ditching) and to dispose of the excavated soil into ditches to restore tidal hydrology. Our first design on the East River in Guilford - in retrospect- is flawed in that we plugged every ditch and forgot to leave ditches every so often as is the case for the few unditched marshes we have as a model. Subsequently we have changed that model to leave every third or so ditch open - and that EXPERIMENT on the Quinnipiac River is under study. Our third EXPERIMENTAL design is on the lower CT River where we are testing a hypothesis that restoration of the tidal hydrology by ditch plugging - will elevate the sulfide and salt concentrations and help to check the invasion by the non-native form of Phragmites. We are also testing to see if strategic ditch plugging can shift the drainage to the original meandering tidal creeks - the remnants of which are still present.

Based upon the results of these studies - we may decide to continue these practices for the purpose of habitat restoration. So pond restoration 1) does not target mosquito breeding areas and 2) does not incorporate other OMWM techniques such as radials or reservoir ditches which target mosquito breeding habitat.

OMWM is simply a mosquito control practice - pond restoration using historic information about the size, number and distribution of natural ponds is a bonafide habitat restoration technique. Still the question (and cost effective at that) - if we are patient and stop thinking on human time frames - will pond habitat return to our restoration marshes?

Hope that helps.

9/27/2004

Page 2 of 3

Kon

>>> "Kevin McAllister" <mac@peconicbaykeeper.org> 06/15/04 09:52AM >>>
Hi Ron,

If you recall, I spoke with you ~6 months ago regarding the Conn's efforts to restore coastal marshlands vs. Suffolk County's ongoing ditching program for mosquito control. If i recall correctly, you made a clear distinction between OMWM and restoration, that they weren't necessarily the same. Suffolk County has been using the terms synonymously. could you please take the time to comment.

thanks

Kevin McAllister
Peconic Baykeeper



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Comments on the Suffolk County Vector Control and Wetlands Management Long Term Plan and Draft Generic Environmental Impact Statement

Citizens Campaign for the Environment (CCE) is an 80,000-member independent, not-for-profit advocacy organization working for the protection of public health and the natural environment in New York State. CCE has been providing public input to Suffolk County's vector control plan since 1999.

CCE is pleased to have this opportunity to review and comment on the DGEIS. In general, CCE wishes to acknowledge the technical and professional work that went into of the plan. The level of expertise is greatly appreciated.

Comments:

□ Disease Control Versus Nuisance Control

"In general, "vector control" is interchangeable with "public health nuisance control," as these instances of adult control take place under conditions where there is a low imminent public health threat of the outbreak of serious disease (such as WNV or EEE), where the risk to the public cannot be said to be zero, and where sublethal impacts also occur." (Page ES-12).

- The Plan states a true distinction between nuisance control and health-based vector control is impossible. CCE believes there is a true distinction between the two and it's hazardous to state otherwise. Adulticides shouldn't be taken lightly and with a blurred definition more spraying than needed may occur, which would have adverse impacts to the surrounding communities, wildlife and environment.

Suffolk County's Vector Control Division has been applying adulticides for nuisance control since the 1930's. This is evident not only in the County's actions but also by the statements presented in recent *Work Plans* published by Suffolk County. For instance, in the 2000, 2001, 2002, 2003 and 2004 *Annual Plan of Work*, Suffolk County Department of Public Works Division of Vector Control all state "The Division's responsibility is to control mosquito infestations that significantly threaten public health, or create social or economic problems to the communities in which they occur. To achieve this goal, the Division employs an integrated control program," (page one). Again, each *Work Plan* states, "These [the Division's] goals are:

1. Protect the public from mosquito-borne diseases.
2. Reduce mosquito infestations to alleviate social or economic impact to the public." (Page three).

It appears that previous work plans and vector control activities have been able to distinguish between disease control and nuisance control of mosquitoes. Past reports, as well as public meeting presentations by SCVC representatives, have attempted to explain the rationale for the County's nuisance control program. However, the Plan erroneously states "A true distinction proved to be impossible because all mosquitoes found in Suffolk County that bite people are capable of spreading disease, and therefore, the public health risks from biting mosquitoes can never be said to be zero... Finally, health concerns from mosquito infestations exist (pain, itching, possibility of infections, etc.), irrespective of detected pathogens. Vector control clearly results in ancillary quality-of-life benefits..." (Page ES-6)

We agree with the need for disease control in Suffolk County, however, we are not in agreement in the County's inability to make a distinction between presence of disease and nuisance infestations. We have the following concerns associated with this proposed theory:

- Current language in the Plan linking all mosquito control with disease control is not a reflection of the reality of disease control and will result in needless public alarm with a false perception that all mosquitoes are harmful or possibly deadly. This false perception can result in increased demand from the public for adulticide applications and perhaps even an increase use in DEET and other dangerous pesticide products applied directly to children.
- This theory implies that reducing saltwater mosquito populations will reduce incidence of WNV. This is not supported by current test results, which have yet to establish saltwater mosquitoes as carriers or as good vectors of this virus in Suffolk County.
- The Long Term Plan repeatedly emphasizes that a primary function of disease control is to reduce the potential impact of EEE. We should be mindful that according to the Center for Disease Control (CDC) in Atlanta, Georgia, there have been two human incidents of EEE in humans in New York since 1960. Both cases were in Onondaga County around the Cicero Swamp. Suffolk County has never had a case of EEE in humans. The new language will give the public the false impression that EEE is carried by both salt and fresh water mosquitoes and is a acute threat.
- Onondaga County, the only place in NY where EEE cases were found, only has a disease control program. They do not have a nuisance control program and thus spraying occurs only when mosquito pools test positive for EEE. Suffolk County should follow suite and only adulticide in a limited, targeted way when a disease is discovered.

- It was our expectation and understanding that the Plan would contain an educational component designed to increase the public's tolerance for mosquitoes as a part of life here on Long Island. The current Plan does not promote this important goal and will undermine any public education efforts the County may engage in to increase public tolerance of mosquitoes. The public will not accept an increase in mosquito populations if the County is telling them they are all harmful dangerous and disease ridden species.
- The 2001, *New York State West Nile Virus Response Plan*, Appendix B, states, "Adulticiding should be considered only when there is evidence of WNV epizootic activity at a level suggesting high risk of human infection (for example, high dead bird densities, high mosquito infection rates, multiple positive mosquito species including bridge vectors, birds or mammal cases indicating escalating epizootic transmission, or a human case with evidence of epizootic activity) and abundant adult vectors. In general, the finding of a WNV positive bird or mosquito pool does not by itself constitute evidence of an imminent threat to human health and warrant mosquito adulticiding." This language clearly substantiates the ability for health departments to make the important distinction between disease and nuisance control. Suffolk County should both acknowledge the distinction and adopt similar language in the Plan.
- Both the Fire Island National Seashore ("FINS") and The National Wildlife Refuge have specific triggers for mosquito control based upon the risk of disease founded upon clear distinctions between nuisance control and disease prevention.

The Draft Plan needs to establish a clear distinction between disease control and nuisance control. SCVC department has an excellent surveillance program. When disease is detected this should be the trigger for defining disease control.

□ Thresholds for Adulticide Applications

"The use of adulticides, will be considered, when all other methods of control have been ineffective or when other control methods cannot be implemented, if Vector Control (Public Health Nuisance) thresholds are exceeded, or if emergency response conditions exist." (Page ES-14).

- The Plan should be modified to include specific criteria and thresholds for the application of adulticide. Currently the language is too vague and doesn't offer any precise data to illustrate when a spray event would occur.
- The Plan does state that ~25 mosquitoes in the NJ Light Trap, ~100 in the CDC light trap, and 5+ landings/minute will be criteria for vector control. As in New Jersey's mosquito management standard this should specify the species of concern. Does the criteria pertain to all mosquitoes or just certain species? Is the landing rate calculated for just one minute or is it an average over several minutes?
- Also, there is a discrepancy in *Appendix A: The Long Term Plan*. In Table 1 the basic surveillance parameters for adulticide spraying state "landing rate 5+/min".

However directly after this table on page 10 the Plan states, "landing rates of one to five per minute." This parameter needs to be clarified. Is the Plan suggesting that if a resident is standing outside and for one minute and one mosquito lands on him/her that could trigger an adulticide?

- The Plan should only use chemical control when an infection or disease is discovered and at that point should only conduct a limited, targeted spray such as in Connecticut's Mosquito Management Plan.
- The DGEIS fails to accurately research the effects of adulticides on wetland ecology since only one site was analyzed in the Caged Fish Study (John's Neck) and low dissolved oxygen levels, which may have attributed to the mortality of the specimens, confounded the results. Other factors such as stress, crowding, food supply, etc. synergistically impacted these organisms and thus finding mortality due to pesticides would be difficult with this particular methodology. Laboratory results aren't enough to make the conclusion that there are no effects. This small sample does not hold up to rigorous scientific scrutiny and cannot and should not be used to support any specific conclusions. In addition, long-term lethal or sub-lethal effects cannot be detected over a short period of time, which was the case in this study since only four days were used.
- The Plan states, "The control of adult mosquitoes means managing their populations so that they cause less of an impact to people. Suffolk County has a pesticide phase out law that sets a goal of limiting or eliminating pesticide use when possible. Adulticides must be used in residential areas to control mosquitoes that are biting people. This means that human exposure to the materials is inevitable, and efforts to minimize exposure to pesticides are prudent. In addition, it is at least theoretically possible that there are as yet unknown adverse impacts that could result from use of these materials, so that it is wise to place limits on their use" (Page 158 of *Appendix A*).
 - The statement that "Mosquito adulticides must be used in residential areas to control mosquitoes that are biting people" is unfounded and dangerous. Spraying to eliminate biting by mosquitoes is risky and irrational. It is impossible for Suffolk County to stop mosquitoes from biting, or any insect for that matter.
 - The most effective way of practicing prudence with these "materials" is by eliminating exposure in general, unless a health emergency arises.
 - Adulticides shouldn't be advertised or considered an easy fix to nuisance control. CCE recognizes that mosquito bites can be an annoyance, but the risks far out way the benefits of eliminating an itchy bite.

□ The Wetlands Screening Committee

- The composition and authorities of the Proposed Screening Committee for Individual Major Restoration Projects is lacking in specific areas.
 - All projects should be reviewed by the Screening Committee. The stipulation of 15 acres or more leaves out projects such as ponding and naturalizing. CCE believes that all projects should be reviewed by the

screening committee so that residents and Vector Control can benefit from diverse and comprehensive views on wetlands management and protection.

- o Segmentation of projects may occur in order to decrease large projects to appear small. Removing the 15 acres minimum will prevent this from occurring.
- o The composition of the committee should include at least two more environmental non-governmental organizations. Currently, of the 13 positions, only two are from the environmental advocacy community.

o Public Education

- The Plan should evaluate the effectiveness of public education programs in modifying behavior to alleviate the need for chemical control of mosquitoes.
- By educating members of the public on mosquito tolerance and safe prevention measures Suffolk County will eliminate the need for spraying and thus eliminate the health and environmental risks from adulticide applications.
- The Plan states, "Targeted outreach will stress the importance of avoiding exposure to mosquitoes, and in taking mitigating steps if exposure cannot be avoided." This will create a public fear of mosquitoes and cause people to pursue chemical relief which when done in excess and applied incorrectly can have damaging, and sometimes irreversible, impacts to human health, in particular children.
- The "Fight the Bite" brochure title has a negative connotation that creates an unwarranted public fear as well.
- CCE agrees with the public outreach idea of posting efficacy reports on the SCVC website at the beginning, middle and end of the season.
- CCE recommends the use of a Reverse 911 system anytime adulticide spraying is conducted. This practice is performed in Onandaga County, New York and has been found very effective.

o Ditches and other marsh alterations as conduits for nutrients and fecal coliform to our bays and estuaries

- When discussing the risks involved with ditches and other marsh modifications, the 2005 Southampton College Estuarine Research Program (SCERP), now known as Stony Brooke Southampton Estuarine Research Program, research should be included since it used numerous Long Island marshes to analyze nutrient runoff, particularly Nitrogen, and also fecal coliform for open ditches and closed ditches.
- The DGEIS should include the research from SCERP on ditches as conduits for nutrient runoff (N) and fecal coliform; this study contradicts the research by Cashin Associates in this regard (<http://www.scerp.net/Summary%20of%202005%20SCERP%20Activities.pdf>). CCE believes this is beneficial because it provides site specific information that should be used to supplement a general literature search.

- The results of "Effects of Tidal Discharge from Salt Marsh Ditches on Estuarine Ecosystems" states "Mosquito ditches contained high levels of nitrogen (> 100µM) and fecal coliform bacteria (>2,000 per 100 mL). The draining of mosquito ditches in Flanders Bay likely accounts for a flux of >1,200 moles of N per day, and thus represents ~25% of the N load to the southern portion of the bay and nearly 10% of the N load to the entire bay... mosquito ditches are a source of N and fecal coliform bacteria which can degrade water quality in estuaries such as Flanders Bay. Since the plugging of mosquito ditches can effectively eliminate ditch flow, such a practice seems warranted in ecosystems such as the western Peconic Estuary where the primary goal of the estuary's Comprehensive Management Plan is to minimize N loads to this region."

□ Methoprene

"Methoprene disrupts insect maturation and reproduction by mimicking the activity of natural juvenile insect hormone (CA-IC, 2004). At sufficiently high concentrations, it also has been shown to be toxic to fresh water invertebrates and fish, estuarine and marine invertebrates, and amphibians (USEPA, 2002). Fresh water invertebrates are especially sensitive to methoprene, with a lowest observable adverse effect concentration (LOAEC) of 51 ppb reported (USEPA, 2002). Overall, the potential for aquatic toxicity is mitigated by the rapid degradation of methoprene in surface water (Etoxnet, 1996a)" (Page 1030). CCE is concerned about the impacts of methoprene to the marine environment. An over zealous larvicide application will have negative impacts on the myriad of important species previously identified. We urge Suffolk County to practice caution when using this chemical because of those reasons. Long Island's marshes are sensitive ecological areas and need to be monitored safely and alternatives to methoprene need to be aggressively pursued.

□ Open Marsh Water Management

A central tenant – perhaps the central tenant – of the Plan is that the County can significantly reduce its long-standing reliance on pesticides by embracing better "source control," i.e. the elimination of potential mosquito breeding habitat. While the Plan touches on efforts to minimize potential household (birdbaths, tires, etc.) and municipal (drainage basins, etc.) breeding sites, the bulk of the Plan's source control efforts are focused on eliminating breeding habitat for salt marsh mosquitoes. The County asserts that this would be accomplished by "improving" management of the County's 17,000 acres of salt marsh.

The Plan refers to the arsenal of potential marsh management techniques – which includes everything from the plugging ditches to digging tidal channels to creating large ponds – as "Progressive Water Management." Despite this new term, the Plan acknowledges that everything in this category falls under what has historically been referred to as Open Marsh Water Management ("OMWM").

According to the Plan, OMWM not only has the potential to greatly reduce reliance on pesticides, but also holds the promise of "restoring" the County's salt marshes. While it is possible that some individual techniques and practices that fall under the OMWM umbrella may, in fact, be employed to restore marsh health, we have serious concerns about the Plan's strategy to pursue large-scale OMWM projects (4,000 acres "restored" through just 15 projects - an average project size greater than 250 acres!) for the primary purpose of mosquito control. For the reasons outlined below, we are not confident that such a strategy will necessarily result in an overall improvement in the ecological health of the County's marshes.

- The Plan states outright that OMWM has been successful in neighboring states, including New Jersey, Connecticut and Rhode Island. While it may be the case that these states have achieved satisfactory results from a vector control standpoint, we have seen no conclusive evidence (in the form of peer-reviewed, published scientific reports) that OMWM always results in ecological improvements to the marsh. Even if the anecdotal "evidence" suggests that OMWM both reduces mosquitoes and enhances wildlife habitat, there have been no comprehensive, long-term studies to document the impact of OMWM to overall marsh attributes, including a wide array of ecological functions, bio-filtration, and storm protection. In fact, it is our understanding that many professionals in the field still refer to or describe OMWM as being in an "experimental" phase.
- The Plan touts the initial success of the pilot project at the Wertheim National Wildlife Refuge as support for the promise of success in utilizing OMWM. While the results at Wertheim may be useful to demonstrate Vector Control's technical and logistical capabilities, it is premature to draw any conclusions about the ecological impacts of the alterations to the marsh. The project is still less than a year old. *Years of rigorous monitoring and research are necessary before this site should be used to support a program of OMWM efforts in Suffolk County.*
- Further, even a preliminary review of the literature reveals scientific support for the notion that OMWM fails to recreate attributes of an unaltered, healthy marsh. A 2000 Rutgers University report (Lathrop & Cole, "Quantifying the habitat structure and spatial pattern of New Jersey salt marshes under different management regimes" *Wetlands Ecology and Management* 8: 163-172, 2000) concluded that OMWM sites "differ from unaltered salt marsh habitat in several important ways." Importantly, the paper also notes the lack of research and scientific understanding of salt marsh function in general and, more specifically, the long-term impacts of OMWM and other marsh alterations.
- The Plan is deceiving to use the term OMWM interchangeably with "restoration." Restoration implies a return to complete, naturally functioning salt marshes as they existed prior to the ditching regime of the early 20th Century. The scientific evidence does not appear to support the contention that OMWM accomplishes

this goal. The plan uses the definition of restoration as "the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed" from the Society for Ecological Restoration. This definition is too vague when used to decide the proper modifications for salt marsh health. This definition implies any action, no matter what size or impact, can be considered restoration on a non-pure marsh.

For these and other reasons, we are very concerned by the Plan's embrace of OMWM - especially large-scale projects - as the silver bullet to solve the County's mosquito "problems." It is our position that, while some of the individual OMWM techniques may be employed in an ecologically sound marsh restoration effort, the large-scale OMWM projects lack the scientific support necessary to be embraced on a programmatic basis at this time. We believe additional time is necessary to allow for rigorous monitoring and study of the Wertheim project, as well as similar efforts in neighboring states.

If you have any questions about these comments please feel free to contact us at 516-390-7150.

Respectfully submitted,

Adrienne Esposito
Executive Director

Kasey Jacobs
Long Island Program Coordinator

Q

Mr. James Bagg
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17 July 2006

Dear Mr. Bagg:

On behalf of the undersigned organizations, I submit the following comments on the Suffolk County Vector Control and Wetlands Management Draft Generic Environmental Impact Statement (DGEIS).

In general, we appreciate the improvements that have been made to the plan since our first review of it in October 2006. Specifically, the addition of numeric criteria for the application of adulticide enhances the transparency of the Long Term Plan, and helps the public understand the circumstances under which these substances are deemed necessary by the Division of Vector Control. Further, the undersigned organizations applaud the County on the development of a long-term plan that embraces the progressive notion that vector control should be consistent with ecological values. To this end, the plan's key objectives are good: To reduce the use of chemicals for controlling mosquitoes and to restore marsh health. However, the plan still requires some revision:

1. The plan should clarify the applicability of thresholds and criteria used to initiate the spraying of adulticide. Currently, the DGEIS is ambiguous regarding the use and availability of trap data. The Executive Summary narrative suggests that CDC traps will always be set specifically to confirm reports of mosquito infestation and to support a decision to spray (“[Once a preliminary decision to adulticide has been made], the QA/QC team should locate a suitable area in or near the center of the application block, and set up a CDC light trap for confirmatory sampling,” ES-62). However, the Executive Summary also suggests that trap data will be used only when it is “available” (“complaints invaluable where traps are not set”, ES-77). Elsewhere in the DGEIS, Fire Island-specific criteria are alluded to (“complaints invaluable where traps are not set; intend to set CDC traps before all non-Fire Island applications,” Vol. 2, p. 203). The DGEIS should be modified to clarify that a mosquito “infestation” meriting application of adulticide should be confirmed using the trap count criteria is required for every application of adulticide, whether on Fire Island or otherwise. Similarly, the DGEIS is ambiguous regarding the landing rate criterion. Specifically, the Executive Summary suggests that the applicable landing rate is five or more mosquitoes per minute (“landing rate 5+/min,” ES-77). Elsewhere in the document, the relevant threshold is cited as 1-5 per minute (“[I]landing rates of one to five per minute,” Vol. 2, p. 211). The DGEIS should be modified to clarify that the landing rate that might trigger adulticiding is five or more mosquitoes per minute.

2. The plan should clarify the thresholds and criteria used to initiate the application of larvicide. The plan should specifically document the standardized sampling protocols used for larval surveillance applied in all sampling areas. The plan should also indicate the implementation of regular staff training to assure an appreciation for the necessity of strict adherence to the protocol in order to produce reliable and trustworthy data. The decision tree and threshold or criteria for treatment should be stated and justified. Suffolk County Vector Control has informally agreed to these recommendations; however it is important to document this request on the administrative record. | 9
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3. The composition of the Wetlands Screening Committee should be expanded to include 4 representatives of environmental nonprofit organizations, and representatives from all 3 estuary programs sitting at all times. The Wetlands Screening Committee is an important component of the Wetlands Management Plan, in that it will oversee the design and selection of Open Marsh Water Management (OMWM) projects. This is a critical role, given there is debate among reputable scientists regarding both the ecological impacts and the mosquito control efficacy of OMWM techniques. It is appropriate that the County proceed with caution when implementing OMWM projects, and the oversight of the Committee will serve to provide additional scientific insight into this process. However, the Committee as currently envisioned in the DGEIS is heavily weighted toward government interests. The DGEIS should be modified to create a more balanced Committee, with at least four representatives of environmental nonprofit groups, and representatives from all three estuary programs (PEP, SSER, LISS) sitting at all times. This additional representation will bring both scientific expertise and a focus on wetland health to the Committee that will ensure an adequate level of oversight of OMWM projects. The county has informally agreed to the composition that we recommend, however it is important to document this request on the administrative record. | 12
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4. The Committee should be given written notice of all projects, regardless of size, and the discretion to concentrate on the projects that are of real concern. As currently articulated in the DGEIS, the Screening Committee has jurisdiction to review OMWM projects of more than 15 acres. Wetlands Management Plan at 50. For projects of 15 acres or less, and that use BMPs described as having “no to little impact” or “minor impact,” the Screening Committee need not be consulted. Several controversial OMWM techniques are included among BMPs having “minor impact,” including “naturalize existing ditches,” “install shallow spur ditches,” and “create small (500-1000 sq ft) fish reservoirs.” WMP at 50. As alluded to above, the controversial nature of these techniques strongly recommends in favor of careful oversight by the Screening Committee. In order to promote a science-based program, the Committee should be charged with evaluating the study design and monitoring protocols of all proposed projects in order to determine their effectiveness in terms of both ecological restoration and mosquito control, and should clearly have the authority to reject proposed projects that are inconsistent with appropriate standards for marsh health. The Committee should also have the authority to determine which projects are truly *de minimis*, requiring no further review. | 17
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5. The county’s education and outreach program is a good start, but we believe that it could be even more proactive. Public awareness and behavior modification are important elements of both general mosquito management and mosquito-borne disease control. In addition to providing additional detail about the educational activities already proposed, we recommend the development of a more comprehensive educational program. People who are informed about mosquito biology and control measures are more likely to mosquito-proof their homes, and eliminate mosquito breeding places on their own property. Such an educational program can be designed to meet the needs of the community. The following components should be included:
- Public Service Announcements (audio and video): to educate all citizens on what they can do to help protect themselves from mosquito bites;
 - Elementary education programs;
 - Homeowner association presentations: educating the homeowner on what they can do around the home and what Suffolk County Vector Control does to control mosquitoes;
 - School property inspections: designed to prevent mosquito problems before they start by checking and treating drains and catch basins on school property;
 - Waste tire collection service: designed to eliminate potential mosquito breeding sites and clean up the environment;
 - Commercial/residential inspections: completed either by request or on a routine basis to check and treat mosquito problems.
6. The County should develop a regional comprehensive marsh-management plan for which mosquito management is not the primary focus. The County rightly envisions a regional, comprehensive marsh recovery approach, when it states – and I quote – “It is anticipated that the Wetlands Screening Committee will develop a County-wide, comprehensive marsh management plan...” We applaud the County on this vision, but believe that it should go even further and create a Wetlands Recovery Project. This Project would set objectives for acquisition, restoration and enhancement of coastal wetlands and secure funding from state, federal, local or private sectors in order to implement the objectives. We envision a science-based, collaborative effort involving multiple stakeholders, which is guided by established scientific principles setting a high bar for wetlands health. The County should evaluate and implement this option immediately; this enterprise would be an ideal flagship project of the new Department of Energy and Environment.
7. The County should revise the DGEIS to address the specific comments made by peer reviewers. The purpose of a GEIS is to present a comprehensive assessment of potential risks to the public. In light of this, the County must revise the DGEIS to reflect criticisms made by peer reviewers. The County solicited comments from two qualified reviewers referred to here as Reviewer #1 and Reviewer #2. A group of environmental organizations, including the undersigned, also solicited outside review of the plan: Dr. D. Pimentel and Dr. M. N. Horst. In addition to these comprehensive reviews of the DGEIS, Jake Kritzer, Ph.D. of Environmental Defense prepared a review of the caged fish study. The written comments and CVs of those reviewers are attached. The following components of the four reviewers’ comments should be addressed:

- Reviewer #1 observes that the Plan does not consider the risks of dermal exposure from ULV applications. | 42
- Reviewer #2 criticizes the plan for exaggerating the risks associated with WNV and downplaying the risks associated with pesticide exposure. | 43
Specifically, this reviewer observes that the plan does not address a new contribution to the scientific literature (Busch et al. 2006) that indicates that the risk of contracting WNV is lower than originally thought in Suffolk County likely due to a rapid acquisition of immunity.
- Both Reviewer #1 and Reviewer #2 comment that the Plan should update the permethrin and resmethrin cancer information to be consistent with the 2005 EPA standards. Specifically, Reviewer #2 notes that the more recent US EPA Permethrin RED Factsheet (June 2006) classifies permethrin as a likely carcinogen in contrast to the two earlier studies cited by the SCVC plan (WHO 2005, IARC 1991). Reviewer #2 also summarizes a lot of the recent literature linking phyretroid pesticides to dopamine neuron loss in multiple animal species. This is important because dopamine neuron loss has been linked to Parkinson’s Disease in humans. | 45,46
- Consistent with our previous comments on the Plan, Reviewer #2 criticizes the plan for not making the distinction between known disease vector mosquito species, suspected disease vector species, and “aggressive salt marsh mosquitoes, which may or may not be a subset of the vector species.” | 48
- Dr. Pimentel asserts that the risk analysis in the Plan understates the adverse effects of insecticide application on non-target insects. | 49
- Dr. Pimentel does not believe that the ecological risks of using pyrethroids are worth the mosquito control benefit. He is concerned that the DGEIS does not address the high toxicity of pyrethroids to fish and the risk associated with weekly pyrethroid sprayings. | 50
- Dr. Pimentel notes that although adult mosquito traps and landing data are cited by the Plan, the degree to which these data are available is not mentioned and furthermore the Plan does not specify how data are collected from these traps. | 52
- Both Dr. Pimentel and Reviewer #2 cite the lack of treatment of efficacy data in the Plan. Dr Pimentel questions the estimated efficiency of adulticide cited by the DGEIS; he considers an efficacy of over 90% to be nothing more than wishful thinking. | 53
- Dr. Horst criticizes the Plan for a lack of adequate consideration of both the acute and chronic effects of methoprene on crustacean larvae and other non-target species. | 55
- Dr. Kritzer of Environmental Defense notes that the caged fish study suffers from limited to no replication across the series of experiments, an extremely short duration of monitoring in each experiment, and probable excessive background stresses due to cage effects and/or surrounding environmental conditions, all of which severely limit the ability of the study to provide general insights into pesticide effects in the local context. | 56
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The undersigned organizations, together with other environmental organizations, have submitted several comment letters prior to the formal public comment period, and we

append those comments hereto and incorporate them by reference. As noted above, the County has improved the DGEIS with respect to some of the concerns expressed in these prior comments. Specifically, improvements have been made with regard to supplying thresholds and criteria for adulticide application, although more needs to be done to clarify these provisions (*see* ¶ 1, above). Nevertheless, several of the points made in these previous comment letters remain applicable.

The modifications recommended above and in the appended correspondence (as applicable) would substantially improve the DGEIS and the ability of the Division of Vector Control to protect wetland health and ecology while simultaneously carrying out a highly effective mosquito control program. Please feel free to contact me if you have any questions.

Sincerely,

Nicole P. Maher, Ph.D
Wetlands Specialist
The Nature Conservancy

Jake Kritzer, Ph.D.
Marine Scientist
Environmental Defense

Matthew R. Atkinson
General Counsel
Peconic Baykeeper, Inc.

Adrienne Esposito
Executive Director
Citizens Campaign for the Environment

Enclosed:

COPOPAW Comments 121305.doc
CEQ Comments 051506.doc
Peer Reviewer #1.doc
Peer Reviewer #2.doc
Pimentel Review SCVC Plan.pdf
Pimentel CV.doc

Horst_Commentsonask3ecotoxliteraturereview.pdf
Horst_Commentsonthecagedfish.pdf
Horst_FinalCommentsonAppendicesofExecutiveSummary.pdf
Horst_FinalCommentsontheDGEISExecutiveSummary.pdf
Horst_FinalSummaryMHcomments.pdf
Kritzer_Caged fish study review 071706.doc

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resubmitted CEQ Comments 051506

May 15 2006

Dear Dr. Swanson and Members of the Council:

Thank you for your careful consideration of the Suffolk County Vector Control Long Term Plan and Wetlands Management Plan (collectively, “the Plan”). The undersigned groups, representing a broad swath of environmental interests, would like to recognize the significant improvement in several of the Plan’s components that the County has committed to since the last iteration of the DGEIS. Specifically, the County has committed to making the following changes:

- A draft three-year wetlands workplan will be added;
- The Plan will state the need for continuing and expanding regional wetlands management efforts (through the Screening Committee, the TAC, and the wetlands work group);
- Reducing mosquito populations need not be the paramount goal of restoration projects, to the potential detriment of biodiversity and other goals. E.g., a wetlands restoration project which is mosquito-neutral is certainly feasible;
- The Screening Committee will be emphasized as having authority to consider non-Vector wetlands restoration projects;
- The Plan will emphasize that the Screening Committee can refine goals, objectives and priorities for restoration (through Steering Committee and annual/triannual report processes);
- The Screening Committee will have the authority to reject a project, if inconsistent with standards;
- The Screening Committee will include 2 non-profit representatives, as well as representatives from the three estuary programs.

These improvements respond directly to concerns we raised in previous comment letters, and we appreciate the attention the County has paid to these important issues. We are confident that the oversight of the Screening Committee, with its revised composition, will mitigate concerns over large-scale application of Open Marsh Water Management (OMWM) methods, and will move the County closer to a comprehensive regional wetlands management approach. We hope to continue to work with the County to implement this important component of the Plan.

We continue to have concerns about the Plan, however, especially with its lack of specificity regarding thresholds for action and failure to provide details of public education and outreach activities, and we continue to assert that the plan is incomplete without these details:

1. *The Plan Should Include Thresholds and Criteria for Actions That Recognize the Distinction Between Nuisance and Disease Control.*

As we have asserted in previous comments, the County should be required to amend the plan in order to distinguish actions that are permissible for disease control efforts from actions that are permissible to control nuisance (or non-pathogenic) effects. Doing so

would accurately characterize the real disease risks to the community, and allow the public to properly weigh the costs and benefits of mosquito control action. | 13

The County argues that all mosquito control is disease control, justifying its position thus: “[t]here was unanimous agreement among all experts nationwide that public health risk can never be deemed to be zero when significant numbers of competent vectors are co-located with substantial populations.”¹ Accordingly, the County appears to be managing mosquitos based on a threshold acceptable risk level of zero. The EPA defines “acceptable risk” as a “[l]evel of risk judged to be outweighed by corresponding benefits or one that is of such a degree that it is considered to pose minimal potential for adverse effects.”² The federal Food and Drug Administration manages for an acceptable risk of cancer on one incident in one million lifetimes. Many commentators have remarked on the folly of a one-in-a-million standard when the background cancer rate in society is 250,000 in one million.³ Excessive or not, however, the FDA standard illustrates that – at a minimum – regulatory agencies generally manage for a certain quantifiable risk. | 14 | 15

The County’s plan, in contrast does not disclose any level of acceptable risk, and instead appears to be basing management decisions on the premise that there is none. To this end, the County conflates disease control and nuisance control under the heading of “vector control” because reducing vectors to less-than-significant levels is the only way to reduce public health risk to zero. This posture is problematic because it gives the public the impression that it is subject to greater risk of disease than it is in reality. The County should determine – as other public health agencies regularly do – an acceptable level of risk associated with mosquito-borne disease. | 16 | 17 | 18

Moreover, failing to differentiate between these two objectives creates a situation in which the mere presence of mosquitoes opens up the entire suite of management actions, some with greater environmental and public health consequences than others.⁴ It is axiomatic that society’s willingness to tolerate environmentally risky actions is greater when such actions are undertaken for the purpose of controlling a disease outbreak than when they are undertaken to alleviate minor discomfort. Accordingly, many places that manage mosquitoes do so according to two separate sets of policy guidance: one for general mosquito control, and one for circumstances in which the presence of disease has been confirmed and quantified through monitoring. | 19 | 22 | 23

¹ Suffolk County Vector Control and Wetlands Management Long-Term Plan, *Preliminary Response to 12/05 Comments of Coalition for the Protection of People and Wetlands (COPOPAW)* (January 20, 2006).

² United States Environmental Protection Agency, Terminology Reference System, available at http://iaspub.epa.gov/trs/trs_proc_qry.navigate_term?p_term_id=29177&p_term_cd=TERMDIS (accessed April 25, 2006). | 20

³ See, e.g., Breyer, *Breaking the Vicious Circle* (1990).

⁴ The County has, to date, refused to acknowledge environmental and human health risk associated with exposure to pesticides. In support of its position, it cites its Task 8 Report – Impact Assessment, which has yet to be reviewed by independent peer reviewers. Nevertheless, other studies cited by the Impact Assessment (especially the CDC’s 9-State Study), the New York State West Nile Virus Response Plan’s policy – together with the County’s own policy of limiting pesticide use – indicate some environmental and human health risk. | 21 | 20

One example of a disease-specific plan is the New York State West Nile Virus Response Plan, which restricts the use of adulticide to circumstances in which “current isolations of virus and/or evidence of disease has [sic] been established.”⁵ In responses to a previous comment letter, the County chided us for referring to New York State’s plan: “[i]t is inaccurate to cite the New York State West Nile Virus Response Plan as a document on general mosquito control, and to imply that control should only be conducted as prescribed in the State Plan.”⁶ In fact, we cited – and cite again today – this plan as an illustration of how disease response can and should be tactically separated from general mosquito control.

We do not suggest, however, that the County needs to have an additional plan – like the New York State Plan – for disease control. We do, however, assert that thresholds and criteria should be established to limit the use of adulticides to circumstances when the risk of disease outbreak is intolerably high. The County’s monitoring is more than adequate for this purpose. However, before it can do so, the County must: (1) determine an acceptable level of risk of mosquito-borne disease; (2) determine what monitoring data will be needed indicate that the threat of exceeding the acceptable risk level exists; and (3) commit to taking certain mosquito-control actions *only* in the presence of confirmed evidence that that risk level is approaching.

Instead, the County proposes a suite of “criteria” that may be summed up as follows:

IF...residents notice a mosquito problem and call Vector Control...
AND IF...Vector Control confirms that mosquitoes are present...
AND IF...the problem looks like it might continue or get worse...
AND IF...no environmental circumstance would mitigate the efficacy of treatment...
THEN...Adulticide may be applied.

Although the confirmation of a problem by Vector Control is a substantial improvement over previous iterations of this Plan, these criteria simply do not address the concerns we have repeatedly expressed: specifically, that the mosquito-control response should reflect the level of actual disease risk to society in a clear and predictable manner. The criteria outlined by the County would permit an extreme mosquito control response at almost any density of mosquitoes. This approach does not balance the risks and benefits of this action, which is – quite simply – only necessary to abate the imminent threat of disease.

2. *Revisions to the Plan Should Include Significantly More Details Regarding the Education and Outreach Program.*

Public awareness and behavior modification are important elements of both general mosquito management and mosquito-borne disease control. The DGEIS acknowledges this:

⁵ New York State Department of Health, New York State West Nile Virus Response Plan – Guidance Document (May 2001) at 14.

⁶ *Id.* at 5.

Benefits to source reduction efforts in water management structures are fairly clear, as *Cx. pipiens* is the primary zoonotic vector of WNV, and uses these habitats to breed in. Recharge basins also support other fresh water mosquitoes. Human discomfort, at a minimum, can be decreased by controlling mosquitoes in these habitats and if bridge vectors are produced, control efforts can reduce risks to human health.⁷

Nevertheless, both the Long-Term Plan and Wetlands Management Plan focus on controlling mosquitoes using primarily chemical, physical or biological methods. A large percentage of the methods proposed include controlling mosquitoes in tidal wetlands, which are – at best – an unlikely source of the mosquitoes that are vectors for West Nile Virus and other diseases of concern. | 34 | 35

While we agree that in certain well-defined circumstances (*see* section #1, above: “Thresholds, Criteria, Nuisance and Disease”), these methods are appropriate, it is unquestionable that the need for such methods – and exposure to the environmental and health risks they carry – should be reduced whenever possible. Aggressive public education and outreach would permit the County to significantly reduce its reliance on wetland manipulation, spraying of adulticide and other treatment. | 36

Currently, the Long Term Plan contains the following Education/Outreach Components:

- Brochures;
 - Home visits, assistance in removing breeding sites;
 - Working with SCDHS educators;
 - The LTP suggests that the County “should” undertake a tire-related education program;
 - Farm education: County contemplates performing this component through the Cornell Cooperative Extension;
 - Targeted outreach regarding private stormwater management systems;
 - Website transmits information on spray events and materials used;
 - Highlighting the existence of no-spray registry;
 - Notification of spray events.
- | 37

These actions would be important components of a comprehensive mosquito-control effort, except that the Plan is devoid of both detail and any level of commitment to carry them out. For example, how many brochures? What will they say? When and how will they be distributed? How will SCDHS educators be involved and what will they do? How many personnel hours can be committed to site visits and remediation? Can the County commit to a waste tire removal program? How will this be carried out and by whom? What will be the role of CCE in the farm education program, and what will the program do? | 38

In addition to providing additional detail about the educational activities already proposed, we recommend the development of a more comprehensive educational | 39

⁷ DGEIS at 606.

program. People who are informed about mosquito biology and control measures are more likely to mosquito-proof their homes, and eliminate mosquito breeding places on their own property. Such an educational program can be designed to meet the needs of the community. The following components should be included:

- Public Service Announcements (audio and video): to educate all citizens on what they can do to help protect themselves from mosquito bites; | 40
- Elementary education programs; | 41
- Homeowner association presentations: educating the homeowner on what they can do around the home and what Suffolk County Vector Control does to control mosquitoes; | 42
- School property inspections: designed to prevent mosquito problems before they start by checking and treating drains and catch basins on school property; | 43
- Waste tire collection service: designed to eliminate potential mosquito breeding sites and clean up the environment; | 44
- Commercial/residential inspections: completed either by request or on a routine basis to check and treat mosquito problems. | 45

3. *The County Should Provide for and Release to the Public a Full Peer Review of the Risk Assessment Prior to Asserting that Its Actions Will Not Pose Significant Ecological or Human Health Risks.*

The Risk Assessment is, perhaps, the most controversial component of the Plan. There has been significant debate about the ecological and human health risks of chemical mosquito control for many years. The County implicitly recognizes the public's concern over exposure to these chemicals by creating a hierarchy of action for mosquito control, prioritizing source reduction over larvicide, and larvicide over adulticide. Nevertheless, to the best of our understanding, the Risk Assessment task has not yet been evaluated by a peer reviewer that has been approved by the TAC.

Until such a peer review is complete and the results are released publicly, the County should refrain from asserting that chemical control of mosquitoes poses no significant environmental or health risk. The public should be permitted to rely on the opinion of an independent expert to evaluate the assumptions and limitations of the County's assessment, and until such an opinion is available, it is unfair for the County to foreclose discussion of these important issues.

resubmitted CEQ Comments 051506

* * * * *

Although the deficiencies we have highlighted are significant and should be addressed, we recognize the need to move this document toward substantive public review. Accordingly, we ask the CEQ to instruct the County to address these issues prior to the release of the Final GEIS. We look forward to continuing to work with the County to find the most appropriate ways to do this.

S

resubmitted COPOPAW Comments 121305

Coalition for the Protection of People and Wetlands

Suffolk County Vector Control Long-Term Plan and DGEIS

ACTION ITEMS:

- The Plan should be modified to include specific criteria and thresholds for the application of adulticide. This is called for in the Final Scope. | 1
- The Plan can and should establish a clear distinction between actions taken for disease control and actions taken for nuisance control by making use of the Vector Control department’s excellent surveillance program. The Final Scope explicitly called for this distinction to be drawn. | 2
- The Plan should more fully characterize the ecotoxicity of Methoprene by reviewing more recent scientific literature, including studies produced pursuant to the Long Island Sound Study. An adequate characterization of pesticide risks is a requirement of the Final Scope. | 3,4
- The Plan should evaluate the necessity of performing a separate analysis pursuant to NEPA. The Final Scope explicitly requires this. | 5
- The Plan should more thoroughly explore mosquito population dynamics, including the impact of removal of prey from wetlands systems. This analysis is required by the Final Scope. | 6, 7
- The Plan should describe the interface between vector control and stormwater management regulation. This is required under the Final Scope. | 8
- The Plan should closely analyze other nearby vector control programs. | 9
- The Plan should evaluate the efficacy of public education programs in modifying behavior so as to mitigate the need for chemical control of mosquitos. The Final Scope specifically requires this. | 10
- Vector control should not be the guiding principle for marsh management. Instead, a comprehensive marsh management plan should be one of the frameworks under which the vector control plan fits. The County should bifurcate the process and develop a wetlands management plan that sets clear standards for actions in wetlands, including mosquito control actions. | 11, 12
- The proposed Wetlands Management Plan should, among other things, fully review the efficacy of all the management techniques encompassed by the term “Progressive Water Management.” The Wetlands Management Plan should clearly distinguish among these techniques. | 13

These Action items are based on the comment letter submitted on December 13, 2005 by COPOPAW, which provides additional detail on each. COPOPAW respectfully requests that the Council on Environmental Quality return the Plan to the County and require the completion of the Plan pursuant to these comments.

Coalition for the Protection of People and Wetlands (“COPOPAW”)

**Citizens Campaign for the Environment • Environmental Defense
The Nature Conservancy • Open Space Council • Peconic Bay Keeper**

PRELIMINARY COMMENTS & RECOMMENDATIONS

Suffolk County Vector Control and Wetlands Management
Long-Term Plan and Draft Generic Environmental Impact Statement

December 13, 2005

The Coalition for the Protection of People and Wetlands (“COPOPAW”), comprised of the undersigned organizations, respectfully submits the following comments on the Suffolk County Vector Control and Wetlands Management Long-Term Plan and Draft Generic Environmental Impact Statement (“the Plan”). These comments represent only our initial assessment of the ambitious and voluminous Plan, and should not be considered comprehensive. We offer them at this time so the Council on Environmental Quality can have the benefit of our reaction as it prepares to set the parameters of the public review and comment period.

We urge the Council to decline to certify the Plan as complete at this time because it is inconsistent – in several regards – with the Final Scope. Further, based on the critical public and ecological health issues involved and the sheer size of the Plan documents, we urge the Council to provide a minimum of 90 days for public comment, as well as additional opportunities for public hearings, at such time as the Plan is deemed complete.

In general, we applaud the County on the development of a long-term plan that embraces the progressive notion that vector control should be consistent with ecological values. The plan is commendable in that it explicitly mandates that mosquito suppression “shall not be injurious to wildlife,” and that one of its primary goals is to “reduce impacts to the environment and increase potential ecological benefits.” These sound principles provide an important backdrop for the Plan’s recommendations and should offer a baseline from which ecologically sound standards for mosquito control actions can be developed.

Unfortunately, the Plan fails in many respects to follow through on these promising principles and, as is outlined in more detail below, leaves us concerned about how it will safeguard Suffolk County’s public and ecological health.

I. The Plan Does Not Address All the Components of the Final Scope.

The Plan is incomplete because it fails to adequately address several key components of the Final Scope document. The following commitments made by the County in the Final Scope document were not substantively or adequately addressed by the Plan:

- Establish[] meaningful guidelines (i.e., thresholds) for determining the specific circumstances under which the County will employ pesticides for mosquito control; 1
- Determine if this GEIS process under SEQRA meets NEPA requirements, or how the output of the SEQRA process would need to be modified to address NEPA. 5
- Mosquito ecology and population dynamics will be explored; Efforts will be taken to trace the overall ecological impact of the removal of prey [the mosquitoes] from a system, including an assessment of the likelihood of reinforcement of boom-bust population tendencies; 6
- The current state of stormwater management in various regions and jurisdictions of the County will be described. The potential for these systems to serve as mosquito habitat will be detailed, and impacts from likely changes to be adopted under US Environmental Protection Agency (USEPA) Phase II regulations will be projected. Improvements anticipated to result to local water quality from implementation of the new regulations will also be discussed. 8
- Information will be generated to evaluate alternatives to current [stormwater engineering] design practices to determine what trade-offs (if any) are necessary in considering both water quality and mosquito control goals. 8
- Close analyses will also be made of nearby programs, especially in Nassau and Westchester Counties, New York City, in the State of Connecticut, and some of the jurisdictions in New Jersey. 9
- Public education efforts will be assessed to determine what aspects tend to be successful [in mosquito prevention], and what efforts do not appear to be very effective. 10

This is not a comprehensive list of the inconsistency the Plan relative to the Final Scope, but these deficiencies alone render the Plan incomplete and in need of extensive revision. The CEQ should return the Plan to the County and require these issues to be addressed.

II. The Plan Fails to Establish a Clear Distinction Between Nuisance Control and Disease Control.

Suffolk County’s Vector Control Division has been applying adulticides for nuisance control since the 1930’s. This is evident not only in the County’s actions but also by the statements presented in recent *Work Plans* published by Suffolk County. For instance, in the *2000, 2001, 2002, 2003 and 2004 Annual Plan of Work, Suffolk County Department of Public Works Division of Vector Control* all state “The Division’s responsibility is to control mosquito infestations that significantly threaten public health, or create social or economic problems to the communities in which they occur. To achieve this goal, the Division employs an integrated control program,” (page one). Again, each *Work Plan* states, “These [the Division’s] goals are:

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1. Protect the public from mosquito-borne diseases.
2. Reduce mosquito infestations to alleviate social or economic impact to the public.” (Page three).

It appears that previous work plans and vector control activities have been able to distinguish between disease control and nuisance control of mosquitoes. Past reports, as well as public meeting presentations by SCVC representatives, have attempted to explain the rationale for the County’s nuisance control program. However, the Plan erroneously states, “there can be no clear distinction between mosquito control for public health protection and mosquito control for the relief of human discomfort (sometimes called nuisance control)” (page 18). *This new theory is not supported with any rationale or supporting data.*

We agree with the need for disease control in Suffolk County, however, we are not in agreement in the County’s inability to make a distinction between presence of disease and nuisance infestations. We have the following concerns associated with this proposed theory:

- We are concerned that current language in the Plan linking all mosquito control with disease control is not a reflection of the reality of disease control and will result in needless public alarm with a false perception that all mosquitoes are harmful or possible deadly. This false perception can result in increased demand from the public for adulticide applications and perhaps even an increase use in DEET and other dangerous pesticide products applied directly to children. 15 | 16 | 17 | 18
- This type of language implies that reducing saltwater mosquito populations will reduce incidence of WNV. This is not supported by current test results, which have yet to establish saltwater mosquitoes as carriers or as good vectors of this virus in Suffolk County. 19 | 20 | 21
- The Draft Long Term Plan repeatedly emphasizes that a primary function of disease control is to reduce the potential impact of EEE. We should be mindful that according to the Center for Disease Control (CDC) in Atlanta, Georgia, there have 22 | 23

been two human incidents of EEE in humans in New York since 1960. Both cases were in Onondaga County around the Cicero Swamp. The new language will give the public the false impression that EEE is a serious threat that needs to be addressed by action on the part of the Vector Control Division. | 24

- It was our expectation and understanding that the Plan would contain an educational component designed to increase the public’s tolerance for mosquitoes as a part of life here on Long Island. The current Plan does not promote this important goal and will undermine any public education efforts the County may engage in to increase public tolerance of mosquitoes. The public will not accept an increase in mosquito populations if the County is telling them they are all harmful and dangerous. | 25
| 26
- The 2001, *New York State West Nile Virus Response Plan*, Appendix B, states, “Adulticiding should be considered only when there is evidence of WNV epizootic activity at a level suggesting high risk of human infection (for example, high dead bird densities, high mosquito infection rates, multiple positive mosquito species including bridge vectors, horses or mammal cases indicating escalating epizootic transmission, or a human case with evidence of epizootic activity) and abundant adult vectors. In general, the finding of a WNV positive bird or mosquito pool does not by itself constitute evidence of an imminent threat to human health and warrant mosquito adulticiding.” This language clearly substantiates the ability for health departments to make the important distinction between disease and nuisance control. Suffolk County should both acknowledge the distinction and adopt similar language in the Plan. | 27
- Both the Fire Island National Seashore (“FINS”) and The National Wildlife Refuge have specific triggers for mosquito control based upon the risk of disease founded upon clear distinctions between nuisance control and disease prevention. | 28
| 29

The Draft Plan needs to establish a clear distinction between disease control and nuisance control. SCVC department has an excellent surveillance program. When disease is detected this should be the trigger for defining disease control.

III. The Plan Fails to Adequately Consider the Impacts of Water Management

A central tenant – perhaps *the* central tenant – of the Plan is that the County can significantly reduce its long-standing reliance on pesticides by embracing better “source control,” i.e. the elimination of potential mosquito breeding habitat. While the Plan touches on efforts to minimize potential household (birdbaths, tires, etc.) and municipal (drainage basins, etc.) breeding sites, the bulk of the Plan’s source control efforts are focused on eliminating breeding habitat for salt marsh mosquitoes. The County asserts that this would be accomplished by “improving” management of the County’s 17,000 acres of salt marsh. | 30
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The Plan refers to the arsenal of potential marsh management techniques – which includes everything from the plugging ditches to digging tidal channels to creating large

ponds – as “Progressive Water Management.” Despite this new term, the Plan acknowledges that everything in this category falls under what has historically been referred to as Open Marsh Water Management (“OMWM”).

According to the Plan, OMWM not only has the potential to greatly reduce reliance on pesticides, but also holds the promise of “restoring” the County’s salt marshes. While it is possible that some individual techniques and practices that fall under the OMWM umbrella may, in fact, be employed to restore marsh health, we have serious concerns about the Plan’s strategy to pursue large-scale OMWM projects (4,000 acres “restored” through just 15 projects – an average project size greater than 250 acres!) for the primary purpose of mosquito control. For the reasons outlined below, we are not confident that such a strategy will necessarily result in an overall improvement in the ecological health of the County’s marshes.

- The Plan states outright that OMWM has been successful in neighboring states, including New Jersey, Connecticut and Rhode Island. While it may be the case that these states have achieved satisfactory results from a vector control standpoint, we have seen no conclusive evidence (in the form of peer-reviewed, published scientific reports) that OMWM always results in ecologically improvements to the marsh. Even if the anecdotal “evidence” suggests that OMWM both reduces mosquitoes and enhances wildlife habitat, there have been no comprehensive, long-term studies to document the impact of OMWM to overall marsh attributes, including a wide array of ecological functions, bio-filtration, and storm protection. In fact, it is our understanding that many professionals in the field still refer to or describe OMWM as being in an “experimental” phase.
- The Plan touts the initial success of the pilot project at the Wertheim National Wildlife Refuge as support for promise of OMWM. While the results at Wertheim may be useful to demonstrate Vector Control’s technical and logistical capabilities, it is premature to draw any conclusions about the ecological impacts of the alterations to the marsh. The project is still less than a year old. Years of rigorous monitoring and research are necessary before this site should be used to support a program of OMWM efforts in Suffolk County.
- Further, even a preliminary review of the literature reveals scientific support for the notion that OMWM fails to recreate attributes of an unaltered, healthy marsh. A 2000 Rutgers University report (Lathrop & Cole, “Quantifying the habitat structure and spatial pattern of New Jersey salt marshes under different management regimes” *Wetlands Ecology and Management* 8: 163–172, 2000) concluded that OMWM sites “differ from unaltered salt marsh habitat in several important ways.” Importantly, the paper also notes the lack of research and scientific understanding of salt marsh function in general and, more specifically, the long-term impacts of OMWM and other marsh alterations.

- It is misleading for the Plan to use the term OMWM interchangeably with “restoration.” Restoration implies a return to complete, naturally functioning salt marshes as they existed prior to the ditching regime of the early 20th Century. The scientific evidence does not appear to support the contention that OMWM accomplishes this goal.

For these and other reasons, we are very concerned by the Plan’s embrace of OMWM – especially large-scale projects – as the silver bullet to solve the County’s mosquito “problems.” It is our position that, while some of the individual OMWM techniques may be employed in an ecologically sound marsh restoration effort, the large-scale OMWM projects lack the scientific support necessary to be embraced on a programmatic basis at this time. We believe additional time is necessary to allow for rigorous monitoring and study of the Wertheim project, as well as similar efforts in neighboring states.

IV. The Plan Improperly Couches Salt Marsh Restoration in the Context of Vector Control.

We recognize that the Plan’s primary objective is to address mosquito and disease control rather than to plan for ecologically sensitive marsh restoration and management – and we recognize that this is consistent with the mandate of SCVC. However, the County (as well as the State of New York) has a broader obligation to protect and enhance the function and biodiversity of its coastal marshes.

The County’s salt marsh obligations are beyond the scope and capacity of SCVC. The marshes of Suffolk County are about much more than mosquitoes – they all serve a wide array of critical ecological functions and are a vital part of our coastal ecosystems. However, nearly all of the County’s 17,000 acres of salt marsh have been manipulated and are in need of attention. Many fail to adequately serve their complete spectrum of functions; many are in need of major restoration efforts.

The Plan (not surprisingly given the SCVC mandate) fails to measure up to this immense, yet critically important challenge. First of all, the Plan’s geographic scope is severely limited. Only 4,000 acres of marsh will be “restored” under the Plan. Another 9,000 acres will be “assessed” over a twelve-year period – a relaxed approach that will ensure incremental overall progress while maintaining status quo management. The Plan declines to address 4,000 acres, regardless of their restoration needs, because they don’t present “mosquito problems.” Further, marsh “restoration” will be conducted for the primary purpose of vector control, not overall marsh health.

Under the Plan, therefore, as many as 13,000 acres of marsh may go without necessary attention and restoration and any “restoration” that is conducted will have a narrow, vector control focus. This is simply unacceptable; a commitment to across-the-board assessment and improvement of the County’s marshes is essential. We urge the County to give careful consideration to these broader goals, evaluate the regulatory

obstacles, and convene a working group to discuss the feasibility of implementing a comprehensive program of marsh management and restoration.

We believe that the administration of such a program should not be handled by SCVC. It should instead be handled by an agency with a specific mandate to protect, preserve and enhance the County's ecological health and biodiversity. The County's salt marshes should be managed from a primary perspective of overall marsh health, not simply mosquito control. Vector control should be one component of a broader management regime, the primary focus of which is overall marsh health, rather than trying to fit marsh health into a management regime focused primarily on vector control. 63

V. The Plan Fails to Accurately Characterize Pesticide Risks

Methoprene (Altocid), an insect growth regulator, is routinely applied to wetlands throughout Suffolk County. The Plan concludes that impacts to estuarine invertebrates are not anticipated to occur at expected environmental concentrations. This contention is based on a deficient literature review and the results of an inconclusive caged fish experiment. 64 65 66,67

In Book 7, Ecotoxicity, the Plan fails to identify at least 16 studies that indicate adverse environmental effects of Methoprene at various concentrations. The report on Methoprene relies mainly upon a secondary review of the literature (Antunes-Kenyon and Kennedy 2001, Massachusetts Pesticide Bureau) and adopts its conclusions regarding the impacts on crustaceans while ignoring the discussion of impacts on other biota and long-term impacts on the food web. More recent literature produced under the Long Island Sound Study contradicts the conclusion concerning crustaceans. Research conducted by M. Horst and A. Walker, et al. identified mortality, morbidity and bioaccumulation in the various growth stages of lobsters and blue crabs at concentrations at or below typical field application rates of Altocid (10 ppb). A manufacturer of Methoprene states in their Material Data Safety Sheet, "toxic to aquatic organisms; may cause long term adverse effects in the aquatic environment." 68 69 70 71 72

In representing the results of the caged fish experiment, the Plan concludes that there are no impacts to fish and grass shrimp based on their survival following the spraying of Methoprene. However, concentrations considered to be lethal and sublethal to larval crustaceans were detected by the USGS during post spraying monitoring for the caged fish experiment. At best, the Plan's assertion is inconclusive because it doesn't take into account the potential impacts to juvenile stages of crustaceans. 73 74 75

In sum, the Plan provides a skewed and incomplete consideration of the ecotoxicity of Methoprene. Suffolk County should join New York City in its recognition (2001 EIS) of the adverse effects of Methoprene and prohibit its use in the estuarine environment as they have. 76

* * * * *

In sum, we encourage the CEQ to return the Plan to the County and require the completion of the Plan pursuant to these comments. The undersigned organizations look forward to working with the County on completing the plan, and encourage the County to contact us if there are any questions or concerns.

Sincerely,

Citizens Campaign for the Environment
Environmental Defense
The Nature Conservancy
Open Space Council
Peconic Bay Keeper

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submitted risk assessment Peer Reviewer #1

This reviewer is cited as “Peer Reviewer #1” in the joint letter from The Nature Conservancy, Environmental Defense, The Peconic Baykeeper, and Citizens Campaign for the environment.

Peer Reviewer #1's comments:

Comments primarily are focused on the Risk Assessment portions of the documents, in particular Parts 1, 3 (and associated appendices), and the 3-page Executive Summary (SCDHS Draft 5/12/06).

Overall, the risk assessments follow accepted methodologies and, I believe, for the most part adequately capture reasonable worst-case exposure scenarios for both humans and other non-target organisms. The tone of the documents needs to be changed in many places. Currently, it reads as though there is an underlying assumption that all of the vector control risks a priori are below levels of concern before the presentation of the results of the risk assessment. To increase public trust, especially revise the executive summaries so as to present only the facts of the analysis. In many cases, there are statements about "no risk". These should be avoided at all costs.

The EIS needs to give credit where credit is due. There are only fleeting references to the New York City EIS published in 2001. The Suffolk County EIS owes much to this previous work and it should be discussed and cited prominently where appropriate. Also, the Suffolk County EIS should be updated to reflect current information in draft RED's and the primary scientific literature. For example, the authors should cite the peer-reviewed scientific article by Peterson et al. (2006) as providing supporting evidence that human-health risks from exposure to mosquito adulticides most likely would be below EPA levels of concern.

The authors do not consider human dermal exposures from ULV applications drifting directly onto human skin. Even though it may be assumed that people will be indoors during ULV spraying, this assumption clearly is not worst case. During the summer months, many people are outdoors at night when spray trucks pass by and are minimally clothed. Indeed, because of the nature of ULV spraying, you could assume that the dominant exposure routes would be acute inhalation and direct dermal deposition. Additionally, Moore et al. (1993) documented dermal deposition within 50 feet of a ground application. Even though the USEPA has not considered dermal deposition from adulticide ULV spray drift in its current RED's, they provide no compelling reasons for why they don't include direct dermal deposition. Peterson et al. (2006) incorporated direct dermal deposition into their risk assessment. The authors should seriously consider incorporating this exposure route into their human-health risk assessment.

The comments below reflect issues of style, grammar, syntax, and content.

Executive Summary (SCDHS Draft 5/12/06)
Page 3. Standardize lower case spellings for the active ingredients (resmethrin, permethrin, etc.). I believe that these terms should be lower case because they represent the chemical common name and not a brand name.

submitted risk assessment Peer Reviewer #1

However, "sumithrin" is a brand name (by Sumitomo). The authors should consider changing "sumithrin" to "phenothrin".

Page 3. "Part of the effort to develop..." This paragraph needs to be re-written. Although it is technically true that the risks from the use of mosquito insecticides are small relative to other risks, the statement gives the impression that the risks from exposures to pesticides in food, indoor residential use, and some pet flea and tick products are serious and exceed levels of concern. I recommend that the statement be changed to reflect that exposures from the use of vector control insecticides are much lower than potential exposures to insecticides from other use patterns.

Part 1: Summary

Page 12, last paragraph. The second sentence should be re-written. The three larvicides were not subjected to a risk estimate not because you could not find any quantitative human health risks in the literature, but rather because there are no effect thresholds established for humans to these materials and human exposures would be negligible. These materials are essentially non-toxic to humans, so it makes no sense to compare a potential exposure to a toxic endpoint that does not exist.

Page 13, first sentence. Despite what is written above, you cannot state that these materials "do not pose a risk to people." There is no such thing as zero risk. Rewrite the sentence to conclude that risks would be negligible because of lack of toxicity, exposure, and persistence.

Part 2: Mosquito Borne Disease Impact Assessment Page 1, third paragraph. Change "principle" to principal".

Page 4, second paragraph. Change "was oriented" to "were oriented".

Page 5, last two sentences. Delete. This is highly speculative wording, could be written about anything, and does not add anything to the text.

Page 7, first paragraph. Why is there no mention of the effectiveness of the yellow fever vaccine?

Page 15. Change "in any area requires" to "in any area require".

Part 3: Human Health and Ecological Risk Assessment of Vector Control Pesticides Considered for Use by Suffolk County Page II, Page 3-11: synonym for sumithrin is sumethrin? Page II = sumithrin as synonym for sumithrin. As stated above, you should probably use "phenothrin" or "d-phenothrin".

Page IV, paragraph 2: change upper end to conservative Page VII, line 7. "...indicate a true increased risk of adverse..."

Page VII (twice) and many other times throughout the EIS: "...do not pose a risk to people." There is no such thing as "no risk". The authors need to re-word these statements to reflect the limits of science and risk assessment. The results suggest that reasonable worst-case exposures would be below current levels of concern (or that the risks are negligible).

Page VII and other pages: Why were community garden risks driven by produce ingestion? Why would a gardener consume more produce or produce with higher deposition rates? I assume the gardener will not consume more produce, but rather his/her consumption of produce would be weighted toward the garden which receives the deposition of the insecticide. This needs to be clarified. Also, why wouldn't the gardeners family be as exposed via ingested produce?

Page VIII. need to show citations ("Other Health Evaluations").

Page XIX. citations on "Overall Conclusions"

Page XIV, top paragraph: 1st line period after 1 Page XVII, first paragraph: repeated exposure will raise risk in chronic situations...more exposure

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equals more risk...reword or quantify Page XVIII, second paragraph: many wildlife reserves use vector control methods. What is the status of this reserve?

Page XVIII, fourth paragraph, bullet 2. Why is pyrethrum associated with lower risk? It is certainly no less toxic than some of the chemicals and Peterson et al. (2006) concluded that its acute risks were greater than other pyrethroids. | 14

Page 1-1. Paragraph 2: define "straw man plan" | 15

Page 1-4. Paragraph 1: no independent verification of info. Confused by meaning.

Page 2-4: Why wasn't naled included in the study? | 16

Page 2-5: Why consider garlic oil at all? There is little if any data to produce a meaningful risk assessment. In spots, the authors even fall into the trap of assuming minimal risk because garlic is natural. In reality, the toxicological profile for garlic oil is incomplete and garlic oil represents the most uncertainty with regard to a risk assessment. | 16

Page 2-6: If a tier-1 is reasonable worst case, why not base time between applications, season and time of the day on the worst-case scenario, instead of "past practices/conventions"? Same applies to application methods. | 17

Page 2-6: Paragraph 4: report lbs. AI acre...and that it is maximum use per label. | 18

Page 3-2,3. Again no listing of actual products and formulations. | 19

Page 3-8, Paragraph 2: no mention of time-release larvicides Page 3-12. Malathion paragraph 3 is contradictory, needs rewording. | 20

Page 3-17. Bs may pose risk to non target dipterans. | 21

Page 3-18. Methoprene is directly applied to water so will pose almost negligible risk to terrestrial wildlife and humans except through surface water contact and ingestion. Tox numbers may be overkill for non-aquatic species. However, in the human health report if there is a list of effects there should be a list of endpoints.

Page 3-21. Human health paragraph 2 sentence 1: reword sentence so that it sounds like the liver is not a target of PBO.

Page 3-22, Paragraph 3: study should incorporate irrigated cropland if such is in the county which is unclear as these lands are perfect breeding grounds for mosquitoes which will fly quite a distance for a blood meal. If study was comparative it would have to take these areas into deeper consideration. | 23

Page 3-23. Report policies regarding vector control in these areas.

Page 3-25, line 7: "...including and transitional...?"

Page 3-27, Tables 3-4: are good surrogates identified for salamanders and turtles and is a turtle considered terrestrial or aquatic? | 24,25

Page 3-28: someday should be two words

Page 4-2: "birth to 6" is too broad, since exposure to infants is completely different than that of a 6-year old. | 26

Page 4-4: includes an incomplete pathway, but before it was stated that only complete pathways were included. | 27

Page 4-5, Paragraph 14: change dose to doses under "Longer Term Dose Calculations".

Page 4-7: general formula: why include an FI (fractional intake) in a tier-1? Worst-case should be that all media contacted are assumed to be from potentially contaminated sources. | 28

Page 4-8, last paragraph: replace "high end" with "conservative"

Page 4-9: "Any receptor-pathway combination for which the relative potential dose exceeded a factor of one...". But dose is different than HI or HQ, and

submitted risk assessment Peer Reviewer #1

usually doesn't reach 1.

Page 4-12, paragraph 1: looks like you are using bias to eliminate pesticides. Reword.

Page 4-13. The exposure assessment is not transparent in the report. Materials and methods should be stated concisely in Part 3 as the assessors generated their own models for this part of the assessment rather than relying solely on other studies. | 29

Page 4-14, paragraph 1: To take the maximum point estimate of one receptor is an unreasonable worst case assumption. Some sort of mean seems like a better fit. | 30

Page 4-15, paragraph 1: the assumptions for long-term exposure are unclear in this paragraph. Reasonable worst-case scenarios would consider a degradation average over 90 days rather than the peak. The assumptions made for the modeling were not clear. At no point is there a discussion of distance away from the line of the spray and each individual landscape that makes this assessment remotely reproducible or semi transparent. | 31

Page 4-15, paragraph 2: update to reflect current RED status.

Page 4-15: by now resmethrin RED is out - needs to be updated Page 4-16, paragraph 4: extrapolation from LOAEL to NOAEL in human health risk assessment may be a little cavalier, refinement of exposure might be more conservative. | 29

Page 4-17, middle paragraph, last sentence: lifespan studies and multigenerational reproductive studies are used.

Page 4-21: How can HQs be calculated for the product? Only if you consider the effect to be additive, but we know it is synergistic. So, it may not be an overestimate of risk (as stated on the next page). | 33

Page 4-24, middle of paragraph 1: delete "considered".

Page 4-26, paragraph 2: delete "still".

Page 4-29, last paragraph: there are a multitude of reasons but this EIS should cite more evidence to conclude that malathion estimates are conservative. | 34

Page 4-30, paragraph 1: Knepper suggests that insecticides will stack against building. | 35

Page 4-31 and many other pages: update permethrin and resmethrin cancer information, Q* (USEPA 2005). | 6

Page 4-31. Toxicological Hazard, second sentence: this sentence applies to all substances, not just pesticides. Delete.

Page 4-33, Table 4-6: delete column 5.

Page 4-34, line 5: "...in Suffolk County would not be associated..."

Page 4-38. (4.3.3) Chemicals in these studies are not considered in this risk assessment.

Page 4-38. Delete the sentence, "These researchers concluded that more than 100 years of direct daily exposure to the maximum..." This sentence is a horrible example of inappropriate extrapolation and an awful risk communication.

Table 4-3: needs to be updated

Malathion: ingestion acute NOAEL= 7.1mg/kg-day (USEPA Sep 13, 2005)
Permethrin: all need to be updated according to USEPA 2005
Resmethrin: all need to be updated according to USEPA 2005 | 6

Sumithrin: most need to be updated (USEPA 2000) | 36

PBO: acute ingestion = 630 mg/kg-day, and inhalation long term is 3.91 mg/kg-day (USEPA 2005) | 6

Page 5-8, line 1: change "not" to "minimally"

Page 5-8, Paragraph 3: dermal absorption might not be important, but animals | 37

that groom themselves may get a dietary dose.

Page 5-10 through 5-14. This section needs to be completely re-thought.

Page 5-12, first bullet: What about insects in the spray zone (e.g., caterpillars on plants, resting adults)? The authors need to state that the "risks being largely mitigated for daytime flying insects if spraying were to occur at night." Page 5-13, second bullet: The authors also can use vegetative contact data to make conclusions about honey bee risks (EPA tier II honey bee testing). 38

Page 5-11, paragraph 2: may affect non-biting midges and community structure.

Page 5-13, bullet 3: there are always insects other than mosquitoes out when there are mosquitoes...should go away from generalities and just talk about spraying based on mosquito behavior.

Page 5-25, last paragraph: ¼ mile buffer is not consistent with label recommendations or EPA risk assessments. A better explanation of buffers this large needs to be provided. 39

Page 5-36, last paragraph, bullet 2: No means or medians given for permethrin deposition rates.

Page 5-43, first paragraph: minimal effects in Minnesota only were concluded after the spray regime stopped. 40

Appendices to the Human Health Risk Assessment A-G

Exhibit C-1, in table: misspelled "concentration"

Page C-2, 2nd paragraph: "... If the HQ is less than unity then...". One? One unity?

Page C-2, 2nd paragraph: "...then the potential for adverse health effects is unlikely."

Page C-2, 2nd paragraph: "...it does not mean that an adverse health effect will occur."

Page C-3: "The USEPA assumes..." citation?

Overall: document lacks citations

Page C-5, 2nd paragraph: "...while the pyrethroids were evaluated using via a hazard quotient"

Page B-3: "Sources of Toxicity Criteria" needs to be updated | 6

Page C-1; In a situation where you are assessing exposure to residents, is a 20-min time frame enough (acute exposure)? And, if you are doing 20 minutes, why use the 1-hour average? It can be underestimating exposure. Can't you use peak value? 41

Page C-2: I don't agree that "Use of the maximum 1-hour concentration provides an estimate of the likely worst-case conditions that can be expected in a study area." 41

Page D-4: Agree with statement about <1 mo and 1 to <3 mo age groups having minimal exposure via some pathways, but other pathways should actually be higher exposure. Depending on the scenario, inhalation, and mostly dermal contact with spray particles, could present higher exposures. 42

Page D-10: Why were 72 kg used here, while in other parts of the document is 70kg? If averaging male and female, shouldn't it be between 60 and 70 values used by USEPA for females and males respectively?

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submitted_risk_assessment_Peer_Reviewer__2

This reviewer is cited as “Peer Reviewer #2” in the joint letter from The Nature Conservancy, Environmental Defense, The Peconic Baykeeper, and Citizens Campaign for the environment.

REVIEW OF THE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT AND OTHER PARTS OF THE IMPACT ASSESSMENT TASK REPORT OF THE SUFFOLK CO VECTOR CONTROL & WETLANDS MANAGEMENT LONG TERM PLAN & ENVIRONMENTAL IMPACT STATEMENT

SUMMARY: This summary responds to the questions with which I was charged and is followed by detailed comments that pertain to specified Parts and sections of the document.

1. **Organization:** A document such as this, with many separate reports and appendices to these reports, begs for a strong, clear *Summary* that lays out the framework of the study and the report, clearly describes the relationships among the parts, and provides clear statements of the objectives, methods, results and conclusions. *I.e.*, the Summary should be the means by which both close- and casual-readers are oriented to what lays before them, as well as to what brought the Project to the current point. However, this *Summary* comes across as an anecdotal, rambling narrative that is internally inconsistent in referring to parts of the document, and intermixes methods, findings, conclusions and recommendations without clearly differentiating among them. It is unclear throughout whether this set of documents (and its component parts) is intended to be an Impact Assessment Statement, a Risk Assessment, a set of possible plans, or a Recommended Plan. The terminology is not consistent. It would be useful to reference the Part numbers when referring to the separate sections on page 6 and in the Table of Contents. Strengthening the *Summary* would greatly improve the presentation and utility of the report as a whole. | 1
2. **Weakest and strongest aspects:** A tiered Integrated Vector Control approach with emphasis on proactive prevention is an entirely appropriate vector control strategy. The proposed approach to marsh management and the broad conceptualization of the roles and responsibilities of vector control are strengths of the report. The health and ecological review is well organized. As noted above, the *Part 1 Summary* is weak. The errors in *Part 2* are a correctable weakness (see the detailed review below). | 2, 3, 4, 5, 6
3. **Missing elements:** My comments focus on the *Part 3* risk assessment of pesticides.
 - *Higher Use Scenario:* I recommend an assessment of pesticide risk in scenario(s) in which higher-than-current levels of pesticides are assumed. Such scenarios are realistic—more widespread and frequent applications of mosquito control (MC) pesticides are made in many areas of the US—and would provide a broader context for understanding current and reduced levels of risk. Without such scenarios, this risk assessment will not be useful should greater use of MC pesticides be called for. It seems very possible that political or social pressures could demand more frequent or more widespread applications of adulticides should the proposed marsh management plan falter or not have the anticipated success in controlling mosquitoes, or should a frightening public health situation emerge. | 7

- *Life-Cycle Assessment:* Beyond assessing risks from **use** of pesticides at their regulated or otherwise-approved level, I recommend that an assessment of risk consider the full life cycle of the product or practice—from manufacture to disposal. Risks at other points in the pesticide life cycle receive far less scrutiny than during regulated use. For example, Bian et al (2004) found that occupational exposures during manufacture of the pyrethroid fenvalerate are associated with a significant increase in sperm DNA damage. Cantor and Silberman (1999) conducted a retrospective cohort study comparing mortality data for nearly 10,000 aerial pesticide applicators with corresponding data for a similarly sized control group of flight instructors. They found that during the period 1965-1988 the aerial pesticide applicators had significantly elevated mortality rates from malignant tumors, stroke, motor vehicle accidents, non-motor vehicle accidents (mostly aircraft accidents), and all causes of death, as well as significantly higher rates of pancreatic cancer and leukemia than the controls. 8
- *Efficacy Data:* Another missing element is a review of efficacy, which is an important component of a Plan, if not a typical component of a risk assessment. Understanding the efficacy of current and alternative practices provides important context for both decision-makers and the public. It is irresponsible to promote methods that veer from the “tried-and-true” without assessing their efficacy. Low efficacy products and practices stand the chance of increasing other risks. *E.g.*, if applications need to be repeated more frequently, the risk of mechanical failures and truck or plane crashes increases, more non-renewable resources are used, etc. Less effective practices also increase the likelihood that the problem requiring the intervention will not be controlled, increasing risks associated with the disease or other problem. 10
9
- *Low Level Sub-Lethal Distributed Effects:* Nuanced interactive effects of adulticides applied at low levels—*e.g.*, the debatable effects of pyrethroids on endocrine disruption—are not addressed. See, for example, Garey and Wolff 1998, Go et al. 1999, Tchernitchin et al. 1999. Discussion of these studies might temper the blanket statements that imply a level of “safety” over a wide range of pesticide exposure levels. As pyrethroids are coming to dominate the pesticide market, more such studies are emerging (see the review below in commentary to the Ecological Risk Assessment), suggesting among other things that new testing protocols may be required for pyrethroids that differ from those previously used for the OPs and OCs. The concepts of risk factors (rather than linear cause-and-effect relationships) and interactive effects are not given sufficient attention in the assessment of pesticide risks. 11
12
- *Exposure & the risk analysis paradigm:* I recommend that the context for exposure from MC be more fully developed and set within the framework of risk. *I.e.*, risk = f(hazard, exposure); there is no risk to human health without capacity to do harm (*i.e.*, the hazard) and some likelihood of being in harm’s way (*i.e.*, exposure). I do not believe that the public is sufficiently cognizant that MC pesticides play such a small role in their overall exposure to pesticides and toxic chemicals. *E.g.*, (i) only 4% of permethrin is used for mosquito control. (ii) The pyrethroids that have been in the news recently due to detection of residues in urban streams are those used primarily for cosmetic lawn care, not for public health (see review of these articles in the Ecological Risk Assessment section below). The review of the CDC report documenting insignificant increases in levels of urinary pesticide metabolites following large-scale MC pesticide applications is a important start on documenting human exposure to MC pesticides (CDC MMWR 2005). 13
14
15

4. **Other significant studies:** information from more current and different literatures is interspersed in the detailed comments below.
5. **Are the conclusions supported?** If it can be assumed that the conclusions are the “findings” discussed in the first pages of the *Summary*, I have extracted the following conclusions from this discussion (comments re: these conclusions are indented in the paragraph following each conclusion):

- The current Suffolk County mosquito control program has limited human health impacts of WNV to 19 serious illnesses and 4 deaths, over a multi-year period, whereas without MC there may have been as many as 160 serious illnesses (including 16 deaths) annually.

The approach used to simulate WNV (and EEE) risk in absence of mosquito control and compare it with actual disease incidence is a useful means for approximating the impact of the Suffolk County MC Program. See comments to Part 2 re: specific assumptions of the model. | 16

- The existing Suffolk County mosquito control program may also be responsible for preventing human health impacts from EEE, a virus that is present in the county.
- The proposed MC management plan is expected to further reduce vector-borne disease risk as a consequence of more effective and consistent control of salt marsh mosquito populations by means of progressive water management.

Based on experiences in Connecticut and other Northeastern states, this is a reasonable expectation over the long-term. Because of differences in local ecology, the experiences and rate of success is not likely to be completely the same. | 17

- None of the pesticides currently used, or proposed for use, were found to pose a significant threat to human health. However, (i) the adulticides could impact nocturnal flying insects in the immediate vicinity of application; (ii) permethrin and malathion could potentially affect non-target aquatic invertebrates, but these impacts are rapidly reversible and do not propagate in the food web; (iii) there are possible adverse impacts from pesticides used for purposes other than mosquito control [unclear if this statement refers to other types of pesticides or the same active ingredients as are used for MC]

The discussion and conclusions about pesticides impacts should make use of a risk framework, *i.e.*, one that explicitly refers to hazards and to exposure potential. The products used as adulticides are not hazard-free for people or non-human biota. The fact that risk is below reasonable levels of concern is due in large part to very low exposure potential from mosquito control activities. | 19

- The proposed Plan—involving 15 recommended techniques—will minimize insecticide use by reducing mosquito breeding habitat and improving conditions for mosquito predators. The legacy grid ditch system will no longer be maintained and natural processes for marsh management will be relied upon in areas without mosquito problems. This management strategy is expected to reduce need and use of larvicides in the salt marshes.

The meaning of the term “progressive water management” is never defined, to the best of my knowledge. *I.e.*, does “progressive” refer to “advanced, forward thinking,” or to “introduction in stages”? | 20

- Implementation of the Long-Term plan will likely result in improved mosquito control, improved human health as a result of improved mosquito control, and better environmental conditions in the marsh. With improved mosquito control, pesticide use will be reduced and consequently the risks associated with exposure to MC pesticides.

This is a positive and optimistic conclusion and set of goals to work towards. It is not | 22
clear that there is experience and data to support the certainty of success that is implied, | 23
for example, by the goal of reducing larvicide applications by 75%. | 24

6. **Other modifications/improvements:** see the detailed review that follows.

7. **How well does this document address the plan/program needs in relation to the document's intended purpose as depicted in the program description?**
Unclear what program description is referenced.

DETAILED REVIEW OF SPECIFIED PARTS

PART 1: SUMMARY

Readers of the *Summary* would benefit from greater clarity in use of language and in organization of the document. *E.g.*, It would be useful to reference the Part numbers when referring to the separate reports on page 6 and in the Table of Contents. In addition, sloppy language prevents clear inferences from statements. | 25

PART 2—IMPACT ASSESSMENT OF MOSQUITO BORNE DISEASE

• Section 2.1 Diseases of Greatest Concern:

- **Context and relevancy:** Diseases of greatest concern to whom? Context is needed to clarify whether these are the greatest concerns worldwide or in Suffolk County. Without clarification, this section is misleading as well as locally irrelevant.
- **Need for a stronger conceptual framework for disease risk:** The WNV and EEE focus | 26
mask other risks that I believe should be developed more fully. In addition to the unrecognized disease load resulting from mosquito bites that is described in the Appendix *Additional Impacts from Mosquito Biting Behavior*, and the potentially greater human health risks from vector borne diseases that have not yet emerged in Suffolk County, I would | 27
suggest that indirect risk factors for human disease also be considered (*e.g.*, limiting physical activity to avoid outdoor exposure to mosquito bites).
- **Errors and reliability:** Several blatant errors/mix-ups are made in defining disease symptoms and disease agents. The fact that they were not caught and corrected dampens overall confidence in this report. *E.g.*,
 - P9. “Encephalitis is a virus”: Encephalitis is not a virus, but refers to inflammation of the brain, which is a potential serious effect (*i.e.*, a hazard) of a number of bacterial or viral infections—including those listed on page 9—as well as from allergic reactions.
 - P9. “WNV is an inflammation of the brain.” WNV is not an inflammation of the brain, but is a virus that can cause encephalitis, as well as other symptoms. | 28
 - Similarly, the statement on page 10 that the “Risk of contracting WNV is low...” confuses the risk of WNV infection with the risk of experiencing disease symptoms. This paragraph focuses on the risk of exhibiting symptoms from WNV infection, not on the risk of contracting WNV (risk of infection).
 - Other details of section 2.1 were not reviewed in similar detail, but—given these errors—I would have reservations in relying on this document for accuracy.

• Section 2.2. Recent History of Mosquito Borne Disease in Suffolk County

- **Consistency within the document:** P11. “Two young children contracted malaria in 1999”. The category “young children” is defined in the *Part 1: Summary* section on Exposure

Assessment as those younger than 6 years. However the children who contracted malaria in 1999 while at Boy Scout Camp in Suffolk Co were both 11 years old, *i.e.*, in the category of “older child” per the Exposure Assessment categories.¹

- **Presentation of data:** P12-13. The narrative presentation of known and suspected disease vector species is confusing and somewhat misleading.² Suggest a tabular presentation instead of, or in addition to, the narrative, both for clarification and also to facilitate consideration of new and emerging information, geographically-different information and the considerable differences of opinion re: the role of various mosquito spp in transmission of WNV and, particularly, in human disease risk. | 29

- **Section 2.3 WN Serosurveys and Section 3, Suffolk Co Modeling Results for WNV**

- **Additional Literature and implications.** Risk of contracting disease (p15-19): A recent study by Busch et al. (2006) is a significant addition to the literature reviewed here because:
 - results indicate a higher rate of infection per neuroinvasive case than the previous studies: 256 WNV infections (95% CI 112–401) per neuroinvasive case as compared with the often cited 150 infections per neuroinvasive case, and | 30
 - this study used a different methodology: screening of donated blood rather than taking of blood samples from willing participants, which may reduce participation bias.

My interpretation of the Busch et al. results is that they may indicate that (i) WNV has and will continue to penetrate the US population more rapidly than assumed by disease transmission models, leading to more rapid acquisition of immunity, and/or that (ii) the infection rate may be greater than the 2% of exposed population assumed in the Suffolk County model, and/or that (iii) neuroinvasive cases of WNV may be undiagnosed or misdiagnosed, especially in areas where less attention is paid to WNV. These factors could have implications for the Suffolk County WNV Risk model described in Section 3 (the first two factors would decrease simulations of the magnitude of risk without mosquito control; the third factor would increase this magnitude). | 31
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- **Vis-à-vis risk from WNV:** in developing assumptions for the simulation models and projections, it should be noted that
 - definitions and reporting practices for WNV have changed over time since 1999 to include West Nile Fever and other symptoms, as well as neuroinvasive cases; | 34
 - “less serious” symptoms came to be acknowledged as having potentially more deleterious long-term effects than were initially considered. It also became recognized that people can suffer long term effects from non-fatal neuroinvasive cases. *I.e.*, human health risks for the 20-30% of symptomatic cases came to be acknowledged to be greater in terms of severity, longevity and non-reversibility, despite the fact that risk of mortality risk remained relatively low. | 35

¹ For details re: these cases of malaria, see ProMed-Mail archive #19990902.1538, posted Sept 2, 1999 “Malaria, autochthonous - USA (New York).”

² By following sentence #1 “Certain spp...” in the same paragraph with sentence #2 “*Aedes vexans*...” it is implied that sentence #2 is a complete listing of recognized or suspected vectors, rather than a listing of aggressive salt marsh mosquitoes, which may or may not be a subset of the vector species. *I.e.*, sentence #2 should not be in the same paragraph with sentence #1, and the first paragraph should list the species considered to be vectors.

- **Table 3, Model of Suffolk Co WNV Incidence, No Mosquito Control (page 23).**
 - Despite the explanations given on page 22, the derivation of numbers used in the Table is somewhat unclear. *E.g.*, If 1,482,284 refers to the total population of Suffolk County, this should be stated. If the numbers listed in the column “Exposed Population” are the sum of populations in the zip codes described, this should be stated in the column header. | 36
 - I question the validity of the assumption that exposure results only from place of residence, but not also from occupational exposures, commutation route, or recreation. | 37
 - If results from Busch et al. are pertinent to Suffolk County, then the number of hospitalizations and deaths from the no-action plan would be less than indicated here. | 30
 - Why is the Year 2000 “Resulting Immune Percentage” 1.5%, rather than the 2% assumed to be exposed to infection? If Busch et al. findings are correct, then immunity would increase at a greater rate than given here. | 38
 - The significance of the points made here is that the total risk from WNV without intervention may be less than suggested by Table 3 and therefore that the effect of intervention could be less than described. | 39
- **Section 3.3, Actual Conditions.** A new generation of predictive models for WNV human disease risk is considering factors such as meteorological and geographical conditions that should be, but are not, included in the discussion of mosquito ecology. | 40
- **Section 4, EEE Risks.** This section was not closely reviewed.

**PART 3: HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT OF VECTOR CONTROL PESTICIDES
VCONSIDERED FOR USE BY SUFFOLK COUNTY**

- **Current/Past Practices:** This first section is a review of the Evaluation Management Plan based on past practices that are believed to “*represent a reasonable upper-end management scenario*” (italics mine). I question whether this is an accurate assumption, given that WNV poses a low/moderate human health risk in terms of numbers affected (*i.e.*, it is not an “upper-end” risk), and that there is no certainty the proposed wetlands management plan will provide sufficient mosquito control—either in terms of controlling a future vector borne disease or in terms of meeting community expectations. Given a context of increased population pressure on the natural environment, global climate change and its suspected effects on increasing infectious disease risk, and other trends indicating environmental degradation, there is certainly a possibility that a higher level of pesticide use may be considered warranted in the future. The risk analysis would be more robust if it included a fully-developed higher use scenario. (There is brief mention of some increased use of adulticides in the Davis Park area as one of the alternative scenarios considered). | 7
- **Exposure:** On the other hand, in reviewing information about the risks associated with the pyrethroids it is important to keep the relative use for mosquito control in context: mosquito control | 14
accounts for just 4% of the 2 million pounds of permethrin applied annually in the US.
- **Malathion:** risk of exposure to degradates should be reviewed if use of the organophosphate malathion remains a possibility under the new Plan, particularly given the greater potency of malaoxon and its higher rate of formation in urbanized and aquatic environments. This comment is not said to fault this risk assessment for omitting consideration of the poorly studied malaoxon, but | 41

because this situation seems to beg for a stronger statement of recommendation against use of malathion in the mosquito management toolkit.

In addition, malathion is a greater risk to honeybees/beneficial insects because it does not have the repellent properties of the pyrethroids. In addition to direct kill, honeybees take nectar and pollen that is contaminated with such pesticides back to their hives as food for the young. | 42

- **Garlic Oil:** I am not knowledgeable about either the risks or efficacy of garlic oil as a barrier repellent, but the fact that it is a naturally occurring substance widely used as a food flavoring or additive and that it is Generally Regarded as Safe, or GRAS, by FDA, should not be taken to mean that it is also “safe” or desirable to use at the quantities needed for pest control. For example, acetic acid—a.k.a. household vinegar—is listed as a Class I toxin in California because it is a strong irritant of mucous membranes when used at the concentrations and dosage needed to be effective as a contact herbicide (its MOA is as a dessicant). It is irresponsible for agencies to exempt naturally occurring food substances from review and not to provide efficacy data for approved products and practices. The only literature I have seen re: efficacy of garlic as a repellent, other than the US EPA RED Facts (June 1992) is a Research Letter in JAMA (Stjernberg and Berglund 2000). | 43
- **Degradation Rates:** Summary data for persistence and degradation typically reflect agricultural conditions. However, pesticides typically degrade more slowly and persist longer in the less studied urban environments where they are less likely to be exposed to the sun’s phytolysis or to biodegradation by microbials (Rettich 1980). | 45
- **Larvicide Risks:** It is noted that no assessment was conducted for human health endpoints. However dusts of *bacillus* products pose inhalation risk to applicators. | 46
- **Methods:** Prenatal exposures are among the most critical (*i.e.*, exposure to pregnant women). Not to have focused specifically on this receptor population could be a serious omission, unless the vulnerabilities of this sub-population are accounted for elsewhere. (*e.g.*, in the hazard assessment.) | 47
- **Other Health Evaluations:** The following are recent additions to the literature. While for the most part the results and conclusions are consistent with the *Part 3* summary that large-scale ULV insecticide applications for mosquito control do not pose a significant threat to human health, there are also recurrent themes of concern that:
 - (i) methodologies for analysis of pyrethroids are still under development. For example, the US EPA RED for permethrin (June 2006) notes that not enough is known about the mode of action of pyrethroids to know if they should be considered collectively, or if they operate by different modes of action.³ Halpin and Heine (2005) note that toxicity thresholds for aquatic organisms—*i.e.*, the exposure level that kills sentinel aquatic organisms—is lower than the level now considered adequate for water quality, and that none of several measurement protocols have regulatory approval. | 48
 - (ii) risk factors resulting from low levels of exposure are more complex to assess than simple cause-and-effect. | 49

³EPA is not now considering the impacts of pyrethroid exposure collectively (what EPA identifies as a cumulative risk assessment) because of uncertainty about whether they have a common mode of action. While all are nerve poisons affecting sodium channels, the US EPA RED notes that there are multiple types of sodium channels and that it is currently not known if they have similar effects on all channels.

- The just published US EPA **Permethrin RED Factsheet**⁴ (June 2006) notes that EPA has classified permethrin as “Likely to be Carcinogenic to Humans” by the oral route. This is contrary to the WHO (2005) and IARC (1991) cancer risk assessments referenced on page 3-19 that indicate, respectively, that “there is no clear indication of carcinogenicity” and that permethrin is not classifiable as a carcinogen in humans. 51

The *RED* further notes that permethrin is a restricted use pesticide (RUP) for crop and wide area application (*i.e.*, nurseries, sod farms) due to its high toxicity to aquatic organisms, with the exception made for wide area mosquito adulticide use. However, permethrin is considered a general use pesticide for residential and industrial applications and is also used pharmaceutically for control of head lice and scabies.

- In his review of Parkinson’s disease, Shapira (2006) notes that pyrethroid pesticides, when administered parenterally to rodents, reduce the numbers of tyrosine hydroxylase-positive dopaminergic neurons in the nigrostriatum and increase expression of dopamine transporter and brain-derived neurotrophic factor. In drawing this conclusion about the possible association of pyrethroid exposure to onset of PD, Shapira draws from work by Elwan et al. (2006), who show pyrethroid pesticide-induced alterations in dopamine transporter function; Pitman et al. (2003), who look at immunohistochemical changes in the mouse striatum induced by the pyrethroid insecticide permethrin; Bloomquist et al. (2002) who investigate the selective effects of insecticides on nigrostriatal dopaminergic nerve pathways; and a study by Imamura et al. (2006) of deltamethrin, a pyrethroid insecticide, as a potent inducer for the activity-dependent gene expression of BDNF in neurons. 52

- While human exposure would be expected to be higher from urban applications as compared with agricultural uses, O’Sullivan et al. (2005) found that “the incidence of emergency department (ED) asthma presentations and admissions to the Lincoln Hospital, located in the South Bronx of New York City, during the 1999 eradication program of the mosquito vector for West Nile virus [spraying of malathion and resmethrin] ... did not increase [in terms of] rate or severity ... as measured by the Lincoln Hospital's ED asthma census or hospital admissions for asthma.” 53

- **Ecological Risk Assessment:**

- **Terrestrial Wildlife:** Question validity of using avian wildlife as surrogates for reptiles. 54
- **Non-Target Insects:** While recognizing the paucity of quantitative toxicological information for other insect species, and that honeybees are often used as surrogates for all beneficial insects, I recommend that qualitative data and expert judgment about these organisms and ecosystems be used to assess impacts on other species, rather than simply applying data from honeybee studies. Other species, for example, cannot be assumed to have the resiliency of honeybees in returning to the place from which they were repelled by pyrethroids. 55
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⁴ June 2006. EPA 738-F-06-012. <http://www.epa.gov/oppsrrd1/REDs/factsheets/permethrin_fs.htm>. EPA published a notice of availability for the Permethrin Reregistration Eligibility Decision (RED) on June 28, 2006 and opened the public comment period on this document through September 26, 2006. The index of EPA documents relating to permethrin reregistration is at: <<http://www.epa.gov/oppsrrd1/reregistration/permethrin/>>.

Amweg and You (2005) explain that whereas past monitoring of pesticides in urban-dominated creeks focused on the water column because of the relatively high water solubility of OPs (including malathion and naled), pyrethroids are less soluble and therefore more likely to be found in sediments. Thus Halpin and Heines (2005) note that recent toxicity studies have found much lower thresholds of toxicity for aquatic organisms than the levels permitted by existing Water Quality Goals and analysis of pyrethroids has been at higher reporting levels than the concentrations of interest. They report on the strengths and weaknesses of various testing protocols for detection of low levels of pyrethroids, none of which have received regulatory approval. 57 49

- **Aquatic Organisms.** Pyrethroids have been found in creek sediments in suburban California at levels of ecological concern (*i.e.*, at concentrations sufficient to cause mortality to aquatic organisms) (Weston et al. 2005). However the particular pyrethroids detected are not used for mosquito control and were primarily, if not entirely, in runoff from structural pest control (*e.g.*, control of cockroaches) and from use in lawn care products. Both Weston et al. (2005) and Amweg and You (2005) note that pyrethroid residues are more likely to be found at levels of concern in dry regions where landscape irrigation dominates seasonal flow in some water bodies. That explains why Amweg and You found toxic levels in most of the peri-urban creeks tested in California, and almost imperceptible levels in creeks in Tennessee. 58 59 60

The implications for Suffolk County would depend on the local soils and ecosystem. Two studies focusing particularly on Suffolk County come to somewhat different conclusions: Barnes et al. (2005) assessed lethal and non-lethal effects of pesticides used in Suffolk County MC on Estuarine Shrimp. They found that despite direct application of MC pesticides to these marshes, water column concentrations were low to undetectable even 30 minutes after a spray. Pesticide residues were higher and more persistent in sediments. They conclude that pesticide levels required to cause mortality in laboratory studies greatly exceeded levels observed after operational sprays in the field, supporting the observations from the field study of minimal if any toxicity due to spraying [of MC pesticides]. 61

DeLorenzo et al. (2005) came to somewhat different conclusions from a similar study. This group assessed permethrin on three life stages of the estuarine grass shrimp, *Palaemonetes pugio*, and found that (i) permethrin exposure increased the time to hatch in embryos, and (ii) was correlated with changes in swimming behavior at the highest concentration for newly hatched larvae in the embryo test (6.4 g/L) and for larvae in the aqueous larval toxicity test (0.2 g/L). (iii) Glutathione levels increased with permethrin exposure, while (iv) lipid peroxidation values decreased. The toxicity of permethrin to both adult and larval grass shrimp was significantly mitigated by the presence of sediment. The authors inferred from these results that very low levels of permethrin may negatively affect individual grass shrimp health and survival and that permethrin use in the coastal zone should be carefully managed to avoid adverse impacts on non-target estuarine organisms. 62 63

Supporting the conclusions of DeLorenzo et al. that the presence of sediment decreases the toxicity of permethrin to grass shrimp, Hunter, Yang and Gon (2005) looked at bioavailability in sediment. They found that only the dissolved fraction of the synthetic

pyrethroids in the sediment was bioavailable to *C. tentans*, and that the bioavailability was likely dependent on sediment properties, especially the organic matter content. | 64

Because of concerns such as these, the US Environmental Protection Agency completed a screening-level ecological risk assessments for a number of synthetic pyrethroids relative to their use on agricultural crops (*e.g.*, cotton, corn, wheat) and urban settings (*e.g.*, mosquito abatement use). These assessments show that pyrethroids pose a potential risk to aquatic species, including fish, invertebrates, and sediment-dwelling organisms. Furthermore, pyrethroid bioavailability is not expected to be completely mitigated through adsorption to sediments and particulate matter. Because of the toxicity, mode of action, high partition coefficients (Kocs), and moderate to high persistence of this class of compounds, the Agency considered pyrethroid bound sediments as an important aquatic exposure component. (Shamim et al. 2005). | 65

Lydy, Weston and You (2005) looked at the “Relative contributions of agricultural or urban pyrethroid usage to toxicity in California streams.” They found pyrethroid residues in 100% of urban streams and 80% of streams draining agricultural areas. Seventy percent of the urban streams and only 20% of the rural streams contained residues at toxic levels. While pyrethroids were likely the sole or major contributor to much of the toxicity to aquatic organisms in both landscapes, the ‘culprits’ were not the active ingredients used for mosquito control. | 66
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The October 2005 issue of the *Journal of Shellfish Research* published a compendium of articles focused on aquatic impacts of MC pesticides. Pertinent articles include:
De Guise, et al.—Resmethrin immunotoxicity and endocrine disrupting effects in the American lobster (*Homarus americanus*) upon experimental exposure.
Walker et al.—Metabolic effects of acute exposure to methoprene in the American lobster, *Homarus americanus*.
Zulkosky et al.—Acute toxicity of resmethrin, malathion and methoprene to larval and juvenile American lobsters (*Homarus americanus*) and analysis of pesticide levels in surface waters after Scourge™, Anvil™ and Altosid™ application.
Wilson et al.—Simulations of transient pesticide concentrations in Long Island Sound for late summer 1999 with a high resolution coastal circulation model, pp. 865. | 69

- **Alternative Repellents.** A review of the field of mosquito repellents with information on recent developments in alternatives to DEET appeared last week in *Science* (Krajick 2006). For an alternative viewpoint re: DEET, see Abdel-Rahman et al. (2001), who document health effects from DEET in situations where the product was used contrary to label—an increasingly possible scenario to imagine should officially-sanctioned and recommended use of DEET increase. Brownstone (2002) offers commentary to Fradin’s (2002) oft-cited, DEET-focused review of repellents in the *New England Journal of Medicine*. Golenda et al. (1999) evaluate gender differences in efficacy of an extended duration formulation of DEET. | 70
| 71

Part 4-5: Avian Population Risks/West Nile Virus Non-Human Effects. The recent study by Kilpatrick et al. (2006) turned a number of assumptions on their head by showing that the American robin is a preferred host of WNV vector mosquitoes. The authors suggest that when robins migrate in late summer, *Culex pipiens* then shift their attention to biting people rather than birds. | 72

PART 6: MARSH MANAGEMENT PLAN RISK ASSESSMENT. This Part describes several scenarios for an Integrated Pest Management approach to vector control, with the objective of focusing on prevention of pest build-up by altering habitat. The preferred scenario restores the marsh to its historically natural situation, such that it will not require a regular schedule of interventions, either for marsh maintenance or for larval control. While I conceptually support the suggested approach, I am unable to critique its technical merit or likelihood of success. 73

I do wonder about the rationale for the stated goal of reducing larvicide use by 75% in conjunction with the adoption of this Plan. Is this a money- and resource-saving objective? A philosophical position? It does not appear to be motivated by an interest in reducing risk, since it was previously stated that the larvicides do not pose human health or ecological risks of any significance (a position I am not fully in accord with). Whatever the rationale for this goal, it should be stated and transparent. The basis for selecting the particular target of 75% reduction should also be explained. While the 75% reduction may be a useful benchmark to measure success in natural marsh management, it seems to be a questionable goal in and of itself, given the over-riding goal of reducing risk from vector-borne diseases and their controls. 74

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V

Kritzer Caged Fish

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ENVIRONMENTAL DEFENSE

finding the ways that work

Review of the study “Impacts to Caged Organisms from Vector Control Pesticides Experiment” conducted to inform the Suffolk County Vector Control and Wetlands Management Long-Term Plan.

Jake Kritzer, Ph.D.

July 17, 2006

Background and summary

The DGEIS for the Suffolk County Vector Control and Wetlands Management Long-Term Plan (here simply “the Plan”) includes description of a study entitled “Impacts to Caged Organisms from Vector Control Pesticides Experiment.” Often referred to as the “caged fish study”, these experiments were one of the approaches used to examine the ecological impacts of any pesticide application to be implemented as part of the Plan. Here, I provide a scientific critique of the caged fish study to help determine its utility in predicting impacts of pesticides. The focus is on Part I: Impacts to Biota (section 6.2 of the DGEIS). | 1

Overall, the caged fish study is at best a preliminary look at potential impacts, but ultimately a study better suited to be a pilot project that can guide a more informative and definitive study rather than a study able to confidently offer useful insights in its own right. Three primary concerns are:

- 1) The limited replication across the experiments, including a complete lack of replication in the | 2
adulticide experiment,
- 2) The limited period of time over which monitoring took place, compromising the ability to | 3
detect effects on mortality, growth or behavior, and
- 3) The substantial background stress apparent in the study that calls into question whether any | 4
impacts of pesticides can be confidently detected.

Below, I discuss these three primary concerns in more detail.

Replication

As detailed in the DGEIS (section 6.2.1), the caged fish study followed a similar study by students at Southampton College. One of the major criticisms of the Southampton College study was the lack of

Kritzer Caged Fish

adequate replication (as indicated on p. 750 of the DGEIS), and the expanded study aimed to correct this shortcoming. Yet, the level of replication adopted in the larger study at best achieved the minimum level needed to be statistically defensible. For example, the July 20, 2004 larvicide experiment included two control and two treatment sites with two ages within each. The August 2 and August 9, 2004 experiments added an additional cage to each site, but several of these experienced such extremely high levels of mortality as to call into question their utility as valid replicates. | 5

At worst, the experiments are pseudoreplicated or not replicated at all. The September 9, 2004 larvicide experiment is pseudoreplicated, as it includes two control sites but only one treatment site. | 6
The adulticide experiments of August 18 and August 25, 2004 are not properly replicated, as only one control and treatment site are used in each. | 7

Overall, this limited or absent replication severely limits the ability of the study to provide more general insights, particularly when coupled with the additional shortcomings discussed below.

Duration of monitoring

Most of the experiments track impacts on the organisms over a period of four days, with some experiments extending this duration to five or six days. We are not certain whether this is a sufficient period of time to detect changes in mortality, growth or behavior, but we suspect that it is not. The DGEIS provides no source to suggest that such a limited period of monitoring will allow effects to be detected. While immediate effects of pesticides on survivorship might be exhibited, effects on growth and behavior will take more time to become evident. Even small, short-lived species like sheepshead minnows and grass shrimp will experience only very limited growth in optimal natural conditions over a period of time of less than one week. This limited growth, combined with natural variability and measurement error, render the study's ability to detect any effects on growth nearly negligible. | 8
| 9

Even if four to six days can allow some or all short-term effects to be detected, there are several potentially important long-term effects that are not addressed. These include effects on survival, growth, behavior, sensory abilities, development and reproduction. There are numerous examples in fish, invertebrates and other organisms of environmental toxins having severe lethal and sub-lethal effects over periods of weeks to years, and this suite of impacts have not been explored in any way in the present context. | 10

Background stress

The raw data provided in Appendix H of the DGEIS shows significant initial mortality in several experimental replicates. These range from approximately 25% (Timber Cage 1 in the August 3 experiment) to more than 90% (Havens Cage 1 in the September 1 experiment). The study took steps to accommodate the high mortality events, specifically by using data only after the first day organisms were in the cage (presumably to allow for some acclimatization), and by excluding cages that experienced >80% initial mortality. Still, the frequency and magnitude of these high mortality events calls into question whether the background environmental conditions in which these experiments took place allowed pesticide effects to be adequately isolated. The DGEIS notes severe dissolved oxygen conditions on several days at several sites. Additionally, food supply, density, and other characteristics of the cages or surrounding environment might have caused excessive stress on the organisms that effectively precluded the ability to confidently observe pesticide effects. | 11
| 12
| 13

Kritzer Caged Fish

Conclusions

The caged fish study is a substantial step forward from the important seed planted by the Southampton College study. However, it is still best treated as a pilot study that can guide development of a series of experiments that could confidently provide general insights into the short- and long-term lethal and sub-lethal effects of larvicides and adulticides on marine organisms. At present, the limited to absent replication, minimal duration of monitoring, and probable background stress in the cages and/or in the surrounding environment severely limit the ability of the present study meaningfully assess likely impacts to marine species.

For further information on these comments, please contact:

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DAVID PIMENTEL

Education

- 1945-48 University of Massachusetts, Amherst (B.S. Degree)
1948-51 Cornell University, Ithaca, New York (Ph.D. Degree)
1954-55 University of Chicago, Ill. (Post-doctorate, winters)
1961 Oxford University, England (O.E.E.C. Fellow)

Positions

- 1951-55 Chief, Tropical Research Laboratory, U.S. Public Health Service, San Juan, Puerto Rico
1955-60 Assistant Professor of Insect Ecology, Department of Entomology and Limnology,
Cornell University
1960-63 Associate Professor of Insect Ecology, Cornell University
1963-69 Professor and Head of Department of Entomology and Limnology, Cornell University
1973-74 Professor, Core Faculty, Center for Environmental Quality Management, Cornell University
1969-76 Professor of Insect Ecology, Department of Entomology and Section of Ecology and Systematics,
Cornell University
1976- Professor of Insect Ecology & Agricultural Sciences, Department of Entomology and Section of
Ecology and Systematics, Cornell University

Honors

Phi Kappa Phi, Sigma Xi, Organization for European Economic Cooperation Fellowship at Oxford University, NSF Computer Scholar. Invitational lectures at the following international congresses: XVI International Congress of Zoology (1963); XI International Congress of Genetics (1963); XII International Congress of Entomology (1964); Keynote Address Xth and XIth International Congress of Nutrition (1975, 1978); Marine Sciences Distinguished Lecture Series, Louisiana State University, Baton Rouge, LA (1979); Gustavson Memorial Lecture, University of Colorado, Boulder, CO (1980); The Fourth A.C. Neish Memorial Lecture, Nova Scotia Agricultural College, Truro (1980); Lectures on Science, Technology, and Society, Illinois Institute of Technology, Chicago, IL, (1981); Keynote Address American Institute of Biological Sciences (1982); Keynote Address Easter School of Food Sciences, England (1982); Keynote Address Italian Society of Genetics, Italy (1984); Keynote Address Biological Control Symposium Mainz, West Germany (1984); Keynote Address Conference of African Association of Insect Scientists, Monrovia, Liberia (1986); Keynote Address Agricultural Ecology and Environment, Padova, Italy, (1988); Keynote Address Agroecology and Conservation Issues, Padova, Italy (1990); Phi Beta Kappa Visiting Scholar (1990-1991); Keynote Address Energy Strategies for Sustainable Food Production, Berlin, Germany (1991); Keynote Address Reducing the Nonrenewables in Agriculture, Nova Scotia (1991); Keynote Address Council of Biotechnology Centers, Washington, D.C. (1991); 1992 Award for Distinguished Service to Rural Life, Rural

Sociological Society Council; Honorary Professor, Institute of Applied Ecology, Shenyang, China (1995); Keynote Address Microbial Control Agents in Sustainable Agriculture, St. Vincent, Italy (1995); Keynote Address International Conference on Pesticides in Developing Countries: Impact on Health and Environment, Universidad Nacional, Heredia, Costa Rica (1998); Keynote Address Wildlife, Pesticides, and People, Fairfax, VA (1998); Keynote Address Conference on the Ecology of Sustainable Agriculture, Stuttgart, Germany (1998); Keynote Address International Conference on the Sustainable Use of Soils, Tutzing, Germany (1998); Keynote address Entomological Society of Canada, Plenary Session on Managing the Millenium Bug (1999); Keynote Address Association of Applied Insect Ecologists, Santa Barbara, CA (1999); Keynote Address Population-Environment Balance ASAP Action Conference, Breckenridge, CO (1999); Keynote Address, British Soil Association, Cirencester, U.K. (2000); Entomological Society of America Special Symposium (2000); Keynote address Bora Conference on World Food Supply and Human Population, University of Idaho (2000); Keynote address, Tribeta Conference on Population, Food and Environment, Eastern Connecticut State University (2000); Keynote address, World Population Balance Conference on Population Carrying Capacity for the Earth (2000); Keynote address, Toxicology Conference, Guelph University (2001); Keynote address, Pesticide Conference, University of Colorado (2001); Keynote address, International Congress of Population, Food and Energy, Adelaide, Australia (2002); Keynote address, Celebration Honoring Rachel Carson, Baltimore, MD (2002); Keynote address, Congress on Sustainable Agriculture, Raleigh, NC (2002); Keynote address, International Vegetarian Congress at Loma Linda University, CA (2002); Keynote address, International Conference on Sustainable Agriculture, University of Wisconsin (2002); Rachel Carson Award, Society of Environmental Toxicology and Chemistry (2002). Keynote address, Aquatic Nuisance Species Symposium, Philadelphia (2003); Keynote address, Environmental Law Symposium, William and Mary School of Law, Williamsburg, VA (2003); Keynote address, International Workshop: Livestock, Environment and Sustainable Development, Havana, Cuba (2003); Keynote address, St. Philips College Literacy Conference on Fuel Cell Technology, San Antonio, TX (2004); Keynote address, International Conference on Area-Wide Control of Insect Pests, United Nations/ International Atomic Energy Agency, Vienna, Austria (2005); Keynote address, Maine Organic Farmers and Gardeners Association, Bar Harbor, ME (2005); Honoree, Northeast Organic Farming Association of New York, Wassaic, NY (2005).

National and International Activities

- | | |
|---------|--|
| 1964-66 | Panel on Environmental Pollution, President's Science Advisory Council |
| 1966-68 | Chairman, Panel on Biology and Renewable Resources, Committee on Life Sciences, National Academy of Sciences |
| 1966-69 | Management and Resources Committee, Int. Biol. Program |
| 1967-68 | Council, National Institute of Environmental Health Sciences |
| 1967-70 | Chairman, Training Committee, International Biological Program |
| 1969 | U.S. Delegate to UNESCO Conference on "University Governance and the Role of the Student" |

1969 Commission on Pesticides, Established by Secretary of Health, Education and Welfare

1969-70 Ecologist Consultant on Environmental Quality, Executive Office of the President, Office of Science and Technology

1970 ad hoc Committee on Environmental Aspects of Foreign Assistance Programs, National Academy of Sciences

1970 Panel on "Water in Man's Life in India," National Academy of Sciences"

1972-73 Co-chairman, Panel on Innovative Mosquito Control, Office of the Foreign Secretary, National Academy of Sciences

1972-73 Advisory Council on Environmental Education of the Office of Education

1972-73 Chairman, Panel on Environmental Impact of Herbicides, Environmental Protection Agency

1973-77 Chairman, Panel on Economic and Environmental Aspects of Pest Management in Central America, National Academy of Sciences

1974-76 Committee on Food and Food Production, National Academy of Sciences

1974-75 Committee on "World Food, Health, and Population", National Academy of Sciences

1974 World Food Conference, Consultant to the Food and Agriculture Organization of the United Nations

1975-79 Chairman, Board on Science and Technology for International Development, Office of the Foreign Secretary, National Academy of Sciences

1975-78 Chairman, National Advisory Council on Environmental Education, Office of Education, Department of Health, Education and Welfare

1975-79 Commission on International Relations, National Academy of Sciences

1976-77 Chairman, Study Team on the Interdependencies of Food, Population, Health, Energy, and Environment, World Food and Nutrition Study, National Academy of Sciences

1977-78 Chairman, U.S. Advisory Committee to IIASA Program "Food and Agriculture," International Institute for Applied Systems Analysis, Austria

1979-80 Chairman, Gasohol Panel, Energy Research Advisory Board, Department of Energy

1979-83 Chairman, Biomass Energy Panel, Energy Research Advisory Board, Department of Energy

1979-82 Chairman, Environmental Studies Board, National Academy of Sciences

1979-83 Member, USAID Research Advisory Committee, Department of State

1979-89 Member, AAAS Committee on Climate

1981-88 Vice Chairman, Committee on Research Grants, Board on Science and Technology for Development, National Academy of Sciences

1980-82 Chairman, Land Productivity Panel, Office of Technology Assessment, U.S. Congress

1982-83 Member, Commission on Physical Sciences, Mathematics, and Resources, National Academy of Sciences

1982-83 Vice Chairman, Solar R&D Panel, Energy Research Advisory Board, Department of Energy

1982-86 Member, Environmental Advisory Committee, Susquehanna Nuclear Power Plant,

Pennsylvania Power and Light

1983-86 Chairman, Energy and Agriculture Panel, Energy Research Advisory Board, Department of Energy

1984-85 Consultant, National Institutes of Health, Recombinant DNA Advisory Committee

1984-86 Member, National Institutes of Health, Working Group on Release into the Environment of Genetically Engineered Organisms

1985-89 Member, Committee on Population, Resources, and the Environment, American Association for the Advancement of Science, Chairman, Subcommittee on Agriculture and Resources

1985-89 Member, Committee for the Study on the Role of Alternative Farming Methods in Modern Production Agriculture, National Academy of Sciences

1985 Chairman, Panel on Population and Natural Resources, Commission on Ecology, IUCN

1985- Member, Advisory Board, Council for Responsible Genetics

1986-1993 Chairman, Committee on Soil Conservation, Commission on Ecology, IUCN

1988 Member, New Production Reactor Technology Assessment Panel, Energy Research Advisory Board, Dept. of Energy

1988- Member, Agriculture, Food and Human Values Society Council

1990-1992 Member, Committee on Malaria Prevention and Control, Board on International Health, Institute of Medicine, National Academy of Sciences

1990- 2001 Member, Board of Directors, Rachel Carson Council

1990- Member, National Board of Directors, Carrying Capacity Network

1990- Member, Earth's Best Scientific and Environmental Advisory Board

1990- 2000 Member, Advisory Committee, African-American Institute

1990-1993 Member, Panel on Vetiver, National Research Council

1991-2000 Member, Committee for Research and Exploration, National Geographic Society

1993 Member, Expert consultation of the UNEP list of Selected Environmentally Harmful Chemical Substances, Processes and Phenomena, IRPTC/UNEP

1993-1995 Member, Advisory Committee, Environmental Refugees Project, Climate Institute

1994- Member, International Advisory Committee, 2020 Vision for Food Agriculture, and the Environment. International Food Policy Research Institute

1994-2000 Member, Board of Directors, Beijer International Institute of Ecological Economics, Royal Swedish Academy of Sciences

1994- Honorary member, Academic Committee, Institute of Applied Ecology Shenyang, Chinese Academy of Sciences

1995- Honorary Professor, Institute of Applied Ecology Shenyang, Chinese Academy of Sciences

1998- Co-Chair, Mexico: Energy/Environment Assessment Study, The World Bank

1998- Editor, Journal of the Environment, Development, and Sustainability

1999- Elected Member, Board of Directors, American Institute of Biological Sciences

- 1999-2000 Elected Member, Board of Directors, National Audubon Society
- 1999-2003 Member, Committee on Research Opportunities in Agriculture, National Academy of Science
- 2000- Elected President of the Rachel Carson Council
- 2004- Member, Board of Directors, The Organic Center for Education and Promotion
- 2005- Editorial Board Member, The Scientific World, Environmental Management and Policy Domain

Activities in the Entomological Society of America

- 1963 Chairman, Biological Control Section
- 1965 Chairman, Publicity and Public Relations Committee
- 1967 Chairman, National Medal of Science Committee
- 1968 Committee on Program Evaluation
- 1968-71 Governing Board
- 1971 Chairman, Editorial Board, Environmental Entomology
- 1973 Chairman, Screening Committee for Bussart and Geigy Awards
- 1974-75 President, Eastern Branch
- 1975-77 Chairman, Special Awards Committee
- 1977-80 Representative to American Association for the Advancement of Science

Activities in:

- 1973-1998 American Institute of Biological Sciences, New York State Public Relations Legislative Representative
- 1973-77 American Midland Naturalist, Associate Editor
- 1971-74 Society for the Study of Evolution, Councilor for the Society for the Study of Evolution
- 1979-2000 Agriculture Ecosystems and Environment Journal, Editorial Board
- 1981- CRPS Critical Reviews in Plant Sciences, Advisory Board
- 1986-2000 Journal of Agricultural and Environmental Ethics, Editorial Board
- 1988- Ecological Economics, Editorial Advisory Board
- 1989- Journal of Sustainable Agriculture, Board of Editors
- 1989- Crop Protection, International Editorial Board
- 1993- Human Ecology, Editorial Board
- 2000- Environment, Development and Sustainability , Editor-in-Chief (Springer Publishing)

Publications

Dr. Pimentel has 600 scientific publications of which 23 are books.

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Comments on the caged fish/shrimp experiments (CA pp 755-771).
Michael N. Horst, Ph.D.

P755:

The cages were made of either Plexiglas or “simple plastic buckets with mesh inserts” – methoprene in such a system will tend to bind to the plastic and not remain in the water and available for binding and uptake by the targets.

Test organisms: where were the shrimp used in this study obtained ? How were the identical characteristics of each experimental animal verified as they were for the fish (provided by Cosper, Inc.)

P756:

This table lists L under spray type, but it does not confirm that this was methoprene. A minor point but still important to document this.

P757:

How many shrimp were brought back to the lab for the prey capture experiments, since they note that some sites had no or few survivors?

In what kind of container were water samples collected and stored before use in the static survival tests ? If they were glass, fine; if plastic, you would expect binding to the walls of the vessel.

P757-758:

“These tests provided...” : Point-these tests did not account for differences in water volume and movement (e.g. current or flow) at the collection site.

P758:

Results- “Due to mortality observed frequently after deployment in the field..” suggests that there may have been something else stressing these animals during this period and warrants more investigation before drawing conclusions. Why did they die ? Did the fish AND shrimp both die ? Later in this paragraph they note 20% deployment survival (that is, 80% mortality)- what is the possible cause of this unexpected mortality ?

P759:

Aug. 3: what is the possible explanation for less than 20% survival at the TP site overnight ? Rather than disregard this data point I think they should have investigated it in more detail. It tends to put the rest of the study in doubt.

Aug 10: after death at TP, they moved the cages to deeper water: does this imply more DO or less pesticide or what ? Also, this test of “larvicide”, i.e. methoprene one presumes, should be tested on larvae of the grass shrimp *P. pugio*, if you really want to determine the non-target characteristics. The effects in adults may take longer to observe, for example death due to tissue death/necrosis following cessation of protein synthesis.

P760:

Aug 25- Adulticide was used: which one ? They note that survival was excellent in the cages placed in the main channel: what are the flow characteristics here versus the previous sites ? See comments above on volume and flow where exposures are taking place.

P761:

DO “crashed” not a very scientific nor professional term to apply here. When did it decrease, during the day or night or both ?

What study was cited as the source of the LC50 for DO in *P. pugio* as well as the NOE values that they used here ?

“several cases where all the shrimp died but fish survived reasonably well..” is this possibly due to the combination of two (or more) stressors ? (It is not clear if methoprene was used in the case cited here.)

P762:

Prey capture studies: I liked this approach it has scientific validity. Their data on Johns Point suggests that they need to go back and repeat the deployment and retest this site. There have been observations made in the literature regarding methoprene causing lethargic behavior in crustaceans.

Discussion: Havens Point site problems: this site may point out (once again) the synergistic stressor effect of low DO and pesticides. It cannot be overlooked nor swept under the carpet. It may be the canary in the mine shaft.

P763:

Top paragraph: the data in this paragraph conflicts with itself. I cannot see how they can state that the decreased shrimp survival at the HP and FP sites after larvicide (methoprene, one presumes) “...could be attributed to low DO alone.” Based on what criteria or rationale ? They do note the low DO was persistent at these sites (next paragraph) but I do not see the data.

P765:

Table 6-7: the methoprene concentration (3.3 ppb) 0.5 post-spray: I assume this is 30 min ? Not clear from the legend. Still, 3 ppb is significant in that it is the LD50 for Stage III lobster larvae.

P766:

Figure 6-6: It would have aided interpretation if the investigators had taken samples at 2h, 4h, 8h, and 12 h: this part of the data set is impossible to interpret as it stands.

P767:

2nd paragraph: “Methoprene was detected in the sediments...” It would be of interest to know at what concentration it was measured. Surely their detection sensitivity would have allowed this determination.

P768:

2nd Paragraph: “methoprene is intended to sink through the water column..” This statement is not clear: intended by who ? the manufacturer ? the investigators ? What formulation of methoprene are they referring to here ? One presumes the timed release form. The briquettes would not be expected to behave in this manner, however.

“..methoprene must have a half-life considerably shorter than one week.” Point is, this is still far greater exposure time than the 24 h period after which Walker et al (2005) observed 90% decrease in protein synthesis in lobster hepatopancreas. Time is relative to the species involved.

P770:

Bottom of last paragraph: this is the first (and only) mention of worms being accounted for in any of the studies noted in this report. Such worms eat detritus (which may be laden with methoprene after spray or briquette application) and may be eaten by crustaceans such as crabs and lobsters, providing a pesticide dose that was of detrital origin.

End of comments on the caged fish.

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Comments on the DGEIS Executive Summary

Michael N. Horst, Ph.D.

(All page numbers are based on Cashin Associates numbering scheme)

Page #:

ES-2 they plan to reduce adulticides: why not use less toxic compounds, e.g., neem?

ES-3: The explanation of the Adapco Wingman system could be expanded here; it is noted in more detail on p. ES-73, however, it still appears to be a bit arbitrary in how decisions are made.

ES-4: the acreage numbers quoted for Suffolk County don't add up: 4000 acres are "larvicided", the remaining 9,000 acres of wetlands require assessment. Later in the ES (on ES-97) they state 17,000 acres of tidal wetlands and 18,000 acres of freshwater wetlands. Which are accurate ?

ES-5: as noted later in this critique, how many people died of influenza virus during the same period ? Why aren't we doing more to eradicate that disease as well ?

ES-6: they note that 21 marshes were examined out of a total of how many? How were these sites selected ?

ES-7: "Impacts on invertebrates do not propagate up the food chain" what is the source of this factoid ?

ES-8: the caged fish study used acute exposure/mortality as the end point. However, there may be other sub-lethal effects that were missed in this study.

ES-14: biorational pesticides seldom target just the insect of concern, so how do they define rational ?

ES-27: will the sampling surveillance include any non-target organisms ?

ES-28: mosquitoes breed in the "high marsh": blue crabs also live in this zone and may be affected.

ES-91-92: they do mention some alternative repellents here, but the primary focus was on DEET. Citronella plus picaridin is another option.

ES-114: again, the term endotoxin is used incorrectly: it is an enterotoxin, which is a subclass of exotoxins, proteins produced and secreted by bacteria.

ES-116: again, methoprene is a JH analog and is not specific for insects as the authors imply.

ES-119: no annelids were included in the study- why ?

ES-163: alternative adulticides include neem and clove oils.

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Comments on DGEIS Executive summary Appendices:
Michael N. Horst, Ph.D.

Appendix A

P89: The timed release formulation of methoprene in briquettes may last for 1 to 3 months. These briquettes produce a concentration gradient into the surrounding water and may give locally high concentrations of pesticide for prolonged periods of time. They also provide a constant source of the pesticide allowing for continuous exposure perhaps trending into chronic exposure.

P133: Larval treatment: there is significant potential for environmental impact of methoprene on invertebrates, especially crustaceans, since they also express juvenile hormone (JH) in their own larval development. Methoprene is not selective in its blocking of JH activity and will act on ALL arthropods including insects and crustaceans.

P134: The statement regarding environmental safety of methoprene is not true: they have already noted the effects on honeybees. There are other pesticides that could be utilized for insect control, including neem, the active ingredient of which is the sesquiterpenoid compound azadirachtin. The literature shows that this compound has been used safely for hundreds of years in India.

P135: Methoprene does have a long literature and is toxic to many crustaceans (as noted later in the rebuttal section of their report) including grass shrimp, brine shrimp, daphnids, mysids, crabs and lobsters.

P136: persistence in temporary ponds will maintain the pesticide load and lasts long enough for chronic effects to be observed.

P137: A combination of larvicides is better than one alone.

P140: If they use briquettes in every storm drain of Suffolk County (~100,000 sites) and there is heavy rainfall immediately afterward, there is significant risk of pesticide washing into the nearby estuary and WLIS.

P141: the terminology is not correct: JH is found in all arthropods, not just insects; to call it juvenile insect hormone is misleading.

P142: The duration of pesticide effect is dependent on the formulation. Thus, the briquettes may last for several months.

Breakdown in soil or by UV light produces methoprenic acid which has been implicated as a potential teratogen by Harmon and Manglesdorf (they reference this paper later in the report). To the best of my knowledge, no one has tested the acute toxicity of methoprenic acid to any arthropod.

Once again, the concept of sustained release may produce concentrations of methoprene in the environment that lead to chronic toxicity as compared to acute effects.

P143: The toxic effects on larval development have been seen in grass shrimp and mud crabs; we determined the LD50 for methoprene in Stage III lobster larvae was 3 ppb.

The caged fish experiment examined survival as the ultimate endpoint of pesticide exposure. Recent studies have shown that there are significant sublethal effects of methoprene exposure including 90% inhibition of protein synthesis in the lobster hepatopancreas. Thus, there may have been effects on the shrimp used in this caged fish study that were missed because of the lack of critical analysis.

“..at concentrations below those that cause non-target effects..” this is not really true: if methoprene is used in the salt marsh, there will likely be significant effects on crabs and shrimp.

P 143-144: The tables state no risk to aquatic life. This is not really true, as noted above.

P147: the duration of briquette XR is 150 days OR 5 months. This continual release of pesticide into the surrounding water is very significant. The slow release may give rise to concentrations approaching 15 ppb; there could be significant mortality to non-target larvae of shrimp and crabs at this level.

Will the briquettes be placed in a wire cage of any sort to prevent transport into the estuary in the event of catastrophic rain ?

P148: the majority of the pesticide use will be in the middle of the summer: this is precisely when crabs, shrimp and lobsters in nearby areas are molting, placing them at increased risk of metabolic stress (see above comments on inhibition of protein synthesis).

P150: In the QC work, how will the water samples be collected and in what kind of container ? Methoprene has a tendency to adhere to plastic surfaces and the measured levels of pesticide might be artificially low. Did the New Jersey study they site do this ?

P152-3: Other adulticides might be used, including neem, as noted above.

DGEIS Exec. Summary, Appendix D

P8: If methoprene has been used since 1995, were has the data been published ? Was it in a peer reviewed journal ? If not, how valid is the interpretation ? This theme is repeated time and again in this document: they quote non-published, non-peer reviewed work as if it was accurate, when in fact the accuracy has never been verified!

DGEIS Exec. Summary, Appendix E:

They did not include the data from DeGuise, McElroy and Horst labs in this section: why ?

Comments on Task 3, Literature review, Book 7: Ecotoxicity Review
Michael N. Horst, Ph.D.

P1, L22-27: the Westchester County and NYC documents: were they ever reviewed for scientific accuracy or are we just assuming that they are valid ?

P2, L18: why were annelids (worms) not included in this list ? They certainly contribute to the biomass of the estuary.

L28: why was behavior not selected as an additional measure of impact (e.g. detrimental effects of methoprene on adult honeybees)

P3, L9: repeated applications may very well lead to chronic exposure if the organisms are bioaccumulating a pesticide, e.g., methoprene in lobsters!

L13: “what new and ecologically relevant... corroborates the previously summarized existing body of information.” What this implies is that nothing new has been published since 2001. That is typical of this entire report in that they sweep information under the carpet and pretend it does not exist.

P4, L1: Here we need to get some definitions clarified: methoprene is a juvenile hormone (JH) analog. Unlike all the other pesticides mentioned in this report, methoprene acts like a hormone in the target/non-target organism. In so doing, methoprene binds to receptors in the nucleus of cells and alters the rate of transcription of mRNA as well as the rate of translation of the mRNA into proteins. These changes are generally classified as alterations in gene expression. Each hormone has a unique set of genes that it turns on while it turns off others, depending on the number of receptors present and the type of cell involved. In short, this one pesticide has the ability to trigger a wide variety of molecular alterations within specific tissues of the organism. In overview, methoprene acts at multiple levels within the cell, unlike the other pesticides listed in this report which generally have a single target of their action, e.g, they act as neurotoxins. In addition to its genetic effects, methoprene has the ability to act directly on membrane bound transporters such as the sodium potassium ATPase, which is critical for neuronal activity. Thus it can kill by two completely different mechanisms and in two different time frames.

P4, L4: “..methoprene generally degrades quickly in the environment” is misleading and overlooks the fact that this pesticide has been shown to bioaccumulate up to 250-fold in non-target organisms such as the lobster. Given the 24 h time course needed to observe biochemical abnormalities in lobsters, persistence for days to weeks offers more than sufficient time for uptake of this pesticide.

P4, L17: note that permethrins also bioaccumulate in fish- this indicates that they understand the concept and just choose to overlook it in the case of methoprene.

P5, L9: here again they mention the toxicity to bees. Since there is no further mention of this sensitivity, one assumes that they feel bees are expendable in the rush to eradicate mosquitoes.

P5, L26: this list of repellants is amazingly short. Why have other compounds not been included for testing ? For example: citronella, DEET, clove oil, neem, etc.

P10, L8: why did the authors not include the AGRICOLA data base in their search of the literature. Surely they know that many pertinent journals are included in this data base and may not be found elsewhere, e.g., Journal of Crustacean Biology.

P11, L20: should read non-target invertebrates. Why are annelids and nematodes not included here ?

P12, L8: “.biochemical changes in gene expression and induction, ...

L9: what is hormesis exactly ?

P13, L10: here the acute study conditions are defined yet later, they criticize this procedure as being meaningless.

L11: actually, the 72 h LD₅₀ is the most commonly applied endpoint. It is defined as the dose at which 50 % of the exposed animals die within the stipulated time frame.

L24: in crustaceans, the middle section of the digestive tract is not lined by a chitinous cuticle, thus absorption of pesticides may be more rapid here than in the shell that covers the body. Also, note that molting often occurs in the summer months (when mosquitoes are prevalent) and this soft-shell condition may allow for increased absorption of pesticides.

P14, L6: the exposure conditions should include feeding as well as aqueous exposure.

P15, L7: in bacteriology, endotoxin is a term applied to lipopolysaccharides derived from the Gram negative cell walls of organisms such as *Vibrio*. The use of this term in the present document is out of place and out of context. The so-called stomach poisons are in fact called enterotoxins which represent a subclass of exotoxins, proteins made inside bacterial cells and exported to the outside to kill or compromise the host.

The citations of Weinzierl et al. (1997): this is not a peer reviewed publication

P17, L10: again change this term to enterotoxin as noted above.

P18, L22: this section is full of errors: (1) methoprene interferes with JH not juvenile insect hormone. To imply specificity of action is to mislead the reader; (2) JH is NOT equivalent to ecdysone. Ecdysone is the molting hormone of (all) arthropods and as the name implies, it regulates the time of molt. JH is a completely different compound and has been shown to regulate larval metamorphosis in insects (see Lynn Riddiford's papers); (3) ecdysone does not lead to suppression of adult characteristics, this is the role of JH. This entire paragraph is full of errors and causes a great deal of concern about the educational level of the person(s) who prepared it- they must never have taken a course in invertebrate zoology; (4) the summary by Antunes-Kenyon and Kennedy was not published in a peer reviewed journal, thus quoting it as a source of facts is misleading.

P19, L 5: the summary by Glare and O'Callahan was not published in a peer-reviewed journal; the conclusions on the degradation rate of methoprene at various salinities and temperatures should be based on published data.

P20, L7: Marine organisms may be exposed to methoprene if it washes out of storm drains during a hurricane, e.g., Floyd in 1999.

L10: to state that methoprene degrades rapidly in water so its use in estuaries is of no concern is oversimplification. The pesticide takes days to weeks to degrade completely and may bioaccumulate in certain species and remain active for longer periods of time.

L16: what are the expected environmental concentrations of methoprene? Again, referencing the summary of Antunes-Kenyon and Kennedy is misleading: it was not published in the peer reviewed literature. Throughout this description, the authors fail to mention that there are two isomers of methoprene, R and S. Only the latter compound has been found to have biologic effects. Some investigators have tested commercial preparations (containing both isomers) without recognition of this fact and have claimed

minimal effects. Such effects depend on the purity and composition of the starting material.

P23, L20: the term biomarkers should be defined for the reader: these are cellular enzymes or proteins that are either increased or decreased in response to a causative agent such as a pesticide or pollutant

L25: Here the bioconcentration factor for permethrin is noted as 715 times; however, the authors neglected to include similar data on the bioaccumulation of methoprene in lobster tissues (Walker et al 2005, DeGuise et al, 2005). Such selective use of the literature makes this report suspect.

P26, L16: they should add in: allows acetylcholine to persist and eventually accumulate.

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Darling Marine Center
University of Maine
193 Clarks Cove Road
Walpole ME 04573

July 13, 2006

Matthew Atkinson
General Council, Peconic Baykeeper
10 Old Country Road
Quogue, NY 11959

Dear Matt,

I hope you will find the attached summary of my critique to be satisfactory for your purposes.

RE: comments on DGEIS:

1. §3, part 3: Testing methoprene concentrations in open, surface water is not sufficient; several pools of known dimensions and volumes should be included in the study. Samples should be taken at various depths from the surface to the bottom. See additional comments made about depth of water where the samples were taken in my full critique.
2. The entire issue of the Journal of Shellfish Research is now available and contains summaries of the DeGuise, Horst and McElroy data from the WLIS study- the first two papers include the bioaccumulation aspects noted below.
3. § 6, Part 1, pp 18, 33-36: lethal concentrations of methoprene must be achieved in the pools to kill the mosquitoes. Unfortunately, a large number of non-target invertebrates live in those same pools and may be adversely affected.
4. The summary by Antunes-Kenyon and Kennedy is not published in the peer-reviewed literature so I am not sure how far it should be extended in terms of interpretation; it may not be viewed as authoritative in the scientific community. That said, we found the 72 h LD₅₀ for methoprene in Stage III lobster larvae was 3 ppb, well below the targeted concentration range of 10 ppb. This suggests that crabs and shrimp living in those pools will likely be affected as well. The estuary is the breeding ground for many important members of the food chain including blue crabs.
5. The report mentions the “fast” degradation of methoprene in water- various estimates are included, ranging from several days (aerial spraying) to weeks for the XR pellets. However, we have shown that after 24 h exposure, methoprene bioaccumulates in specific tissues of lobsters, achieving concentrations up to 250-fold higher than the surrounding seawater. Once localized in lobster tissues, it may remain stable for days, causing biochemical alterations and changes in gene expression (Walker et al., 2005a,b; Horst et al., 2006, submitted for publication)
6. As noted above, it only takes 24 h to get a dose of this pesticide into the organism. Add to that the fact that the pesticide homes in on specific tissues such as the gonads, digestive gland (hepatopancreas) and epithelial tissue. These tissues are

- critical to the health and survival of the animal. We have been focusing in on the effects in the hepatopancreas. This is a multitasking organ in the lobster: it secretes digestive enzymes, it absorbs nutrients like amino acids and sugars, it detoxifies the blood removing foreign toxicants, it plays a role in immunity by filtering the blood to remove bacteria, parasites and particulates, and last but not least, it synthesizes many blood proteins including hemocyanin, the respiratory protein that carries oxygen to the tissues. Add to this the fact that after 24 h exposure to methoprene, total protein synthesis in this organ is decreased by 90%. This will lead to mortality, but it may take a few days or a week before it happens.
7. Our recent work on the effects of methoprene on gene expression in the hepatopancreas indicates that the pesticide up-regulates a certain group of genes while it down-regulates hemocyanin. We suspect that the stress of the pesticide puts the animal into survival mode and it turns off all non-essential genes in order to survive the stress (Horst et al., 2006, submitted for publication).
 8. Another point: toxicity is a relative term; what is non toxic to one species may be lethal to others. In my view, one must do the research on all the major groups of invertebrates present in the target area (including annelids and mollusks) before assuming that one test in one or two animals (i.e., fish and shrimp) is sufficient.

In global overview, I feel the DGEIS report has overlooked some major points. I have tried to identify these points throughout my critique and will encapsulate them below as major themes that emerge in my reading of this document:

- (1) Synergy between pesticide application and adverse environmental conditions, such as DO and decreased salinity- both common events in the high marsh and other temporary pools has not been satisfactorily considered in this report. The point is: one might see effects at a much lower dose of methoprene in the presence of low DO or salinity. In overview, environmental stress may be due to multiple factors; one cannot assume these factors operate independently in the field (or ponds).
- (2) Methoprene is a juvenile hormone analog; thus, it mimics both JH III (the JH found in insects) and methyl farnesoate (the JH of crustaceans). Repeatedly in this report they attempt to imply that methoprene is specific for insect JH. As I have noted in my critique several times, this is simply not true. Methoprene also mimics methyl farnesoate and acts on crustaceans as well.
- (3) Methoprene was designed and created to be more insidious than overt. By that I mean that it was not intended to kill insects on contact, as a neurotoxin would. To the contrary, methoprene was intended to kill target organisms slowly by acting as a hormone mimic and blocking the ability to undergo metamorphosis from one larval stage to another. This is an extremely complicated biochemical process, involving alterations in gene expression in numerous tissues at different times. In overview, gene expression involves synthesis of mRNA, followed by translation of the mRNA into functional proteins that carry out specific cellular functions, e.g. a protease. Under normal conditions, the organism carries out this complex process with reasonable success and the species develop normally and go on to create progeny. When methoprene is applied, something different happens:

molecular switches (aka genes) are activated inappropriately while others are deactivated. It means that the metabolic balance of the cell is lost and the new regime, dictated by methoprene, leads the cells to destruction in certain tissues, as we observed in the hepatopancreas or digestive gland of the lobster. Bottom line on this point: if you alter hormonal regulation, as you do with methoprene, you open up a Pandora's Box of problems, affecting not just one enzyme but many genes and their associated regulatory factors as well. Unlike "knock-down" pesticides, hormone mimics like methoprene lead you into an entirely new dimension of complex molecular, genetic and biochemical problems. This report fails to consider that applying the old rules of survival (as used with "knock-down" pesticides such as pyrethroids and malathion) simply does not apply to methoprene.

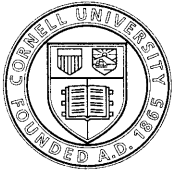
- (4) The properties of methoprene itself make it difficult to precisely control experimental concentrations of the pesticide. That is, methoprene is a lipid-like molecule, it is minimally soluble in water and it has a tendency to stick to surfaces: in nature, it sticks to particles of detritus; in the laboratory setting, it sticks to plastic bottles and surfaces. Therefore, when samples are collected in the field and returned to the lab, they should be in amber *glass* containers. Otherwise, the dose will be lowered by the pesticide binding to the walls of the collection and transport containers. The same argument applies to the experimental set-up utilized in the pilot study quoted here: if the animal is in a plastic or Plexiglas container (e.g. the caged fish study) then almost certainly one would observe binding of methoprene to the walls of the container, and thus a lower effective dose. The detritus bound methoprene may be ingested by detritus feeders (e.g. annelids/polychaetes) which are then eaten by crabs and other crustaceans. Thus, the detritus-bound methoprene gets to a non-target organism via a completely different (non-aqueous exposure) route! This report fails to consider the biology of detritus feeders and animals that prey on them.
- (5) The report suggests that briquettes are the preferred form for delivery of methoprene to storm drains, since they offer advantages of duration and dosage. They fail to address the very real possibility that severe rainfall (e.g., multiple fronts or a hurricane) could wash the pellets out of the storm drains into nearby rivers and estuaries. This could lead to higher than anticipated levels of methoprene in the estuaries and subsequent exposure of non-target organisms.

I thank you for the opportunity to review this proposal and hope that these comments will assist you in your discussion of these important issues. Please contact me if you require any additional information.

Sincerely,

Michael N. Horst, Ph.D.
Professor of Biochemistry

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June 28, 2006

Coalition for the Protection of People and Wetlands
Sarah Newkirk
Conservation Project Director
The Nature Conservancy
250 Lawrence Hill Road
Cold Spring Harbor, NY 11724

Dear Sarah Newkirk:

Overall, the contractors did an excellent job in the Suffolk County Mosquito Control Plan. I examined the risk assessment impacts study, the Mosquito Borne Disease Impact Assessment, and the Mosquito Control report. For the risk assessment, I reviewed all parts, but for my specific comments I will focus on the Executive Summary.

Page VIII – paragraphs 1 and 3: These paragraphs contradict one another. In the first paragraph it is reported that pyrethroids “did not pose a risk”. In paragraph 3, it is reported that all the insecticide applications “do not pose a significant threat to human health”. How serious is significant in this case? No pesticide is totally safe for humans or the environment.

Page XI: Honeybees might be used as a surrogate for a few non-target insects, but they are not good surrogates for most beneficial insects and other arthropods. Most insects are beneficial, with no more than 1% of insects being pests (See Pimentel, 2006). A great many beneficial insect predators and parasites are present in gardens and trees and these

play a vital role in the control of pest insects and other arthropods (Plant Pest Handbook, 2006; University of California, Statewide Integrated Pest Management Program, 2006; Pimentel, 2006). In addition, a wide variety of insects are food for birds and other animals. The reasonable economic estimate is that insects have an annual value of about \$60 billion (Pimentel et al., 1997).

Page XIII: Pyrethroids are highly toxic to aquatic insects and crustaceans, but they also are reported to be highly toxic to fish. The high toxicity to fish was not mentioned.

Page XVII: Spraying pyrethroids once a week appears to be a highly risky environmental action. It certainly would INCREASE THE RISK compared with once a month spraying. I also seriously question the statement that pyrethroids were NOT PREDICTED TO POSE UNACCEPTABLE ECOLOGICAL RISKS. The question I would ask is, "Are the ecological risks worth the mosquito control benefits?" I believe that the overall ecological risks outweigh the benefits.

Page XIX: It should be emphasized that DEET is a pesticide and therefore extreme caution should be encouraged, especially for children.

Page XIX: The statement is made that "any potential risks to non-target insects could be mitigated or ENTIRELY ELIMINATED by management strategies". This is impossible to achieve with the insecticides proposed in the spraying program.

MOSQUITO CONTROL

I was pleased to see in the adult mosquito control section that both trap counts and landing rates were measured. What I did not see was any information of how extensive the trap counts and landing rates were? There were no data on whether a 90% or greater

level of mosquito control was required to consider the mosquito control to be satisfactory?

CDC advises that mosquito control should focus primarily on larval control and secondarily on the less efficient adulticiding (CDC, 2002).

Before Suffolk County treats for mosquitoes, the mosquito traps that were mentioned should be out and measured for 5 days before spraying. Also I did not see any mention of the mosquito traps being out 5 days after spraying? Are measurements made at this time? If not they should be.

It is important that homeowners should be warned at least 72 hours in advance of spraying. Is this done?

When many West Nile infected birds are found and the mosquito population is relatively abundant (how many?) then Suffolk County sprays. Truck mounted ULV and helicopter ULV mounted sprayers are used in the control effort.

The spray produced from ULV sprayers is like a smoke or fine mist and is carried downwind. Even assuming that the spraying is carried downwind in the evening when wind is minimal, the spray is carried a fair distance downwind in an open area, like a golf course or open field. Downwind from 150 to 300 feet and at 3 feet height, the adult mosquito kill will range from 25% to 75% (Mount 1998). However, ZERO mosquitoes will be killed upwind with the insecticide spray. Thus, the average upwind and downwind kill is only 21% to 45%. Note the insecticide spray does not penetrate buildings, and the mosquitoes behind buildings are not killed. Further, dense vegetation hinders spray treatment and desired mosquito control. For example, downwind in a dense stand of trees, mosquito kill is reported to be only 34% to 58% (Mount, 1998).

For effective mosquito control, at least 90% of the adult mosquitoes must be killed. Only a few reliable scientific studies of the effectiveness of spraying for mosquito control have been reported and these results are relatively discouraging. For example, in Greenwich, Connecticut, only a 34% adult mosquito population was eliminated after ground spraying, and in Houston, Texas only a 30% reduction occurred after spraying (Outcome Studies, 2003).

The aerial application of insecticides for adult mosquito control has a few advantages over ground applications. Reports on the effectiveness of aerial ULV spraying range from 42% to 93% (Andis et al., 1987; Williams et al., 1979). However, using ULV aerial application equipment results in only 10% to 25% of the insecticide reaching the target area, whereas 75% to 90% drifts away from the target into the environment at large (Bird et al., 1996; Pimentel et al., 1993). Aerial application of insecticides covers a larger area faster than the ground application equipment, but it is more expensive than ground application, costing from \$250 to \$1,000 per hour (truck spraying costs from \$150 to \$250 per hour). Also to be considered are the serious public health and environmental problems associated with the application of insecticides over a wide environmental area (Pimentel, 2006).

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I hope that the above information is of value to you in considering mosquito control and the risks in Suffolk County.

Sincerely yours,

David Pimentel

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Cornell University
Ithaca, NY 14853

Dp18@cornell.edu

Seatuck Environmental Association
P.O.Box 31 Islip, NY 11751
631-581-6908

July 17, 2006

Via Email (James.Bagg@suffolkcountyny.gov)

Mr. James Bagg
Chief Environmental Analyst
Council on Environmental Quality
H. Lee Dennison Building
Hauppauge, NY 11787

Re: Comments on Suffolk County Vector Control & Wetlands Management Long
Term Plan, Draft Generic Environmental Impact Statement

Dear Mr. Bagg:

On behalf of the Seatuck Environmental Association, I am writing to submit comments on the County's Draft Generic Environmental Impact Statement ("DGEIS") for the Vector Control and Wetlands Management Long Term Plan. My comments are directed to the marsh management portion of plan, particularly the embrace of Open Marsh Water Management ("OMWM") as a means to reduce mosquito sources and restore coastal marshes.

An Expanded Definition

By grouping all potential marsh manipulations [with the exception of Best Management Practices #1 (natural reversion) and #15 (dredge spoil removal)] under the general heading of "Progressive Water Management," the DGEIS seems to blur the distinction between specific mosquito control techniques (i.e. OMWM) and non-mosquito control techniques, which can perhaps be more accurately described as marsh restoration techniques. The result is confusion about OMWM in general and, more troubling, about the state of science regarding its potential impacts to marsh health.

The confusion starts with the document's very definition of OMWM. It defines the practice as "a collection of techniques designed to be used on a salt marsh ... that, by manipulating how water flows through the marsh ... encourages the presence of killifish in areas where mosquitoes breed, and also may limit habitat for mosquito breeding through selective physical alterations of the marsh, including excavations (pond or channel construction) or filling (thin veneers of sediment to fill microdepressions that

support breeding), ditch plugging, ditch filling, etc. OMWM proper is a mosquito control practice, but often is applied in conjunction with other marsh alterations to generate marsh restoration.”

This definition suggests that OMWM may or may not involve excavations or extensive manipulations of the marsh. As far as I have seen, OMWM *always* involves the excavation of ponds/channels or other manipulations of the marsh. In fact, every other definition of OMWM I have come across explicitly includes excavation as a fundamental part of the technique.

In “Guidelines for ‘Open Marsh Water Management’ in Delaware’s Salt Marshes,” for example, it is stated that OMWM is a “method for controlling salt marsh mosquitoes using physical alterations of marsh habitat. OMWM alterations involve selective excavations of ponds and ditches which create unsuitable environs for mosquito egg deposition and larval maturation ...” Meredith, Saveikis *et al*, *Wetlands*, Vol. 5, p. 119 – 133, 119 (1985).

In “Open Marsh Water Management: A Source Reduction Technique for Mosquito Control,” Christopher Lesser from the Delaware Mosquito Control Section explained that the “OMWM method involves the selective installation of small, shallow ponds and inter-connecting ditches superimposed on known mosquito-breeding habitat.” He continued, “[i]n OMWM systems, scattered mosquito breeding depressions and sheetwater habitats are connected through pond and ditch excavations to allow unimpeded water flow and predatory fish movement, while isolated potholes are often filled with natural marsh soils to eliminate these smaller-sized breeding depressions.” (Delaware DNR website, undated)

Similarly, in its report on OMWM on Long Island, the Seatuck Foundation explained that *fundamental* to OMWM “is the creation of permanent, deep water areas in the upper marsh that act as reservoirs for predatory fish. Shallow ditches are dug to connect these reservoirs to surrounding mosquito breeding areas. (Final Report, Seatuck Foundation, 1990)

As these few examples illustrate, OMWM – as it was developed and as it’s seemingly practiced everywhere else – always involves marsh excavation and manipulation. The County’s definition is unique in that it allows for the inclusion of a much broader collection of marsh alterations, many of which may not serve mosquito control purposes. This blurring of the issue is all but confirmed by the introduction, in the DGEIS definition, of the term “OMWM proper” – a term that I have not seen anywhere else in the literature.

While this may seem a trivial matter of semantics, the problem arises when the DGEIS turns to the discussion of OMWM and it’s effects. In this section (5.7.4), the

slippery definition of OMWM rears its ugly head. Because here, while many of us are looking for information about what “OMWM Proper” will do to our marshes, what we get in many cases is a discussion of the effects of other, arguably more benign marsh activities – activities the County calls OMWM, but which fall outside of “OMWM Proper” and which most everyone else simply refers to as attempts at marsh restoration.

The result of all this is to distract the reader from what is a scarcity of information regarding the long-term impacts of OMWM (or “OMWM Proper”) on the overall health of the marsh and its inhabitants.

Where’s the Science?

Despite impressions in the DGEIS to the contrary, it seems impossible for anybody to really know what the impacts of an OMWM program would be on Suffolk County’s salt marshes. From what I have seen and what many scientists have told me, there simply hasn’t been enough scientific rigor applied to the technique for anyone to authoritatively say how OMWM impacts overall marsh health. 7

But the DGEIS conceals this basic truth – that we know very little about OMWM’s impacts on marsh health – by blending discussion of “OMWM Proper” with discussion of other, non-mosquito marsh restoration techniques. The restoration of natural tidal flushing, for example, is a technique that has been applied in many places to try to restore salt marsh functions. But in most instances, efforts to increase tidal flow have little or no mosquito control purposes and are not referred to as OMWM. 8

The DGEIS contains little independent, credible support for its conclusions regarding the potential impacts of OMWM. This is because there are almost no studies published in peer-reviewed scientific journals on the subject and there have been precious little long-term studies of the practice from independent, unbiased researchers. Almost all of the support for the technique comes from reports by mosquito control officials. 9

Specific Comments on Section 5.5.4 “Reported Effects of OMWM”:

In this section, the DGEIS purports to discuss the impacts of OMWM, but more often, as the following examples illustrate, it is referring to the impacts of straightforward marsh restoration efforts or citing to studies by mosquito control officials that lack the authority of scientific papers from peer-reviewed journals. 10 11

For example, on page 555, the DGEIS refers to a 1985 marsh program in Clinton, Connecticut. (citing, Dreyer, GD, and WA Niering. 1995. *Tidal Marshes of Long Island Sound: Ecology, History, and Restoration*. The Connecticut College Arboretum, No. 34.) 12

In that case, while the author of the report admittedly uses the phrase "Open Marsh Water Management techniques," the only thing they did was increase tidal flow to a marsh by opening a tidal gate. This is hardly traditional OMWM and should more accurately be identified as an effort at marsh restoration.

In fact, the section of *Tidal Marshes of Long Island Sound* that this discussion came from was titled, "Tidal Wetland Restoration in Connecticut." It reported on several projects along Long Island Sound and the term OMWM was only used once. Further, these projects were part of a broad scale restoration effort lead by scientists at the Connecticut Department of Environmental Conservation, not mosquito control officials.

The conclusion that the description of this project as OMWM was an anomaly is buttressed by a 1998 document (posted on the Mosquito Management Program's current website) by the State's Department of Environmental Protection, Wildlife Division, titled "Connecticut's Mosquito Control Program" that describes OMWM as involving "selective excavation of shallow ponds and ditches in mosquito-breeding areas." The document says nothing about OMWM also including projects that only alter tidal gate openings to increase flow. (The DGEIS does discuss another Connecticut program that involved the installation of OMWM ponds, but then cites personal communication with one of the project's coordinators as the only support of success.)

Later, the DGEIS concludes, "most OMWM implementations will not substantially alter the marsh surface elevation or restrict water movements. Therefore, there should be no shift in the overall distribution of wetlands vegetation." The citation for this authoritative statement is "Effects of OMWM on Selected Tidal Marsh Resources: A Review," Roger Wolfe, *Journal of the American Mosquito Control Association* (1996).

Not only does the DGEIS cite to Wolfe, but directly borrows language. Wolfe states "[i]f implemented properly, with care given to minimize the depth of spoil, OMWM excavations will not substantially increase the marsh surface elevation or restrict surface water movement, thereby ensuring the reestablishment of pretreatment vegetation." However, none of the citations for this statement come from independent scientific studies. All three come from the proceedings of the New Jersey Mosquito Control Association's annual meetings. In fact, the author concedes that lack of science that has been applied to OMWM's impacts on hydrology, stating in the beginning of the discussion of the issue that, "little research has been done with direct regard to [the impacts of OMWM on] hydrology or topography."

Later, on page 557, the DGEIS discusses OMWM's impacts on vegetation and cites two papers, one from the New Jersey Mosquito Control Association proceedings ("Preliminary effects of open marsh water management on the vegetation and organisms of the salt marsh," Ferrigno, F., *Proceedings of the New Jersey Mosquito Extermination*

Association 57:79-94 (1970)) and one from *Mosquito News* ("Salt marsh productivity as affected by the selective ditching technique, open marsh water management," Shisler, JK, and DM Jobbins, *Mosquito News* 37:631-636 (1977a)). According to the DGEIS, the papers reported that OMWM installations encouraged a shift in vegetation from high marsh to low marsh – a finding that, were it were shown to be true, would certainly be a cause for concern here on Long Island. 11

The DGEIS, however, counters this troubling information by citing personal visits of the consultants to a New Jersey OMWM site, where they "generally found no shift in overall vegetation communities from the pre-operational vegetation conditions. How the consultants were able to make comparisons to the pre-operational conditions is not explained.

The off-the-mark examples and less-than-convincing citations continue in the documents discussion of OMWM effects on biota. On page 562, the DGEIS states that it "has been suggested that OMWM does not significantly impact invertebrate populations." The citation for this broad statement is the aforementioned article by Roger Wolfe titled, "Effects of OMWM on Selected Tidal Marsh Resources: A Review." As the title suggests, Mr. Wolfe's paper is a literature review; he conducted no original research. Further, he cites only a handful of studies by mosquito control officials for this statement, some of which showed inconclusive results or even results suggesting invertebrate abundance could be reduced by OMWM installations. 13

On page 563, the DGEIS discusses the impact on shorebird use resulting from an OMWM installation on a Long Island marsh. With no actual scientific studies on which to rely, the DGEIS again resorts to personal communication with a U.S. Fish and Wildlife official. His less-than-scientific answer, according to the document, was a "fivefold increase in shorebird use."

Later on page 563, after citing studies on the negative impacts of ditching on marsh birds and explaining that the narrow width of traditional ditches prevents birds from using them as forage sites, the DGEIS states that OMWM "should not have these kinds of negative impacts" because it restores open waters on the marsh. This might be a reassuring statement, but it is made without a single citation or support! 15

In the next paragraph, the DGEIS turns to a discussion of fish. It again turns to the Wolfe article, stating that it "demonstrated" that tidal circulation, enhanced by ditches, replenishes the fish that consume mosquito larvae back into the high marsh pools." While this suggests that Wolfe conducted some original science on the issue, he, as mentioned above, conducted nothing more than a literature review. In his paper, he wrote that researchers "have found that tidal circulation, enhanced by ditches, replenished the larvivorous fish in the high-marsh pools." He provided two citations for this

statement, both authored by mosquito control officials and, once again, both published as part of the Proceedings of the New Jersey Mosquito Control Association. | 11

These are just a few examples of the many instances where the DGEIS turns to discussions of marsh restoration efforts or cites to papers by mosquito control officials instead of providing scientific evidence for the impacts of OMWM on marsh health.

* * *

While there are a lot of people who believe Open Marsh Water Management is good for salt marshes, there are many in the scientific and conservation community who remain skeptical. There are even those who believe it may negatively impact the marshes. The State of Maryland, for example, stopped permitting the practice in 1989 because of concerns of negative impacts to overall hydrology and high marsh nesting birds, such as the black rail (personal communication with Cy Lesser, Director, MD Dept. of Agriculture, Vector Control Division and Mike Slatery, Assistant Secretary, Dept. of Natural Resources). | 16
| 17

The bottom line, however, seems to be that OMWM has not been sufficiently studied for anyone to authoritatively state how it does or does not impact marsh functions and overall marsh health. Many officials with whom I spoke agreed with this conclusion, even in states where the DGEIS suggests OMWM has been a great success.

For example, one official who is intimately involved with Connecticut's marsh restoration efforts told me that he still considers OMWM to be "experimental" and not the same as marsh restoration (personal communication with Ron Roze, CT DEC, Long Island Sound office). Similarly, one senior official from Delaware's much-touted vector control program conceded to me that they didn't know much about the long-term impacts of their OMWM installations on overall marsh health, adding that he wished they had more funds to conduct comprehensive, long-term studies (personal communication with William Meredith, Administrator, DE Vector Control). | 18
| 19

In addition, in my attempt to get a handle on OMWM, I spoke with many ecologists, biologists and geologists from various universities and research facilities. The great majority of them agreed with the basic premise that OMWM is a mosquito control technique that has been widely praised by mosquito control officials, but has not been sufficiently studied. A great deal of them went a lot further, telling me that they believe the technique has caused considerable damage to the health of the marshes in many of the places where it has been adopted. Some of these scientists have recently submitted a letter to Suffolk County outlining their concerns about OMWM, a copy of which is attached and submitted as a part of these comments. | 20
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| 23

James Bagg
July 17, 2006
Page 7 of 7

In the end, while I commend the County on the decision to move beyond the legacy of the grid ditch system, I believe we simply don't know enough about Open Marsh Water Management to embrace it as a panacea for our mosquito control needs.

Very truly yours,

ENRICO G. NARDONE
Executive Director

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Mark D. Bertness, Ph.D.
Patrick Ewanchuck, Ph.D.
Ray Konisky, Ph.D.

July 17, 2006

Steve Levy
Suffolk County Executive
H. Lee Dennison Building
P.O. Box 6100
Hauppauge, NY 11788

Suffolk County Legislature
Attn: Tim Laube, Clerk
W.H. Rogers Legislature Building
P.O. Box 6100
Hauppauge, NY 11788

RE: LONG TERM MOSQUITO AND MARSH MANAGEMENT PLAN

Dear County Executive Levy and Members of the Legislature:

We, the undersigned estuarine scientists, have reviewed Suffolk County's Long Term Mosquito and Marsh Management Plan at the request of the Coalition for the Protection of People and Wetlands (COPOPAW) and are writing to voice concern with regard to the proposed wetlands management scheme.

We are intimately involved in efforts to research and restore coastal marshes on the eastern seaboard. Our experience teaches us that tidal wetlands are inherently complex systems with elaborate and often misunderstood hydrological regimes.

Of particular concern to us is the plan's reliance on the practice known as Open Marsh Water Management ("OMWM"), especially the suggestion that it will "restore" Long Island's coastal marshes. OMWM, which involves artificial pond excavation, unnatural creek construction and the leveling of high marsh terrain through back-blading, is a mosquito control technique; it is not synonymous with marsh restoration.

The fact is, that despite the widespread application of OMWM, we know very little about its long-term impacts. The scientific literature contains no comprehensive, scientific studies of OMWM. The only multi-year study of OMWM, a recent assessment

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of the technique on several national wildlife refuges, found mixed and less than persuasive results, even with regard to impacts on mosquito populations. 11

Based on our current understanding of marsh hydrology and ecology, there is nothing to suggest that OMWM restores lost ecological functions. In fact, there are concerns that the structural changes created by this technique lead to unnatural alterations of salt marsh ecosystem function.

With these thoughts in mind, we urge Suffolk County to reconsider the embrace of OMWM as a method to restore its coastal marshes. It is an unproven, experimental technique that is simply not a substitute for careful, comprehensive marsh restoration. In the long run, OMWM may even do more harm than good to your irreplaceable salt marshes. 15

Very truly yours,

Dr. Mark D. Bertness
Robert Brown Professor of Biology & Chair,
Department of Ecology & Evolutionary Biology
Brown University

Dr. Patrick Ewanchuck
Assistant Professor of Biology
Department of Biology
Providence College

Dr. Ray Konisky
Program Manager
Gulf of Council on the Environment

cc: Suffolk County Council on Environmental Quality (c/o James Bagg, via email)
Coalition for the Protection of People & Wetlands –
Citizens Campaign for the Environment
Environmental Defense
Great South Bay Audubon Society
The Nature Conservancy
Peconic Baykeeper

AF

From: Steve_Papa@fws.gov [mailto:Steve_Papa@fws.gov]
Sent: Monday, July 17, 2006 10:54 AM
To: james.bagg@suffolkcountyny.gov
Cc: Rosemarie_Gnam@fws.gov
Subject: DGEIS Suffolk County Vector Control and Wetlands Mgmt Long Term Plan and EIS
Importance: High

Dear Mr. Bagg,

The operational aspects of the proposed project may have the potential to impact Federally-listed threatened and endangered species which inhabit Long Island Coastal Beaches and Marshes, including the piping plover (*Charadrius melodus*) and roseate tern (*Sterna dougallii dougallii*). Particularly, low altitude helicopter flight patterns may disturb breeding plovers and terns to the extent that there is significant disruption of their breeding, sheltering and foraging behaviors. Some of the proposed activities related to marsh restoration or maintenance may require a Department of the Army permit, thereby necessitating consultation under the Endangered Species Act between the Corps and Service. Other activities not requiring a Federal permit, but which may cause impacts to listed species should be addressed through the Section 10 of the ESA permit process. In either case, I encourage you to call me to discuss further.

Thanks for the opportunity to comment.

Steve Papa
Senior Biologist
Federal Activities/Endangered Species
U.S. Fish & Wildlife Service
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For information about the Long Island Field Office and the work we do visit <http://longisland.fws.gov> on the web

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July 17, 2006

James Bagg, Chief Environmental Analyst
Council on Environmental Quality
Suffolk County Department of Planning
H. Lee Dennison Building
100 Veterans Memorial Highway
Hauppauge, NY 11788

RE: Comments on Suffolk County Vector Control and Wetlands Management DGEIS and Long-Term Plan

Dear Mr. Bagg

The New York State Department of Environmental Conservation has received and reviewed the **Suffolk County Vector Control and Wetlands Management Long-Term Plan and DGEIS**. The Department commends Suffolk County for undertaking this ambitious project as it strives to develop a comprehensive plan for vector control. The Department acknowledges that the County and its consultants have worked hard during these past several years to bring this project to a successful conclusion and is hopeful that the final product will be one which addresses many long-standing public issues and concerns.

The Department is grateful for its participation in the process which has led to the development of the long-term plans and DGEIS. Accordingly, the Department offers the following comments: (The Department observes that in many cases certain material presented by Suffolk County is repeated in several different volumes and sections of the DGEIS and plan. Although the Department may not have repeated its comments each time the same information was repeated, the Department's comments should be considered as applicable to all iterations of the same information.)

General Comments:

The Department agrees with many of the concepts presented for wetlands management - the call for a reduction in the amount of pesticide usage, preservation or increase in wetlands acreage and a reduction in the amount of *Phragmites* and believes that the various tables presented throughout the document present a good summary of the pros and cons of the various

management techniques. The Department is gratified that Suffolk County recognizes the need to preserve wetlands acreage, values and functions.

As a whole, the document has a tendency towards conclusory statements, with an overlying assumption that Suffolk County's proposals represent the best wetland management techniques in all cases. It is difficult to find wording that clearly states that there are circumstances in which mosquito control and the need to preserve the values and functions of wetlands may have different and contradictory management needs. This is especially true in cases where tidal wetlands are functioning well yet are breeding mosquitos (this also recognizes that in the cases of tidal marshes, the salt marsh mosquito is a native, not introduced species, and is therefore an integral part of the ecology of the marsh). In these instances the use of Open Marsh Water Management or other manipulations to control mosquitos constitutes marsh alteration, not restoration. An example is the excavation or filling of *Spartina patens* areas to provide fish access or to control mosquito breeding. Thus, while there may be benefits for public health or welfare, an action may not be beneficial to the marsh. The Department believes that the least amount of marsh alteration necessary to control mosquitos and minimize pesticide use in well functioning marshes should be the first course of action contemplated and in some cases it may be determined that the need to preserve the marsh and its functions overrides any potential public health or welfare benefit. The Department must carefully weigh any proposal for wetlands management to ensure that there are minimal impacts and sufficient monitoring to evaluate whether the goals of the project are being met and whether the values and functions of the marsh are being preserved. Therefore, the Department agrees with the DGEIS that each project must be reviewed on a case-by-case basis.

The Department supports the County policy of "no new grid ditching." The Department is also supportive of the concept of the presumptive interim policy of ditch reversion in areas not breeding or causing mosquito control problems, but with some reservations. The Department is concerned that some marsh areas that are currently functioning well may become degraded if reversion causes greater fresh water retention, ponding, *Phragmites* invasion, or other habitat loss. The document correctly identifies this as a concern and suggests that monitoring through remote sensing will help identify problem areas. Remote sensing is a good screening tool, but we recommend that monitoring be done at sufficient frequency and detail that habitat loss or degradation can be identified prior to the wetlands needing major restoration. Simple reopening of ditches may not be enough if a wetlands area has become degraded. Field evaluations may be necessary in some cases to confirm and support the remote sensing data. The Department also believe that some ditched marshes are functioning well and that caution should be taken when considering reversion or other management for these wetlands.

Volume 1 of 7: Executive Summary

ES-1.2. Long-Term Plan Summary (pp. ES-2 to ES-8)

1. On page ES-3 of the Executive Summary, in the last paragraph it is stated that 80 acres of salt marsh were "restored" at Wertheim National Wildlife Refuge. It is premature to state that this area was restored as Phase I was only completed just over 1 year ago and Phase 2 was completed even more recently. A number of years

must transpire before it can objectively be stated that these 80 acres were indeed restored. This includes allowing for completion of a number of consecutive years of post-construction monitoring based on accepted objectives and scientific standards.

2. In the second paragraph on page ES-4, it is stated that “Remote sensing will allow for cost-effective monitoring of the County’s wetlands and supplement field visits.” The viability of remote sensing, especially as a replacement for on-site physical monitoring, will need to be evaluated further to determine whether or not it can be ground-truthed sufficiently.
3. In the second paragraph on page ES-4, in the second-to-last sentence it is stated that “...*any major restoration project proposed will be subject to SEQRA review.*” However, minor wetland restoration projects may be subject to SEQR as well if a discretionary decision must be rendered as to whether or not the project should be undertaken. Accordingly, this sentence should be corrected to state that all wetlands projects will be subject to SEQR as any action which requires a discretionary approval will need to be classified as either Unlisted or Type I and a determination of significance or non-significance issued and those actions which meet the Type II thresholds will not require SEQR review.
4. In the second paragraph on page ES-8, it is stated that “An extensive “Caged Fish” study found no lethal or sublethal impacts to organisms attributable to applications of resmethrin and methoprene.” The use of the term “extensive” is questioned as this study was limited to a few adulticide events and only a few applications of methoprene. There are other questions concerning this study which are explained elsewhere.

ES-2.1 Policy Justification for Mosquito Control (pp. ES-9 to ES-16)

In regard to the discussion on pages ES-15 to ES-16 of Goal 2 (*simultaneously reduce impacts to the environment and increase potential ecological benefits associated with the selected management techniques*) the Department agrees with the policy to preserve or increase vegetated wetlands and with *Phragmites* reduction. However, the Department is concerned that Suffolk County has concluded that increasing biodiversity and creating a “mosaic of ecological communities” is the best management technique in all cases. The Department prefers that wetlands be managed to preserve or increase acreage, values and functions. In some cases this may in fact include the creation of new habitat such as ponds and channels for fish and birds, especially in substantially degraded marshes that are breeding mosquitos. However, in marshes that are functioning well the Department believes that the fewest alterations necessary to provide effective mosquito control and reduce pesticide use should be the primary management option considered. The “jury is still out” as to whether or not the marsh alterations done for the demonstration projects at Wertheim have long-term ecological and mosquito control benefits. Such manipulations require monitoring and in some cases may require maintenance to ensure continued functioning as planned. A case in point is Seatuck, where it appears that lack of sufficient post-project monitoring and maintenance has led to a recurrence of a large mosquito

breeding population and the need for larvicide use (as shown by the County's monitoring data from 1987 - 2003).

ES-2.2. Legal Justification for Mosquito Control (pp. ES-16 to ES-17)

This section should discuss State Public Health Law and County Law authority for Suffolk County to enter onto and conduct mosquito control activities on lands owned by other governmental entities including towns, the State and the Federal government and whether prior permission from these other governmental entities is required.

ES-3.1 Management Plan Approach (pp. ES-19 to ES-25)

1. In the first paragraph on page ES-22, it is stated that the observations and measurements of the test organisms utilized in the Caged Fish experiment "...found no effects from pesticides." However, this conclusion must be qualified by the fact that initial review indicated researchers may not have actually checked on all caged specimens prior to the spray event. It appears there may have been an assumption that the higher mortalities that occurred in the spray area (and not in the control area) were the result of low DO and temperature stressors rather than the spray event although they did not have information on pre-spray conditions and were unable to determine whether the mortalities occurred before, during or after the spraying occurred. Further, field tests were based on a small number of events and a small number of samples.
2. In the second paragraph on page ES-22, statements made imply that the water management demonstration project at Wertheim National Wildlife Refuge was a "success." Yet, as stated previously, such an implication is premature as the first phase was completed just over 1 year ago and the second phase was completed less than 4 months ago. A number of years of comprehensive monitoring must be conducted before such a conclusion can be stated.

ES-3.4 Source Reduction (pp. ES-34 to ES-47)

The fourth paragraph on page ES-35 states that when "recharge basins are slow to drain, the basin owner should be asked to arrange for maintenance of the basin." However, this recommendation belies the fact that some basins, such as those created and maintained by the New York State Department of Transportation, are "ecological recharge basins" which were designed to hold and retain water to provide additional aquatic habitat for a variety of species. In addition, some recharge basins were created within existing wetlands and wetlands systems and/or have intercepted the groundwater table, so it would not be possible to drain these as a form of maintenance. Accordingly, other options which are cognizant of these conditions and factors should be explored.

Water Management (pp. ES-36 to ES-45)

1. In the fourth paragraph on page ES-36, it is stated that “the County recognizes the importance of healthy, good-functioning marshes” but limits the scope of its Wetlands Management Plan to “...immediate factors that affect and are affected by mosquito management at this time.” It should be noted that the Department is charged with managing and protecting tidal wetlands for their many important values, enumerated in Article 25 of the State Environmental Conservation Law and its implementing regulations 6 NYCRR Part 661, which include “marine food production, wildlife habitat, flood and storm and hurricane control, recreation, cleansing ecosystems, sedimentation control, education and research and open space and aesthetic appreciation.” These are the objectives and factor by which the Department will assess any site-specific water/wetland management project. Management for mosquito control is not an explicitly listed tidal wetland objective in either the statute or regulations by which the Department must abide.
2. The Department agrees with “the restoration of environmental values” and functions of marshes, but as stated above, the Department does not believe that habitat creation is beneficial in all cases. Each marsh should be reviewed on a site and case specific basis. Wetlands that are currently functioning well should receive the minimum management necessary to achieve the goal of mosquito reduction and minimization of pesticide use. The EIS also needs to consider what steps the County will take if certain marsh management projects lead to a degradation of marsh health.
3. In the second paragraph on page ES-37 the County discusses its new default policy of reversion. The Department generally agrees with reversion of wetlands where no mosquito control is needed and where reversion will not cause wetlands degradation (*Phragmites* invasion, loss of vegetation, etc), but as stated above, emphasizes that an effective monitoring program is necessary.
4. In the fourth paragraph on page ES-38 the document states that “...*the enhancement of water quality and fish habitat values are the basic requirements for progressive water management to achieve mosquito control aims, by fostering killifish on the salt marsh in the areas where mosquito breeding had been occurring.*” As noted previously, water quality and fish habitat values are only some of the important environmental values of wetlands. These other values also need to be enumerated. In addition, it is problematic that the document narrowly focuses on the enhancement of habitat for killifish when there is a much broader variety of finfish and other organisms which need to be considered.
5. In the last paragraph on page ES-37, the document states that the goals of the “Progressive Water Management” initiative are “...*pesticide reduction by reducing or eliminating the need for such applications and habitat enhancement, including maintaining or increasing biodiversity and Phragmites control.*” While the Department can agree with many of the concepts presented for wetlands management such as the call for a reduction in the amount of pesticide usage and a

reduction in the amount of *Phragmites*, the Department believes that the reasoned weighing of the pros and cons of the various management techniques that is shown in the tables is not adequately reflected in much of the text. The document has a tendency towards conclusory statements, with an overlying assumption that Suffolk County's proposals represent the best wetland management techniques in all cases. It is difficult to find wording that clearly states that there are circumstances in which mosquito control and the need to preserve the values and functions of wetlands may have different and contradictory management needs. This is especially true in cases where tidal wetlands are functioning well, yet are breeding mosquitos. Salt marsh mosquitoes are a native, not introduced species, and are an integral part of salt marsh ecology. In these instances the use of Open Marsh Water Management or other manipulations to control mosquitos constitutes marsh alteration, not restoration. Thus, while there may be benefits for public health or welfare, an action may not be beneficial to the marsh. This is why the Department must carefully weigh any proposal for wetlands management to ensure that there are minimal adverse environmental impacts and sufficient monitoring to evaluate whether the goals of the project are being met and whether the values and functions of the marsh are being preserved. Furthermore, The wording should be changed from "maintaining or increasing biodiversity" to maintaining or increasing marsh quality and function.

6. The text at the bottom of page ES-37 and top of page ES-38 states that progressive water management will be considered for implementation in 4000 acres of tidal wetlands which have been identified as major mosquito breeding problem areas. It would be preferable (and more accurate) to suggest that there are 4000 acres that are candidates for OMWM. Each marsh needs to be assessed on a case-by-case basis to determine whether the type of management best promotes marsh health while providing effective mosquito control. In some cases, these goals may not be entirely compatible. Even where reversion is proposed, it is possible that wetlands functions can be lost or altered if fresh water retention and changes in hydrology lead to an increase in *Phragmites* or loss of marsh to upland.
7. In the third paragraph on page ES-38, again it is stated that "...*progressive water management is intended to alter only the portions of the marsh where mosquito breeding occurs*" and that "*Progressive water management achieves mosquito control through predation by naturally occurring killifish. The essence of the technique, therefore, is to provide habitat enhancement for these fish.*" Again, as stated earlier, what is being promoted here is management and alteration of the marsh for a single-species in order to achieve mosquito reduction when the goal should be restoration of the marsh for all its species, functions and values, especially since such a broader focus will likely still result in a reduction in mosquito generation.
8. In the first paragraph at the top of page ES-39, it is stated that permitting of the Wertheim National Wildlife Refuge project was a major accomplishment. This section fails to note that the County's initial proposal at Wertheim was to undertake "test plots" of various ditch plugging techniques at the Refuge which had

no clear goals or objectives in terms of marsh restoration. The County objected to the recommended pre- and post- project monitoring to assess impacts and this initial project did not receive Department support. Subsequently and conversely, the land managers of the Wertheim Refuge, the US Fish and Wildlife Service, developed a new proposal with specifically identified goals and objectives and a monitoring plan for project success. Each aspect of the project included a specific rationale. For example, placement and location of each newly-created ditch or “channel” was clearly supported and was coupled with the proposal for no net loss of vegetated marsh surface – all of which were missing from the County’s proposal. The US Fish and Wildlife Service project was further supported by the agreement that long-term monitoring was an essential component of the project to identify and, if required, correct any adverse impacts that could potentially arise and to appropriately measure project success.

In another section of this paragraph the Wertheim project is characterized as having already achieved “...the first blush of success at the site in controlling mosquito breeding and enhancing natural resource values.” As alluded to earlier, the Wertheim project was only recently completed and there is no body of longer-term data generated by the project at this time to definitively state that it has been a success.

Later in this paragraph it is acknowledged that State regulators were concerned about a “lack of monitoring and documentation for past OMWM demonstration projects” yet it is intimated that the Wertheim project alone assuaged this concern. This is not the case as the Department has not yet received appropriate monitoring and documentation for a number of related past projects, thereby hindering justification for future proposals. Although reductions in pesticide use and application has been presented as an important aspect of this water management plan, the Department has yet to receive data to support this results from previous restoration projects in the County. Unfortunately, the Department has documented adverse impacts to existing marshes from prior projects in the County. For example, prior efforts at the William Floyd Estate resulted in unplanned ditching of the marsh due to inadequate supervision of work crews. Marsh plugging efforts in Tobay were poorly planned and resulted in the scouring and loss of vegetated areas. Until there is a body of sufficient pre-project and post-project monitoring over a sufficiently long period of time, the Department will continue to require that site-specific wetland restoration/water management projects be reviewed on a site specific basis, including a site specific evaluation of existing conditions, project objectives and proposed techniques. Water management project proposals will be required to include an appropriate baseline of data (existing conditions at the site) as well as a post-project monitoring plan that addresses project goals and incorporates measurements of potential impacts as well as project success.

9. Tables ES-1, ES-2, ES-3 and ES-4 on pages ES-41 through ES-44 provide an assessment of the general compatibility of various proposed actions with the State’s Tidal Wetlands Land Use Regulations (6 NYCRR Part 661). Many of

these assessments are not consistent with the definitions and/or use categories provided by the regulations themselves. Specific examples are listed in the subsequent comments. Given the apparent confusion over use categories and classifications, it seems important to also clarify that any project requiring a Tidal Wetlands permit must meet the standards of permit issuance regardless of whether it is classified as GCp or Pip or P. The applicant has the burden of establishing that the applicable standards are met. Activities listed as GCp are not exempt from this requirement.

10. In regard to Table ES-1, “Management Activities for Minimal or No Action,” (page ES-41) the following should be noted:

BMP 3. Maintain/reconstruct existing upland fresh water ditches

When this activity is conducted within the Department’s Tidal Wetland jurisdiction and includes substantial reconstruction it is listed as GCp (Generally compatible activity with permit required) under Part 661. This activity requires a Tidal Wetland permit.

Under 6 NYCRR Part 663 (Freshwater Wetlands Permits Requirements Regulations), section 663.4(d), Item 19 lists “constructing, expanding, or substantially modifying drainage ditches, except as part of an agricultural activity” as uses which require a Freshwater Wetland permit. Such activities occurring in the freshwater wetland itself are classified as P(X) (“Incompatible”) and as P(N) (“usually Incompatible”) in the adjacent area of a freshwater wetland (upland area within 100 feet of the outward boundary of the freshwater wetland).

11. In regard to Table ES-2, “Management Activities for Minor Impacts,” (page ES-42) the following should be noted:

BMP4. Selective Maintenance/Reconstruction of Existing Salt Marsh Ditches.

When this activity includes substantial reconstruction it is listed as GCp under Part 661. This activity requires a Tidal Wetland permit.

BMP 5. Upgrade or install culverts, weirs, bridges.

These activities are not specifically listed under Part 661.5(b) Use Categories as GCp activities. Therefore, the proposed activities must be assessed based on individual project proposals as to whether or not they are classified as GCp, P (“Permit Required”) or Pip (“Presumptively Incompatible”) activities.

BMP 6. Naturalize existing ditches.

Substantial modification of ditches is GCp. This activity requires a Tidal Wetland permit.

BMP 7. Install shallow spur ditches.

Construction of new mosquito ditches is GCp and not NPN (“No Permit Necessary”). Construction of drainage ditches for other purposes (other than mosquito control or agriculture) is Pip.

BMP 8. Backblading and/or sidecasting material into depressions.

Backblading may be considered NPN or GCp only under strict conditions and is not specifically provided for in the regulations. Sidecasting, or filling depressions with dredged material, may also be considered I (incompatible activity) or Pip in vegetated marshes and/or SM (“Coastal Shoals, Bars and Flats”)/LZ (“Littoral Zone”).

BMP 9. Create small (500-1000 sq. ft.) fish reservoirs in mosquito breeding areas.

Creating fish reservoirs by excavating vegetated marsh areas is classified as new dredging since the excavation/removal of material is specifically conducted for the purpose of establishing/increasing water depth. New dredging is a Pip activity.

12. In regard to Table ES-3, “Management Activities for Major Impacts,” (page ES-43) the following should be noted:

BMP 11. Install tidal channels

Installing tidal channels by excavating vegetated marsh areas is classified as new dredging since the excavation/removal of material is specifically conducted for the purpose of establishing/increasing water depth. New dredging is a Pip activity.

BMP 12. Plug existing ditches

Plugging existing ditches with clean fill is listed as Pip since it is placement of fill in SM/LZ and/or Intertidal Marsh/High Marsh/Coastal Fresh Marsh (IM/HM/FM). Plugging existing ditches with dredged material may be considered under disposal of dredged material, which is Pip in SM/LZ and Incompatible (I) in IM/HM/FM areas.

BMP 13. Construct ponds greater than 1000 sq. ft.

Creating ponds is classified as new dredging since the excavation/removal of material is specifically conducted for the purpose of establishing/increasing water depth. New

dredging is a Pip activity. |

BMP 14. Fill existing ditches

Filling existing ditches with clean fill is listed as Pip since it is placement of fill in SM/LZ and/or IM/HM/FM. Filling existing ditches with dredged material (e.g., from the excavation of ponds) may be considered under disposal of dredged material, which is Pip in SM/LZ and I in IM/HM/FM areas. |

BMP 15. Remove dredge spoils

Depending on when the spoil was placed, removing dredge spoil may be classified as new dredging since the excavation/removal of material is specifically conducted for the purpose of establishing/increasing water depth. New dredging is a Pip activity. |

13. In regard to Table ES-4, “Interim Management/Ongoing Maintenance Actions,” (page ES-44) the following should be noted:

IMA 2. Selective ditch management (Standard Water Management)

This activity may not include substantial reconstruction. Otherwise, a permit is required. |

IMA 3. Culvert repair/maintenance when tidal restrictions are apparent

This activity may not include substantial reconstruction. Otherwise, a permit is required. |

IMA 4. Stop-gap ditch plug maintenance

If the initial permit has not expired, maintenance activities are likely to be covered by the existing permit. Otherwise, a new permit will be required for any activities including construction, filling and/or establishing plantings. Similarly, any modification of the original project will require a permit. |

14. The second sentence of the second paragraph on page ES-45 states that “The need for streamlined and dedicated State processes is highlighted.” As alluded to in comments on the Wertheim water management project, the County would need to compile a longer term record of overall project successes in regard to site-specific projects before the State could even contemplate development of a streamlined review process. Measurement of project success would need to include not just mosquito control effectiveness but the full range of impacts and beneficial effects on the marsh ecosystem. |
15. In Table ES-5, “Source Reduction summary,” the “Other Issues” the lack of any statement for mosquito species inhabiting tidal wetland implies that there would be no

issues with any type of water management project proposed to control these species, namely Aedes vexans, Ochlerotatus cantator, Ochlerotatus sollicitans, Ochlerotatus taeniorhynchus and Ochlerotatus trivittatus. Accordingly, this column should list the statement “Any project in Tidal Wetlands and which requires a Tidal Wetlands permit must meet the standards of permit issuance in order to be undertaken.”

ES.3.5 Biocontrols (pp. ES-48 to ES-49)

1. The text on page ES-48 discusses replacing the use of *Gambusia* with fathead minnows for biological control of larvae. Neither *Gambusia* nor fathead minnows are native species. There is a statement that claims that fathead minnows "have proven themselves to be non-invasive (native species will not be displaced when fathead minnows enter an ecosystem)" according to the NYSDEC. There is no reference from whom or where in the NYSDEC they obtained this information. Also there appears to be little to no mention about exploring possible control using native species of fish.
2. The second paragraph on page ES-48 discusses the potential for use of predaceous copepods. More information is required in regard to their potential use, especially if species not native to Long Island would be considered.

ES-3.6 Larval Control (pp. ES-49 to ES-57)

1. In the discussion of Surveillance on pages ES-50 to ES-51, the Executive Summary should provide a brief explanatory statement about the problems encountered in attempting to use a quantitative larval dipping index due to variability associated with larval behavior, sampler methodology and other conditions and factors.
2. In the second paragraph on page ES-54 regarding the discussion of Larval Treatment Selection, the terms univoltine and multivoltine should be defined.

ES-3.7 Adult Control (pp. ES-57 to ES-84)

1. In the discussion under the Declared Health Emergencies subsection about factors and constraints concerning decisions as to whether or not to apply adulticides (especially in the last paragraph on page ES-65), wind speed and direction and risk of precipitation should also be mentioned.
2. In the fifth sentence in the second full paragraph on page ES-66, it is stated that “...the expedited NYSDEC permit waiver process pursued.” This statement is incorrect. NYSDEC does not issue permit waivers but instead in the past has issued Emergency Authorizations, an expedited form of permit, when the agency has determined that an emergency, as defined in its Uniform Procedures Regulations, exists.
3. Under the discussion of Application Methods, the last paragraph on page ES-69 refers to the “...50 feet regulated buffer surrounding NYSDEC-mapped freshwater

wetlands.” This should be corrected to refer to the “100-foot regulated Adjacent Area | which surrounds NYSDEC-mapped freshwater wetlands.”

4. Under the discussion of Application Methods on the first full paragraph on page ES-70, the last paragraph on page ES-71 and the first full paragraph on page ES-73, the document references “waivers from freshwater wetland regulations” granted by NYSDEC. NYSDEC does not grant “waivers” from its Freshwater Wetland regulations nor has it exempted application of pesticides from its freshwater wetland regulations. NYSDEC has issued a form of expedited freshwater wetland permit, known as an “Emergency Authorization,” to Suffolk County in response to human health emergencies, such as West Nile Virus, in the past. Accordingly, these statements should be corrected.
6. In Table ES-7, General Adulticide Decision Parameters, the acronym “MIR” | in the last row should be defined in the beginning of the volume.

ES-4.4 Potential Impacts Associated with Water Management and Their Mitigation (pp. ES-97 to ES-108)

1. In the first sentence in the second paragraph on page ES-102, the document states that ditching “seems to have fostered *S. Patens* expansion in some areas (Redfield, 1972): but then cites a reference which seems to contradict this statement in which it is stated “At Gilgo, an unditched area has a measurably higher *S. patens* to *S. alterniflora* area ratio than a ditched area did (Merriam, 1974).” It seems that either the result cited by Merriam were recounted incorrectly in the executive summary (i.e. the unditched area should have been cited as having a lower *S. patens* to *S. alterniflora* area ratio) or there should be a transitional phrase, such as “However,” at the beginning of the sentence which cites Merriam.
2. In the first paragraph on page ES-104 and on page 891 of the document it states the following:

“In some instances, storm water management systems have been designed so as to discharge directly to the marsh or to ditches in the marsh. Generally, such connections are targeted for remediation through the USEPA Phase II storm water planning process (NYSDEC, 2001), although in some instances, as in Mastic Beach, it is difficult to determine what Alternatives might exist.”

It would be more accurate to change this statement to the following: |

“In some instances, storm water management systems have been designed so as to discharge directly to the marsh or to ditches in the marsh. Generally, such connections may be targeted for remediation through the USEPA Phase II storm water planning process if it is determined as part of the MS4 permitting process that such connection are contributing to a contravention of water quality.”

2. In the last paragraph on page ES-106, there is a discussion of pre-ditching and pre-European mosquito population densities in salt marshes. This section cites only a few references and also states "...it is generally thought that most natural salt marshes will produce large numbers of mosquitoes, although the truth of this assertion is difficult to prove." More references and more attributions to this belief should be provided and discussed or the premise behind this observation explained in greater detail. Also, if there are few or no studies regarding numbers of mosquitoes produced by unaltered salt marshes, this should be clearly stated in the document.
3. In the last paragraph on page ES-108 the Department agrees with the statements regarding the 15 BMP's that "selections of management alternatives must be in site-specific ways that are dependant on resources evaluations" and that the "technique that carries the least environmental risk compared to the potential environmental benefit, while also meeting mosquito control aims." This reinforces the Department's call for monitoring and minimal disturbance of healthy marshes.

ES-4.5 Biocontrols (pp. ES 109 to ES-110)

The second paragraph on page ES-110 again discusses the potential for use of predaceous copepods for larval control. As stated previously, more information is required in regard to their potential use, particularly in regard to adverse impacts and especially if species not native to Long Island would be considered. The Department could support the use of any proven, ecologically- safe biocontrol agent. However, the Department would prefer to see only native species used in any catch basins which have overflows to surface waters. The use of copepods and other native predatory invertebrates such as Odonata could potentially be permitted in surface water bodies lacking those predators provided there were no impacts to other indigenous species. Vietnam has had good success controlling mosquitos carrying dengue fever using native species of copepods.

ES-4.6 Larval Controls (pp. ES-110 to ES-130)

1. In several sections of the DGEIS including page ES-115 under this section, there are claims of the selectivity of Bti and Bs. However, there is minimal discussion of impacts to non-target Dipterans. Also, Hershey et al. (1998) showed that Bti can have effects upon the food web and change predator-prey dynamics.
2. On page ES-116 and in a few other sections (page 957) the DGEIS discusses how the potential for aquatic toxicity for methoprene is virtually non-existent due to its rapid degradation in surface water. There is no discussion, however, of what it breaks down into. There are many pesticides whose daughter compounds or metabolites are more toxic than the parent compound.
3. In the discussion of Impacts on page ES-119, amphibians are not listed among receptor groups in terrestrial habitats. Certain amphibian species spend considerable portions of their life cycles in upland habitats, including some rare, threatened and endangered species. Accordingly, this should be accounted for in this section.

4. On pages ES-122 through ES-129 there is a discussion about the Results of the Ecological Risk Assessment. This risk assessment determined that methoprene, Bti, and Bs had no ecological risks based on HQ values. These HQ values are based on estimated exposure concentrations of the larvicide compared to known toxicity reference values based on LC50 and LD50 tests. The HQ value basically states that the larvicides in question, at the concentrations estimated to be found in the environment after treatment, will have little to no direct lethal toxic effects on the subject organisms. However, the Ecological Risk Assessment does not address potential long term stress to the organism and possible reduced survivorship or fecundity, synergistic impacts with other stressors, or the toxicity of the breakdown products of the larvicides.

ES-5.2 Other IPM Alternatives (pp. ES-163 to ES-175)

On page ES-165 the document states that monomolecular films, when used according to the label, pose minimal risks to the environment or humans. They do not explain why they are not used in Suffolk County.

Volume 2 of 7:

Section 1: State Environmental Quality Review Act Considerations

1.2.2 Water Management Project Criteria (pp. 10 to 11)

1. The criteria provided on page 10 are too general as to provide any utility in determining the degree of environmental review required for future site-specific projects. More specific performance standards should be listed.
2. The proposed 15-acre threshold should be reduced to 10 acres to coincide with the already existing, well-established Type I threshold found in the SEQRA regulations.

Table 1-3: Wetlands Subcommittee Attendees and Participants (p. 21)

Karen Graulich of NYSDEC should also be listed in this table.

Volume 2 of 7:

Section 2: The Long-Term Management Plan

2.1 Existing Program (pp. 33 to 42)

On page 39 the text discusses “waivers” issued by NYSDEC. Please see prior comments on Executive Summary in which the Department notes it does not issue “waivers.”

2.2.3 New York City (pp. 50 to 54)

On page 52 there is a claim that the 2001 DEIS for the New York City program determined there was a potential for impact by methoprene to non target organisms and its use was restricted to sewers and catch basins where release to surface waters would not occur. The SCVC DGEIS alleges that this decision was based on a refusal by NYSDEC in Region 2 to issue permits for wider use of methoprene. Is there any documentation to support these assertions? Why wouldn't the NYC DEIS simply state that while methoprene has minimal impacts its use is restricted by NYSDEC? Also, why would they include research that documents the impacts of methoprene and supports the decision to limit its use?

2.6 Legal Justification for Suffolk County Vector Control (pp. 96 to 98)

This section should discuss State Public Health Law and County Law authority for Suffolk County to enter onto and conduct mosquito control activities on lands owned by other governmental entities including towns, the State and the Federal government and whether prior permission from these other governmental entities is required.

2.7 Potential Legal and Other Constraints on the Long-Term Plan (pp. 99 to 138)

Under Section 2.7 there should be some discussion of Endangered Species statutes (State and Federal) in regard to legal constraints. Specifically, all those state-listed species identified in Table 3-2 as Endangered, Threatened or Special Concern cannot be taken without a permit from the Department. Roseate terns and piping plover (and sea beach amaranth) are Federally listed as well.

2.7.2 Pesticide Labels (pp. 101 to 112)

It should be explained that pesticide products which meet all labeling and composition criteria assigned to FIFRA 25(b)/40 CFR 152.25(f) minimum risk pesticides are exempt from New York State pesticide registration requirements, and that these pesticides nevertheless remain classified as pesticides that are subject to all requirements relating to pesticide use, with limited exception. Those exceptions relate to the provisions of ECL 33-0701 and 33-1301(1)(a) and 6 NYCRR 326.14(a) relating to pesticide registration; ECL 33-1004 and 6 NYCRR 325.41 relating to neighbor notification, and ECL 33-1205(1) relating to filing annual reports.

2.7.3 Regulations Affecting Wetlands (pp. 112 to 113)

Under Regulations affecting wetlands on page 112, the Tidal Wetlands Act is cited incorrectly. It should be ECL Article 25, Title 1 (there is no section 25). Likewise, on page 113, the Freshwater Wetlands statute is cited incorrectly. It should be listed as ECL Article 24, Title 1.

2.7.3.2 State Regulation (pp. 117 to 123)

In the last sentence of the first paragraph on page 119 it is stated that “Emergency actions required to respond to a public health threat are exempt from regulations under Article 24.” It should be noted that Emergency Authorizations issued by the Department for adulticide applications within 100 feet of freshwater wetlands are issued via Article 24 authority.

2.10.1 Public Education (pp. 149 to 154)

This section refers to the public outreach brochure “Dump the Water.” This pamphlet contains language urging residents to "Clean vegetation and debris from edges of ponds". Many ponds in Suffolk County are Article 24 regulated freshwater wetlands. Cutting or clearing of vegetation within wetlands or within 100' of regulated wetlands requires a permit from the NYSDEC. There have been at least two Article 24 violations over the last 6 months in which the respondents produced the "Dump the Water" brochure as evidence as to why they cleared vegetation without the required permits. The pamphlet should be changed to urge residents to contact the NYSDEC and local town and or village government before conducting these sorts of activities.

pp. 138 to 253

For comments pertinent to the remaining portion of this section, please refer to Department comments on the Executive Summary and Appendices A, B and C.

Volume 3 of 7: Section 3: Suffolk County Background Information

3.1.7. Rare, Threatened and Endangered Species of Suffolk County (pp. 281 to 286)

Table 3-2 on pages 281 to 286 lists species that are tracked by Natural Heritage, but is mis-labeled as “Species of Special Concern.” Missing from this list (assuming it is a comprehensive list of all listed species in Suffolk) are Piping plover (*Charadrius melodus*), an especially significant species as it utilizes areas classified as tidal wetlands) and Northern cricket frog, *Acris crepitans*, which is another endangered species and which although absent for a number of years has been positively identified in an area of the north shore of western Suffolk County.. Also missing from the list are the Osprey (*Pandion haliaetus* - *Species of Special Concern*), Eastern Hognose Snake (*Heterodon platyrhinos* - *special concern*), Marbled Salamander (*Ambystoma opacum* - *special concern*), Blue-spotted salamander (*Ambystoma laterale* - *special concern*), Eastern Spadefoot Toad (*Scaphiopus holbrookii* - *special concern*), Spotted Turtle (*Clemmys guttata* - *special concern*) and Eastern Box turtle (*Terrapene carolina* - *special concern*). Although perhaps not as relevant to this project as the other species, it is noted that marine mammals and sea turtles are not listed.

Volume 4 of 7:

Section 5: Suffolk County Wetlands Background Information

5.1 Introduction (pp. 487 to 488)

At the bottom of page 487, the document states that NYSDEC regulates freshwater wetlands of 12.6 acres. This should be corrected to 12.4 acres.

5.2 Introduction to Suffolk County Salt Marshes (pp. 488 to 489)

The last paragraph on page 488 discusses the loss and conversion of vegetated tidal wetlands. The Department cannot state strongly enough that the loss of vegetated wetlands is a major concern and is occurring throughout Long Island, the east coast and many other areas in the country.

5.3 Impacts of Mosquito Control ditching on Salt Marshes (pp. 489 to 497)

1. In the first sentence in the second paragraph on page 494, the document states that ditching “seems to have fostered *S. Patens* expansion in some areas (Redfield, 1972): but then cites a reference which seems to contradict this statement in which it is stated “At Gilgo, an unditched area has a measurably higher *S. patens* to *S. alterniflora* area ratio than a ditched area did (Merriam, 1974).” It seems that either the result cited by Merriam were recounted incorrectly (i.e. the unditched area should have been cited as having a lower *S. patens* to *S. alterniflora* area ratio) or there should be a transitional phrase, such as “However” or “Conversely” at the beginning of the sentence which cites Merriam.

2. In the second paragraph on page 496 of the document it states the following:

“In some instances, storm water management systems have been designed so as to discharge directly to the marsh or to ditches in the marsh. Generally, such connections are targeted for remediation through the USEPA Phase II storm water planning process (NYSDEC, 2001), although in some instances, as in Mastic Beach, it is difficult to determine what Alternatives might exist.”

It would be more accurate to change this statement to the following:

“In some instances, storm water management systems have been designed so as to discharge directly to the marsh or to ditches in the marsh. Generally, such connections may be targeted for remediation through the USEPA Phase II storm water planning process if it is determined as part of the MS4 permitting process that such connection are contributing to a contravention of water quality.”

5.4 Salt Marsh Functions, Values and Health (pp. 497 to 501)

1. The Natural Heritage reference salt marshes described in the second paragraph on page 500 should be identified and their qualities and characteristics discussed in more detail.
2. The numbers and thresholds listed in Table 5-2 on page 500 (“Proposed first-order indices for marsh health in Suffolk County”) should not be viewed as anything but a starting point for further discussion and review. Indices and evaluations of marsh health must be continually assessed and reassessed based on current research and information. Additionally the indicators and evaluations necessary may vary depending on the particular wetlands in question (please refer back to the same site specific, case-by-case points the Department made in other sections of this comment letter).

5.5.2.3 Terrestrial Species (pp. 520 to 522)

In regard to the discussion of diamondback terrapins in the latter half of page 521, it is suggested that Matthew Draud of C.W. Post College of Long Island University be contacted as well for additional research on this species, in particular in regard to habitats occupied by juveniles.

5.5.3 Mosquitoes in the Salt Marsh Ecosystem (pp. 524 to 528)

This section and subsequent sections do not touch upon the nature of native salt marsh mosquitoes as being an inherent part of tidal marsh ecology. Did any of the studies cited discuss specific mosquito population densities in what would be considered healthy, well-functioning and/or unditched (e.g. “pristine” marshes)? Did any of the studies cited discuss the ecological implications of reducing a native mosquito population in the marsh below a “naturally-occurring” population density?

5.7 Background Information on Open Marsh Water Management (OMWM) (Progressive Water Management) (pp. 530 to 573)

Although this section provides a survey of a large amount of literature, it is noted that quite a number of the references were contained in specialized journals and publications concerning mosquito control. This included such publications as the New Jersey Mosquito Control Association, Northeastern Mosquito Control Association, Proceedings of the New Jersey Mosquito Extermination Association, Journal of the American Mosquito Control Association and Mosquito News. In the various examples of OMWM and restoration projects cited, it would be useful to note the type and extent of project conducted, the parameters which were monitored, the duration for which they were monitored, the degree of pre-project and post-project monitoring, goals and objectives and how these compare against those for the Wertheim Early Action project. For example, were the primary goals and measures of these projects a reduction in adult mosquito production and larviciding or were at least some of these more broad based in their intent (e.g. mosquito reduction coupled with improvements to marsh health, function and quality)?

5.7.4.2 On the Vegetated Marsh (pp. 555 to 561)

In the last sentence on page 558 which carries over to the top of page 559, it is stated that *“Observations of Long Island marshes treated by ditch plugs show that some vegetation can be lost due to the expansion of surface water area; however, the expansion of the surface water area appears to stop after several years.”* But, was the vegetation lost replaced elsewhere within the treated marsh or was there an overall net loss of marsh vegetation?

5.8.1 Introduction (pp. 573 to 579)

The first sentence at the top of page 577, states: “Freshwater wetlands that are smaller than 12.4 acres in size are administered under 6 NYCRR Part 644.” This should be corrected to state: “Freshwater wetlands that are smaller than 12.4 acres in size may be regulated and mapped by the Department pursuant to 6 NYCRR Part 664.” All freshwater wetlands designated by the Department are administered and regulated pursuant to 6 NYCRR Part 663.

5.8.3 Generalized Distribution of Fresh Water Wetlands in Suffolk County (pp. 600 to 608)

The inclusion of McKay Lake in a list of coastal plain ponds on page 604 is questioned as it is believed this water body is anthropogenic in origin. Does its shoreline contain characteristics of a coastal plan pond?

5.10 Primary Study Areas and Wertheim National Wildlife Refuge OMWM Demonstration Project Site Descriptions (pp. 612 to 614)

Labeled maps and aerials for each individual site should be included as it would be helpful in understanding the orientations and locations of certain features, conditions and vegetational associations.

5.10.4 Captree Island West (pp. 624 to 629)

Please explain why no dissolved oxygen data is provided for this site.

5.10.8 Pepperidge Hall (pp. 645 to 648)

At the top of page 647 the document states that salt panne P1 has the highest temperature and salinity and lowest dissolved oxygen. However, Table 5-27 indicates this is not correct and shows that P1 has the highest dissolved oxygen at 13.5 mg/L as well as the fact that ditch D4D had the highest salinity (26.4 ppt as opposed to 18.3 for P1) and the same temperature as P1 (19 C). Please address this discrepancy.

5.10.21.1 Location, Size and Ownership (pp. 704 to 708)

The sixth sentence on page 706 discusses tidal variation “in the nearby Great South Bay at Moriches Inlet...” The name of the bay should be corrected to Moriches Bay.

Volume 5 of 7:

Section 6: Early Action Projects

6.1 Wertheim National Wildlife Refuge Open Marsh Water Management Demonstration Project (pp. 734 to 746)

The first sentence in the second paragraph on page 743 states “Anecdotal evidence shows that the project has been a major success.” As stated previously, such an implication is premature as the first phase was completed just over 1 year ago and the second phase was completed less than 4 months ago. A number of years of comprehensive monitoring must be conducted before such a conclusion can be stated.

6.5 Wertheim National Wildlife Refuge-Seatuck National Wildlife Refuge Marsh History Determination Project (pp. 772 to 788)

Diagrams and aerial photos should be provided which show the location of the transects utilized.

6.5.3 Results (pp. 780 to 783)

Data discussed on these pages should also be placed in tabular form.

Volume 6 of 7:

Section 7: Impact Assessment of the Long-Term Plan

7.6.1 Introduction (pp. 877 to 883)

In the second-to-last paragraph on page 881 the document states that as a result of the Wertheim Early Action project, “...natural resource values clearly improved.” As stated in earlier comments, this assessment is premature.

7.6.2 Long-Term Plan (Wetlands Management Plan) Impact Assessment (pp. 883 to 943)

Department comments made previously in regard to BMPs as well as those rendered in regard to the plans found in Appendices A, B and C, should also be applied to this section.

BMP 9. Small (500-1000 sq. ft.) Fish Reservoirs in Breeding Areas (pp. 910 to 915)

1. In this discussion the County recognizes that in many cases this is wetlands alteration - the creation of a condition that did not previously exist, especially when done in conjunction with filling of *Spartina patens* pothole areas. The county further makes the assumption that increased surface water on the marsh is good. This remains to be demonstrated through monitoring in areas where it is used as a mosquito control technique.
2. In the discussion of Jamaica Bay on pages 912 to 913 it should be noted that Jamaica Bay is not unique in experiencing wetlands loss, nor are the losses there sudden. Jamaica Bay is unique on Long Island due to the severity and accelerating nature of the losses, but vegetated wetland loss is occurring throughout our marshes. It is important that marsh management for mosquito control or any other purpose not exacerbate this trend
3. The last sentence on page 913 states: “*The County also hopes that NYSDEC will locate resources to assume its role in terms of wetlands management and resource inventory work, which may allow for post-project monitoring participation.*” The Department will continue to participate in monitoring through its role in the regulatory process in which a permittee has received a permit from the Department and has been required as part of the permitting process to conduct a monitoring program. The Department’s role in this case is to ensure that the monitoring conducted complies with the monitoring program required in the permit. However, the actual monitoring to be conducted is and will continue to be the responsibility of the permittee and is the obligation of the permittee, the legally-responsible party for implementation of the permitted project, in order to comply with the Tidal Wetlands Land Use Regulations and any other applicable Department regulations. The Department cannot participate in nor conduct any aspect of a monitoring program as it is the permittee’s responsibility and to do so would represent a potential conflict with the Department’s regulatory role.

BMP 10. Break Internal Berms (pp. 915 to 918)

The Department supports the restoration of tidal flows to restricted areas.

BMP 14. Filling Ditches (pp. 925 to 928)

Section 6.8 discussed Spotted Turtle research and reported on use of ditches by this species. Accordingly, this section should also discuss impacts on sensitive wildlife species which utilize ditches.

IMA 1. Natural Processes (No action/reversion) pp. 930 to 931)

In the first full paragraph on page 931 the document discusses reversion. Yes, “reversion” can be “undone” by reopening and maintaining ditches, but without effective monitoring,

there is potential for the wetlands to become degraded and thus require a major restoration effort.

Table 7-4. Natural Heritage Program R-T-E Species in Fresh Water Environmental of Suffolk County (pp. 944 to 946)

Table 7-4 is missing a number of RTE species from this list. These include the Northern cricket frog, *Acris crepitans*, which is another endangered species and which although absent for a number of years has been positively identified in an area of the north shore of western Suffolk County. Also missing from the list are the Marbled Salamander (*Ambystoma opacum*), Blue-spotted salamander (*Ambystoma laterale*), Eastern Spadefoot Toad (*Scaphiopus holbrookii*) and Spotted Turtle (*Clemmys guttata*).

7.8.2.1.3 Conceptual Model (pp. 953 to 968)

On Page 964 amphibians are missing from the list of potential receptors in terrestrial areas. Specifically, salamanders (i.e. Tiger, redbacks, etc.) and toads (all) spend the majority of their adult life in terrestrial habitats.

7.8.2.4 Long-Term Plan Field Work Results (pp. 989 to 992)

On pages 989 to 990 in the discussion of Caged Fish Experimental Results (Larvicide), there is no data presented with the caged fish results. There should be a table that lists the sites, treatments (spray area vs. control) and measure of fish survivorship. Without data to review, the comments of the writer cannot be interpreted. How can the study conclude something that was not measured was the cause of death of anything?

Table 7-14 Critical Review of Additional Methoprene Articles (pp. 997 to 1016)

This table summarizes the technical review of 24 papers by Integral Consulting. The majority of the studies found significant impacts from the use of methoprene on a variety of invertebrate species. The consultant, hired by SCVC, summarily dismissed all the negative findings based on one of two reasons: either the fact that the study used concentrations of methoprene higher than what they claim would be normally found after treatment or based upon the finding of a study done by the Metropolitan Mosquito Control District of St. Paul Minnesota. According to the DGEIS one is supposed to ignore the findings of two dozen published and peer reviewed articles based on a single unpublished study done by a vector control agency and a literature review by SCVC's own consultant, both of which could not be considered unbiased parties.

7.8.2.6 Impacts of Application Methods (pp 1019 to 1021)

Contrary to what is described in this section the use of the helicopters themselves (not the pesticide) is a significant threat to breeding birds (with emphasis on listed species such as plover) when low overflights of breeding areas are conducted (<300 feet). The 300-foot

buffer the Department recommends for all endangered species sites applies to the presence of the helicopter at bird nesting locations as well, not just the application of the pesticide. The location of these areas should be visually apparent to the pilot due to the symbolic fencing around known nesting sites. The Department has observed the eradication of an entire black skimmer colony in a single day by helicopter activity adjacent to a nesting site in Long Beach. The adults abandoned the site completely, leaving eggs and chicks behind, after a rescue helicopter landed about 200 feet away from the site to assist a drowning victim.

7.9 Impacts of the Long-Term Plan: Part 7, Adult Control (pp. 1031 to 1139)

7.9.2 The Long-Term Plan (pp. 1032 to 1139)

In section 7.9.2, there is no realistic assessment of impacts to adult amphibians from adulticides. Amphibians are treated as aquatic organisms and are assumed to be exposed to aquatic concentrations as opposed to terrestrial concentrations. This is only true of larval phase juveniles. As all adult amphibian species breath air and many are fully terrestrial, it is inappropriate to use water concentrations instead of air concentrations. This needs to be addressed.

Appendix A: Long-Term Plan

Executive Summary

1. The first paragraph on page ES-2 discusses the creation of a Wetlands Screening Committee. The Department recognizes the potential value of the Screening Committee, with the provision that it is understood that all marsh management projects will continue to be reviewed on a site-specific basis, that the Department will continue to fulfill its regulatory role pursuant to the Tidal Wetlands and other applicable State regulations and that monitoring will remain an important component of any project.
2. In the last paragraph on page ES-2 the document states that 80 acres of salt marsh were “restored” at Wertheim National Wildlife Refuge.. It is too early to declare the Wertheim project a success in terms of the enhancement of wetlands values. This will be determined through the long-term monitoring.

Overview of the Plan (pp. 1 to 17)

1. On page 7 (the first page of Overview Table 1) the acronym “MIR” in the last row should be defined in a footnote at the bottom of the page.
2. On page 16, the Plan makes reference to the Caged Fish Study, stating that the study found no impacts to caged fish or shrimp from methoprene applications. However, it is important to note that implementation of this study, especially in the field, may have sufficient flaws as to make some conclusions questionable.

Goal 2 (pp. 27 to 28)

1. The wording in the first sentence of Objective 1 on page 27 should be changed from “foster biodiversity” to foster quality and function.
2. The last sentence in Objective 1 states that the Plan will also seek to reduce invasive species, especially Phragmites. Are there projections on how much *Phragmites* will decrease? How will it be monitored?

1.6 Legal Authority for Mosquito Management (pp. 41 to 43)

On page 43, reference is made to the Suffolk County Charter in which it is stated that Suffolk County Vector Control “...shall have the power and authority to enter without hindrance upon any and all lands within the county for the purpose of performing acts which in its opinion are necessary and proper for the elimination of mosquitoes and other arthropods, provided that such measures are not injurious to wildlife.” In a later section of the same page, an additional reference to the Suffolk County Charter states that Suffolk County Vector Control has additional authority to enter any and all lands within the county. However, it is not clear as to both State Public Health Law and County Law authority for Suffolk County to enter onto and conduct mosquito control activities on lands owned by other governmental entities including towns, the State and the Federal government and whether prior permission from these other governmental entities is required. Authority given to the County to enter onto such lands, especially via State Public Health Law, should be clearly discussed and cited. In addition, if such authority does exist, how does this interact with pre-State Constitutional authority most Suffolk County towns have over underwater lands as well as tidal wetlands?

2.1 Public Education (pp. 44 to 50)

The third paragraph on page 48 states that “...poor maintenance of catch basins and other stormwater systems...is not in compliance with United States Environmental Protection Agency (USEPA) Phase II regulations.” This is not entirely accurate as only those stormwater systems which are contributing to a contravention of surface water quality would be targeted for some type of compliance.

3.1 Background (pp. 53 to 54)

Definitions for each should be incorporated into the glossary at the beginning of the Executive Summary (Volume I).

4.2 Household and Institutional Source Reduction (pp. 84 to 91)

On page 88 it is stated that the fathead minnow is not native to Long Island but "is established in all waterways throughout the County." It is correct that this species is not native to Long Island, but the Department disagree sin its degree of establishment on the Island. In over two decades of

field work conducted by the Region 1 Freshwater Fisheries Unit on Long Island, the unit has never collected a fathead minnow from the wild on Long Island. Therefore it is believed that they are neither ubiquitous nor well established in Long Island waters. Despite this incorrect assessment of the extent of fathead minnow distribution on Long island, the use proposed for them is reasonable and acceptable.

4.3 Water Management (pp. 91 to 118)

1. While in this section the County has discussed some of the habitat values that may be affected by its proposed Management Plan, vegetated marshes have several values and functions, including but not limited to, marine food production, cleansing the ecosystem, and storm and flood protection, all of which should be noted.
2. The goal of promoting quality and function should replace that of fostering biodiversity.
3. In the discussion of Progressive Water Management on page 95, in regard to ecological benefits, emphasis is placed on increasing “overall marsh habitat diversity and wildlife values” as well as improving water quality and improving “water fowl and wading bird habitat due to greater open water area.” These statements express the dangers of focusing narrowly on just certain aspects of tidal wetlands. Accordingly, all values of tidal wetlands and the need to maintain and enhance quality and function should be the overarching goals here.
4. At the top of page 96 it is stated that "the State issued a permit to the County contingent on a new County commitment to conduct monitoring..." A permit was not issued to the County. The permit (1-4722-00392/00038) was issued to the US Fish and Wildlife Service (USFWS), as the landowner of Wertheim and it is USFWS, as the permit holder, which is required to do monitoring and provide documentation. Furthermore, the discussion in this paragraph implies that an enlightened application was submitted to the State at the initiation of the project development which is not the case. This section fails to note that the County developed the initial proposal at Wertheim which was to undertake “test plots” of various ditch plugging techniques at the Refuge which had no clear goals or objectives in terms of marsh restoration. The County objected to the State’s recommended pre- and post-project monitoring to assess impacts and this initial project did not receive Department support. Subsequently and conversely, the land managers of the Wertheim Refuge, the US Fish and Wildlife Service, developed a new proposal with specifically identified goals and objectives and a monitoring plan for project success. Each aspect of the project included a specific rationale. For example, placement and location of each newly-created ditch or “channel” was clearly supported and was coupled with the proposal for no net loss of vegetated marsh surface – all of which were missing from the County’s proposal. The US Fish and Wildlife Service project was further supported by the agreement that long-term monitoring was an essential component of the project to identify and, if required, correct any adverse impacts that could potentially arise and to appropriately measure project success.

5. The numbers and thresholds listed in Table 19 on page 97 (“Proposed first-order indices for marsh health in Suffolk County”) should not be viewed as anything but a starting point for further discussion and review. Indices and evaluations of marsh health must be continually assessed and reassessed based on current research and information. Additionally the indicators and evaluations necessary may vary depending on the particular wetlands in question (please refer back to the same site specific, case-by-case points the Department made earlier in this letter).
6. The plan should discuss how it will respond to use of ditches by certain significant species, such as the Spotted Turtle, especially when ditches used by such species are to be altered or filled.

4.4 Source Reduction Summary (pp. 118 to 119)

See prior comments pertaining to Table ES-5 in the Executive Summary (Volume I)

5.2 Vertebrate Predators (pp. 122 to 124)

Fathead minnows are discussed again in the first full paragraph in this section. As stated previously, fathead minnows are neither ubiquitous nor well-established in Suffolk County. Accordingly, the statement should be corrected.

5.3 Non-vertebrate Control Agents (pp. 124 to 125)

This section provides a limited discussion of the potential for use of certain invertebrate organisms including nematodes, protozoans and copepods. The plan should note whether or not these species are native to Suffolk County and should discuss issues related to release of non-native species for control purposes.

6.5 Selected Compounds (pp. 139 to 144)

In the sections regarding methoprene, there should also be a discussion of its various products of degradation and their potential effects, particularly on amphibians.

7.2 Alternatives to Adulticides (pp. 158 to 165)

1. In the first full paragraph on page 161, under the discussion of barrier treatments, the document states that “in most states, these products are not classified for regulatory purposes as pesticides, so posting, notification, and reporting laws do not apply.” This is misleading. This DGEIS relates specifically to the use of mosquitocides in New York State, and so should therefore reflect New York State requirements. The Department is already addressing violations of pesticide-related laws, rules and regulations that stem from a general

misunderstanding of the environmental requirements associated with minimum risk pesticide distribution and use. Such an overly-generalized statement as that proposed would not help the situation.

2. In the discussion of traps on page 164 it should be indicated that the attractive lures that are used in traps, and that employ the active ingredient octen-3-ol, are pesticides that are subject to pesticide registration requirements. These include, for example, *Flowtron Octenol Mosquito Attractant* (EPA Reg. No. 34473-4), *Dragonfly Octenol Lure* (EPA Reg. No. 70909-3), and *Mosquito Magnet Octenol Biting Insect Attractant* (EPA Reg. No. 72563-1).

7.6 Application Methods (pp. 196 to 202)

In the last paragraph on page 197 and third paragraph on page 199, the plan refers to waivers issued by the Department from the Freshwater Wetland regulations. The Department does not issue waivers but does issue Emergency Authorizations, an expedited form of permit, when the agency has determined that an emergency exists, as it is defined in the Department's Uniform Procedures regulations.

8.2 Professional Education (pp. 219 to 220)

The following statement on page 219 is not correct: "Pesticide applicators are required to acquire 18 hours of continuing education every three years in order to maintain licensing." The proper term to use is "certification," not "licensing." The number of continuing education credits that are required to be obtained in order for an individual to be eligible for recertification varies depending on the category or subcategory in which that individual is certified. For example, the six-year recertification cycle requires that commercial pesticide applicators certified in Category 8-Public Health Pest Control obtain 16 credits within a six-year period. Individuals certified in Subcategory 5B-Aquatic Insect and Miscellaneous Aquatic Organisms Control are required to obtain 16 credits within a six-year period. Individuals certified in both Category 8 and Subcategory 5B, as many individuals who work in the county vector control program are, are required to obtain continuing education credits in both areas. It would be worthwhile to include a statement in the DGEIS and the plan that refers the reader to the Department's Internet website for additional information relating to recertification requirements.

Appendix B: Wetlands Management Plan

1. One of the major premises of this report is that the alteration of wetlands (plugging of ditches or OMWM, for example, will result in *improved* or *enhanced* fish habitat. While this may be potentially true in certain areas where wetlands areas have limited tidal flow or are otherwise degraded, for functioning marsh areas there is little or no evidence presented by the authors to support this contention. Most of their comments relative to this premise are speculative or undocumented.
2. On page 1, first sentence in paragraph 1, the text states that progressive water management will be implemented in over 4000 acres of tidal wetlands and that 4000 acres will undergo

reversion. It would be better (and more accurate) to suggest that there are 4000 acres that are candidates for OMWM and that 4000 acres are proposed for reversion. Each marsh needs to be assessed on a case-by-case basis to determine whether the type of management best promotes marsh health while providing effective mosquito control. In some cases, these goals may not be entirely compatible. Even where reversion is proposed, it is possible that wetlands functions can be lost or altered if fresh water retention and changes in hydrology lead to an increase in *Phragmites* or loss of marsh to upland. (This is recognized in the tables)

3. This report is poorly referenced, if at all. There are no formal citations, and there are many references to studies or findings that are either not documented or unclear as to the source of the assumption or finding. For example, on p.ES-2. the report implies that an early demonstration project at the Wertheim National Wildlife Refuge was successful and that it not only controlled mosquito breeding but also resulted in "...enhancing wetland values such as biodiversity." The document further claims the Wertheim project demonstrates that the alteration of wetlands for 'Progressive Water Management (OMWM)' will improve or enhance fish habitat. The document does not include a citation for the Wertheim study nor is the study report itself included as an appendix. A generic literature review would be helpful as an appendix, but not useful in terms of supporting statements. Specific citations need to be added throughout the text.
4. While the Department can agree with many of the concepts presented for wetlands management - the call for a reduction in the amount of pesticide usage, preservation or increase in vegetated wetlands acreage and a reduction in the amount of *Phragmites*, the Department believes that the reasoned weighing of the pros and cons of the various management techniques that is shown in the tables is not adequately reflected in much of the text. The document has a tendency towards conclusory statements, with an overlying assumption that Suffolk County's proposals represent the best wetland management techniques in all cases. It is difficult to find wording that clearly states that there are circumstances in which mosquito control and the need to preserve the values and functions of wetlands may have different and contradictory management needs. This is especially true in cases where tidal wetlands are functioning well, yet are breeding mosquitos. In these instances the use of Open Marsh Water Management or other manipulations to control mosquitos constitutes marsh alteration, not restoration. Thus, while there may be benefits for public health or welfare, an action may not be beneficial to the marsh. This is why the Department must carefully weigh any proposal for wetlands management to ensure that there are minimal impacts and sufficient monitoring to evaluate whether the goals of the project are being met and whether the values and functions of the marsh are being preserved.
5. While it's important to recognize the essential public health objectives of SCVC, which are appropriately detailed in these documents, the Long-Term Wetlands Management Plan fails to provide a suitable environmental impact assessment of past or planned wetland practices. Much of the data and justifications presented in these documents are vague and/or unsubstantiated.

Executive Summary (pp. 1 to 6)

1. In the discussion second paragraph on page 1 the concept of progressive water management is introduced. The 17,000 acres of vegetated tidal wetland in Suffolk County

are a mixture of privately and publicly held properties. Therefore, the type and extent of wetlands management will depend on landowner approval. This paragraph also states that progressive water management will be implemented in the 4000 acres currently treated with larvicides. Progressive water management may be considered, but the actual management technique used will be assessed on a case-by-case basis based on a reasonable balance between marsh health and mosquito control needs. The first paragraph also mentions restoration, but not alterations. In some cases, mosquito control could result in an alteration of a well functioning marsh and thus could not be called "restoration".

2. In the discussion on page 1 it is not clear that the acreages provided in those discussions are not actually under County ownership until much later in the document. Land ownership will be an exceedingly important aspect to any proposed future action, maintenance and/or monitoring of wetland properties. From the Department's regulatory viewpoint, project authorization will require the long-term cooperation and participation of the landowner and the landowner should be involved in all aspects of project development. It would be appropriate to clarify the issue of ownership as soon as it is introduced in the document by providing the approximate acreages or proportions of acreages being discussed that are under county, town/local municipality, state, federal and private ownership. The document should clarify the specific acreage of wetlands under County ownership that is proposed for future action under this plan. Similarly, landowners should be involved in all project stages.
3. In the second paragraph on page 1 the wetlands management plan emphasizes the goal of reducing larviciding applications. However, would not the County be interested in reduction of adulticide applications as well? This too should therefore be discussed.
4. In the last paragraph on page 4, the Plan's use of the Wertheim National Wildlife Refuge as a successful example of a progressive and holistic approach to water management by SCVC is inappropriate and misleading. Project implementation began just over one year ago and the second phase was only completed earlier this year. Complete post-project monitoring data related to this project must be completed and reviewed before any such assessments can be made that the project is a success.
5. In the first paragraph on page 5, the County states that "the state issued a permit to the County contingent on a new County commitment to conduct monitoring..." A permit was not issued to the County. The permit (1-4722-00392/00038) was issued to the US Fish and Wildlife Service (USFWS), as the landowner of Wertheim and it is USFWS, as the permit holder, which is required to do monitoring and provide documentation. The Department would be unlikely to consider permit applications for similar future projects from the County unless they are the landowner. Third party compliance with monitoring requirements would be essentially unenforceable without landowner permission. The only way to have long term conditions and requirements that the Department can enforce through the permit process is to make the landowner responsible for the activities.

Similarly, monitoring requirements for the Wertheim permit extend for the life of the permit - ten years, not three. As all parties agreed prior to issuance, the Department is interested in assessing long term impacts not just short term changes. The problem that remains with this project is the limited pre-project data that is available. Again, all parties agreed that pre-project data requirements will have to be improved (e.g, minimum of three years) for any future project under consideration.

1 Goals and Objectives (pp. 7 to 19)

1. In the bulleted discussion of *Ochlerotatus sollicitans* on page 8, the last sentence states that “Prior to destruction of many salt marshes and the development of screens and air conditioning, this mosquito species inhibited development in coastal areas along the East Coast.” As was noted in general for the entire plan, no references or citations are provided to support this conclusion. Such references must be provided.
2. At the bottom of page 9, the Plan states “Killifish so voraciously feed on mosquito larvae that it is a truism that sighting killifish mean mosquito larvae will not be found, and if larvae are present, the fish must be absent or unable to reach mosquito breeding locations.” Supporting references for this “truism” must be provided.
3. In the second paragraph on page 12 an additional consideration which should be added is that in wetlands inspections, degraded structures that may be causing wetlands degradation should be reported.
4. In the second full paragraph on page 14, it is stated that the Peconic Estuary Comprehensive Conservation and Management Plan proposes “...to stop the maintenance of existing mosquito control ditches.” The Peconic Estuary Program Comprehensive Conservation and Management Plan does not call for the end of existing ditch maintenance. It states that no reopening of filled ditches should occur and calls for agency cooperation on OMWM projects where they may benefit wetlands.

1.4 Goals (pp. 15 to 17)

In Goal number 2 on page 15, the phrase “*foster marine and estuarine biodiversity and a mosaic of ecological communities*” should be changed to “*foster quality and functions.*”

1.5 Objectives (pp. 17 to 19)

1. In the discussion of Objectives for Goal 1 (Reduce Mosquito Populations) on page 17 Objective 1 calls for maintaining salt marsh mosquito populations at 1996-2004 levels. Is this a reduction?
2. In the discussion of Objectives for (Preserve or increase acreage of coastal wetlands, including vegetated tidal wetlands, and to foster marine and estuarine biodiversity and a

mosaic of ecological communities) on page 18 the wording should be changed from “*foster marine and estuarine biodiversity*” to “*foster quality and function.*” As discussed above, managing for biodiversity may involve habitat creation and/or alteration and may not be consistent with good management for some healthy marshes. The Department is not convinced that habitat alterations for biodiversity or to create a mosaic of ecological communities has been demonstrated to be the best management practice in all cases.

2. Operational Structure

In the discussion of principles under which a salt marsh management project will be evaluated at the top of Page 20 an addition bullet should be added which states: “is monitored to assess effectiveness in meeting environmental and mosquito control goals.”

Figure 1 - Wetlands Management Plan (p. 21)

1. The correct listing should be Bureau of Marine Resource, not Division.
2. The organizational chart puts all the responsibility for monitoring on the landowner/stakeholder (with potential County assistance). Doesn't Suffolk County as the implementor have a responsibility here, especially for mosquito monitoring?
3. The organizational chart indicates that New York State permitting agencies will be members of the Screening Committee. It should be noted that approval by both the Commissioner of the New York State Department of Environmental Conservation and/or the Governor of the State of New York may be required in order for the Department to participate in this entity. Also, the potential conflict that participation may pose for with the Department's regulatory role will need to be rectified, as was done for its participation in the TAC.

2.3 Long-Term Plan Wetlands Subcommittee (pp. 25 to 29)

In the discussion of responsibilities assigned to the Screening Committee, the Committee should also review project monitoring information.

2.6 Permitting (p. 34)

In the first paragraph of the Permitting section, it is stated that in some situations projects on federal lands or sponsored by federal agencies may be exempt from state permits. All projects, even those proposed by federal agencies will require state permits. This has been the case for all federal agencies whether they be Fire Island National Seashore/National Park Service, US Fish and Wildlife Service, US Coast Guard and others. Even Brookhaven National Lab, under the control of the US Department of Energy, obtains “equivalency” permits from the Department.

2.8 Monitoring (pp. 35 to 36)

1. In the second paragraph of this section on page 35, remote sensing is suggested as a means of quantifying various measures of marshes. Monitoring techniques other than remote sensing should be outlined. In addition, what are the strengths and limitations of remote sensing? How often must it be done? The Department suggests a minimum of every 5 years.
2. In the discussion of the level of effort in the third paragraph under this section on page 35 it should be noted that the level of effort required will depend not only on the size and scope of the project, but also on information generated from prior projects.
3. There is little or no plan to monitor or evaluate impacts on finfish populations. Since a key element of an OMWM plan is the reliance on fish to control larval mosquito populations, the potential impacts of wetlands alterations on finfish populations (and not just *Fundulus* sp.), should be a high-priority component of any evaluation or monitoring plan.

3 Action Hierarchy (pp. 37 to 69)

Table 2 (Management Activities for Minor Impacts) on page 41 and Table 3 (Management Activities for Major Impacts) on page 42 repeatedly state that the listed BMPs will provide the following benefits: ‘enhance fish habitat’, ‘improve fish habitat’ and ‘allow higher fish populations’. There is little or no explanation or even a description of how these practices might be expected to result in these improvements, nor are there any studies cited that support these assumptions. Interestingly enough, ‘Interim Action IMA1 Natural processes (No action reversion)’ in Table 4 (Interim Management/Ongoing Maintenance Actions) on page 43 does not claim to provide similar enhanced fish habitat benefits. Isn’t it at least possible that the reversion alternative might actually improve finfish habitat and productivity?

4 Implementation (pp. 44 to 46)

1. In regard to the discussion in Consideration 1 on page 44, it should be noted that the marsh losses in Jamaica Bay are not sudden. It is a long-term trend that is accelerating rapidly. This is not a local aberration limited to Jamaica Bay. Marsh loss has also been documented by the Department in the South Shore, Peconics and Long Island Sound. Since many of the Plan’s proposed actions for wetland water management are likely to involve the potential loss of vegetated marsh habitat (e.g., plugging projects routinely result in the loss of vegetated areas as does the creation of pannes and ponds), the Department will continue to review each project proposal for its anticipated impacts as well as benefits.
2. Consideration 2 on page 44 is a reasonable statement. The applicants for these type of activities should be expected to provide evidence that wetlands alterations, even if they are intended to minimize the impacts of pesticide use, will not ultimately result in potentially greater impacts on finfish diversity or productivity.

5 Resource Allocations (p. 47)

The County continues to indicate that "one interpretation" of the Tidal Wetlands Land Use Regulations is that digging ponds and filling in the marsh can be considered GCp (generally Compatible - permit required). The County is well aware that this is not the regulator's interpretation of such activities. Dredging new ponds in vegetated marshes is a presumptively incompatible activity (PIp). Proposals to place fill may be consider presumptively incompatible or incompatible (when disposing of dredged material). Any applicant proposing to conduct these regulated activities in a tidal wetland will, appropriately, have a higher burden of proof to show that authorization of such a project would be justified

6 Timeline (pp. 48 to 49)

In the third paragraph on page 48, the document discusses the development of "practical permitting and approval processes" with the Department and other agencies. The Department would be willing to discuss the development of such measures but not if there is a goal of eliminating the extent and duration of data collection and monitoring to a point at which it does not provide the Department with sufficient information to assess impacts of projects, especially long-term impacts of major projects, and the ability to measure the success of a project, especially its ability to at least maintain or better to enhance or improve values and functions. It should be noted that the Department believes the current system works well as long as sufficient information is provided by the applicant to enable the Department to make a decision.

Appendix C: Management Plan Salt Marsh Management Best Management Practices Manual

1 Introduction (pp. 5 to 15)

1. In the eighth sentence of the second paragraph on page 7 it is stated that "...it is also clear that ditches allowed more access to the interior of the marsh by insect-consuming fish..." This report focuses disproportionately on the impacts of past marsh alterations on insectivorous fish. It is well-known that many species of fish, particularly small forage species and juveniles of many commercially and recreationally important species, also inhabit the creeks, ditches and edge areas of marshes. These fish also move onto and off of the surface of the marsh with tidal flow, using the marsh surface for feeding, shelter from predation, and breeding. The report needs to adopt a broader perspective.
2. The report goes on to say in the ninth sentence in the second paragraph on page 7 that "...on the south shore of Suffolk County, the predation by fishes is likely to have been much more effective for mosquito control than any effects from draining." If this statement is accurate, it becomes even more essential that we understand the interrelationship between mosquitoes and various fish species and how these wetlands alterations might affect them. Many forage fish and juvenile finfish are known to be omnivorous or exhibit shifts in feeding and target prey species seasonally and over time. What species and life stages inhabit and use marsh surfaces, ditches and creeks? How would these fish species be affected by marsh surface alterations, particularly the construction of small ponds or spur ditches for OMWM?

Do any of these other fish species feed on mosquito larvae? What do *Fundulus* feed on when larval mosquitoes are not available? A recent review of the food habits of *Fundulus heteroclitus* states that “Larval, juvenile and adult *F. heteroclitus* feed, apparently opportunistically, on small crustaceans, annelids and gastropods...All life-history stages depend to a large degree on marsh surface food sources.” For *Fundulus majalis*, the review reports they consume “a wide variety of prey including molluscs, crustaceans, fishes and insects.” (see Bigelow and Schroeder, 2002). *Fundulus* that become trapped in isolated small ponds or spur ditches and are unable to move on and off the marsh with the tidal flow may lose access to their preferred feeding areas on the marsh surface and in deeper connected ditches. Fish trapped in these ditches, particularly in the higher marshes that may not be inundated regularly, may shift to feeding on less preferred and/or less nutritional forage.

3. The discussion beginning at the bottom of page 7 and continuing on to page 8 references past OMWM work conducted at Wertheim and Seatuck. In regard to Seatuck, it appears that the number of mosquitoes ultimately increased after the OMWM project was completed. This appears to be at odds with the concept that OMWM will reduced mosquito numbers.
 4. In the third paragraph on page 10, the wording in the last sentence should be changed from “foster marine and estuarine biodiversity” to “foster marsh quality and function.”
 5. On page 11 “install shallow spur ditches “ and “create small fish reservoirs” are listed under Class II activities - those intended to have minor impacts. Both of these activities should be included under Class III activities. The impacts of small spur ditches and ponds on finfish may be substantial. While it is well known that certain highly tolerant species thrive in the extreme temperatures and salinities typical of these shallow ditches and ponds, other species of fish may become trapped in these areas as the tides recede, resulting in significant mortalities. These artificially constructed ‘habitats’ could act as sinks or death traps for some larval or juvenile fish species.
 6. In the second paragraph on page 12, Class III activities are listed - those they have the potential to result in major impacts. Listed under this category is the activity of “construct ponds greater than 1000 sq. ft.” The construction of larger ponds may be equally problematic for some fish species. Aside from trapping fish in areas in which they will be subjected to extreme temperature (winter and summer) and salinities, the larger ponds which are designed to provide waterfowl and wading bird habitat will subject these organisms to high levels of predation by piscivorous birds and waterfowl. Given the environmental and predatory conditions fish could encounter in these structures, it might be remarkable if any fish survive long enough to consume significant numbers of mosquito larvae.
 7. In the last paragraph on page 13, a threshold of 15 acres of tidal wetlands is proposed. It may be more prudent to reduce the threshold to 10 acres which then coincides with an already-established threshold of alteration of 10 acres or more for SEQRA Type I actions.
- 2 Establishing the Need and Type of Alteration (pp. 16 to 24)

Pages 16 through 24 discusses data collection and monitoring. This segment is unacceptable in terms of evaluating the impacts (pre- and post-project studies) of these wetland “management” proposals on finfish. The use of vague criteria such as “health of the marsh” based on aerial photographs and long term history will not be useful in assessing the stated goal of “fostering marine and estuarine biodiversity and a mosaic of ecological communities”. The minimal data collections segment must include data collections that address the impacts of the proposed activities on finfish species.

2.2 Pre-project Initial Data Collection (pp. 17 to 20)

1. The Natural Heritage reference salt marshes described in the second paragraph on page 18 should be identified and their qualities and characteristics discussed in more detail.
2. The numbers and thresholds listed in Table 1 on page 19 (“Proposed first-order indices for marsh health in Suffolk County”) should not be viewed as anything but a starting point for further discussion and review. Indices and evaluations of marsh health must be continually assessed and reassessed based on current research and information. Additionally the indicators and evaluations necessary may vary depending on the particular wetlands in question (please refer back to the same site specific, case-by-case points the Department made earlier in this letter).
3. On Page 19 minimal data collection for all projects designed to increase open water should include fish and wildlife surveys, particularly at sites where listed species (those which are listed by the State and/or Federal government as Endangered, Threatened or Special Concern) are known to exist. This is important for assessing the utility of the management actions.

2.3 Permits (pp. 20 to 22)

1. In the latter half of page 21, a threshold of 15 acres of tidal wetlands is again discussed. As noted previously, it may be more prudent to reduce the threshold to 10 acres which then coincides with an already-established threshold of alteration of 10 acres or more for SEQRA Type I actions.
2. In the latter half of page 21, discussion ensues concerning environmental impact review requirements for future site-specific project emanating from the plan. As noted in Volume I, Section 1.2 of the DGEIS, Section 617.10 of the SEQRA regulations discusses the nature and content of Generic Environmental Impacts Statements and notes the specific thresholds, performance standards and criteria should be established (in both the Final GEIS and Findings) for dealing with future site-specific projects. This should be cited in this document along with the four criteria that pertain to future site-specific actions after a final generic EIS has been filed.

2.4 Salt Marsh Screening Committee (pp. 22 to 23)

The first paragraph of this section on page 22 states that New York State permitting agencies will be members of the Salt Marsh Screening Committee. It should be noted that approval by both the Commissioner of the New York State Department of Environmental Conservation and/or the Governor of the State of New York may be required in order for the Department to participate in this entity. Also, the potential conflict that participation may pose for with the Department's regulatory role will need to be rectified, as was done for its participation in the TAC.

3 Best Management Practices (pp. 25 to 67)

As was stated in an earlier part of these comments, some of the assessments of compatibility of BMPs with the State's Tidal Wetlands Land Use Regulations are not consistent with the definitions and/or use categories provided by the regulations themselves. It should be noted that any project requiring a Tidal Wetlands permit must meet the standards of permit issuance regardless of whether it is classified as GCp or Pip or P. The applicant has the burden of establishing that the applicable standards are met. Activities listed as GCp are not exempt from this requirement. (Please see prior comments on Executive Summary.)

BMP 1. Natural Processes (reversion/no action) (pp. 25 to 27)

Without effective monitoring of reversion, there is potential for the wetlands to become degraded and thus require a major restoration effort.

BMP 3. Maintain/Reconstruct Existing Upland/Freshwater Ditches (pp. 27 to 29)

When this activity is conducted within the Department's Tidal Wetland jurisdiction and includes substantial reconstruction it is listed as GCp (Generally compatible activity with permit required) under Part 661. This activity requires a Tidal Wetland permit. Under 6 NYCRR Part 663 (Freshwater Wetlands Permits Requirements Regulations), section 663.4(d), Item 19 lists "constructing, expanding, or substantially modifying drainage ditches, except as part of an agricultural activity" as uses which require a Freshwater Wetland permit. Such activities occurring in the freshwater wetland itself are classified as P(X) ("Incompatible") and as P(N) ("usually Incompatible") in the adjacent area of a freshwater wetland (upland area within 100 feet of the outward boundary of the freshwater wetland).

3.2 Class II: Minor Impact (pp. 31 to 47)

The first sentence on page 31 states that "There are six management activities that result in minor impacts to a salt marsh" As has been stated previously just because the State Tidal Wetland regulations classify an activity as GCp (generally compatible) does not mean the specific action proposed to be undertaken is innocuous or does not have the potential for adverse impacts. The section goes on to state that these types of activities "...might be addressed through a general permit of some kind." A general permit for these activities is unlikely to be considered for the vast majority of such activities. Past practices and operational

history, the need for pre and post implementation data and the sensitive nature of many sites would obviate the possibility of a general permit.

BMP4. Selective Maintenance/Reconstruction of Existing Salt Marsh Ditches (pp. 33 to 36)

1. When this activity includes substantial reconstruction it is listed as GCp under Part 661. This activity requires a Tidal Wetland permit.
2. The last sentence of the first full paragraph on page 34 states “*In fact, one complaint about grid ditching is that it leads to such vigorous marsh grass growth that it makes the marsh appear like a monoculture lawn.*” This comment is not helpful - it carries the implication that the County carries a bias that a monoculture is undesirable and that management practices will lead to a vigorous monoculture are undesirable when in fact intertidal (or low) marshes are essentially a monoculture of *Spartina alterniflora*. Accordingly, this sentence should be deleted.
3. The discussion in the two full paragraphs on page 35 emphasizes the creation of habitat for killifish. As noted previously, impacts and implications for other fish species needs to be examined.

BMP 5. Upgrade or Install Culverts, Weirs or Bridges (pp. 36 to 38)

These activities are not specifically listed under Part 661.5(b) Use Categories as GCp activities. Therefore, the proposed activities must be assessed based on individual project proposals as to whether or not they are classified as GCp, P (“Permit Required”) or Pip (“Presumptively Incompatible”) activities.

BMP 6. Naturalize existing ditches (pp. 38 to 40)

1. Substantial modification of ditches is GCp. This activity requires a Tidal Wetland permit.
2. The second full paragraph on page 39 discusses the deepening and widening of ditches to provide additional refuges for fish from wading bird predators. If killifish can access these newly-created areas, so can other finfish species. At depths ranging from 6" to 36", the environmental conditions would be expected to be extremely stressful to some fish species. Accordingly, the report needs to describe the typical range of salinities, water temperatures, and dissolved oxygen (year round) that fish trapped in these ‘refugia’ would be routinely exposed to; in addition, the buildup of other potentially toxic conditions (hydrogen sulfide, ammonia?) should also be examined and discussed in the report.

BMP 7. Shallow Spur Ditches (pp. 40 to 41)

1. Construction of new mosquito ditches is GCp and not NPN (“No Permit Necessary”).

Construction of drainage ditches for other purposes (other than mosquito control or agriculture) is Pip.

2. The fourth sentence in the first paragraph of this subsection on page 40 states that the spur ditches will allow “more frequent access by killifish” and are intended to provide connections to ponds and pools which can serve as refuges for fish. Obviously, if killifish can frequent these ditches, so can other small fish. The report acknowledges (p34) that current ditches may need to be deepened to ‘provide adequate refuge from predatory birds’. At depths ranging from 6" to 36", the environmental conditions would be expected to be extremely stressful to some fish species. The report needs to describe the typical range of salinities, water temperatures, and dissolved oxygen (year round) that fish trapped in these ‘refugia’ would be routinely exposed to; in addition, the buildup of other potentially toxic conditions (hydrogen sulfide, ammonia?) should also be examined and discussed in the report.

BMP 8. Backblading and/or Sidecasting Material into Depressions (pp. 41 to 43)

1. Backblading may be considered NPN or GCp only under strict conditions and is not specifically provided for in the regulations. Sidecasting, or filling depressions with dredged material, may also be considered I (incompatible activity) or Pip in vegetated marshes and/or SM (“Coastal Shoals, Bars and Flats”)/LZ (“Littoral Zone”).
2. One of the goals cited earlier in the document is “...foster marine and estuarine biodiversity and mosaic of ecological communities.” If backblading essentially is designed to “homogenize” *Spartina patens* communities by removing a variety of microhabitats such as potholes and pannes, how does this accomplish this goal? Are potholes and pannes part of a “natural” or “healthy” marsh?

BMP 9. Small (500-1000 sq. ft.) Fish Reservoirs in Breeding Areas (pp. 43 to 46)

1. Creating fish reservoirs by excavating vegetated marsh areas is classified as new dredging since the excavation/removal of material is specifically conducted for the purpose of establishing/increasing water depth. New dredging is a Pip activity.
2. The discussion in this section notes that ponds and pools created on the marsh surface are “intended to fish refugia.” At depths ranging from 6" to 36", the environmental conditions would be expected to be extremely stressful to some fish species. The document needs to describe the typical range of salinities, water temperatures, and dissolved oxygen (year round) that fish trapped in these ‘refugia’ would be routinely exposed to; in addition, the buildup of other potentially toxic conditions (hydrogen sulfide, ammonia?) should also be examined and discussed.
3. In the first paragraph on page 44, the document states that Long Island marshes “nearly all have much less open water than is usual for natural marshes.” It then cites

studies conducted in New Jersey and New England. The document should provide more detailed information which supports these conclusions. Were these studies conducted on marshes which had never been grid-ditched or manipulated in any way in the last 100 to 150 years - were these marshes truly natural or “pristine”? Are the conditions which support New Jersey and New England marshes the same as those found in Long Island marshes?

BMP 11. Tidal Channels (pp. 50 to 52)

Installing tidal channels by excavating vegetated marsh areas is classified as new dredging since the excavation/removal of material is specifically conducted for the purpose of establishing/increasing water depth. New dredging is a Pip activity.

BMP 12. Plug existing ditches (pp. 52 to 55)

1. Plugging existing ditches with clean fill is listed as Pip since it is placement of fill in SM/LZ and/or Intertidal Marsh/High Marsh/Coastal Fresh Marsh (IM/HM/FM). Plugging existing ditches with dredged material may be considered under disposal of dredged material, which is Pip in SM/LZ and Incompatible (I) in IM/HM/FM areas.
2. Additional concerns remain that the plugging of ditches appears to result in the loss of essential fish habitat for many juvenile fish, including recreationally and commercially important species. Although this technique has been claimed to enhance fish habitat, the habitat benefits, if there are habitat benefits other than mosquito predation, are likely to be limited to only a few species of fish, particularly when ditch plugs only allow tidal inundation during storm or spring tides. Few species can survive the poor water quality that is a characteristic of plugged ditches. Similarly, many invertebrate species found in open ditches and their tidal margins cannot survive in a plugged ditch that prohibits regular flushing and normal tidal cycles.

BMP 13. Ponds above 1000 sq. ft. for Wildlife Value (pp. 55 to 57)

Creating ponds is classified as new dredging since the excavation/removal of material is specifically conducted for the purpose of establishing/increasing water depth. New dredging is a Pip activity.

BMP 14. Filling ditches (pp. 57 to 58)

1. Filling existing ditches with clean fill is listed as Pip since it is placement of fill in SM/LZ and/or IM/HM/FM. Filling existing ditches with dredged material (e.g., from the excavation of ponds) may be considered under disposal of dredged material, which is Pip in SM/LZ and I in IM/HM/FM areas.
2. The section should discuss the types of sediments which would be most suitable for filling of ditches, especially since it is unlikely that materials which mimic natural marsh

peat layers would be available. Studies of the use of such materials in filling and restoring ditches should be cited and discussed.

BMP 15. Dredge Material Removal (pp. 59 to 60)

Depending on when the spoil was placed, removing dredge spoil may be classified as new dredging since the excavation/removal of material is specifically conducted for the purpose of establishing/increasing water depth. New dredging is a Pip activity.

IMA 2. Selective Ditch Maintenance (Standard Water Management) (pp. 63 to 65)

This activity may not include substantial reconstruction. Otherwise, a permit is required.

IMA 3. Culvert Repair/Maintenance when Tidal Restrictions are Apparent (p. 65)

This activity may not include substantial reconstruction. Otherwise, a permit is required.

IMA 4. Stop-gap ditch plug maintenance (pp. 65 to 66)

If the initial permit has not expired, maintenance activities are likely to be covered by the existing permit. Otherwise, a new permit will be required for any activities including construction, filling and/or establishing plantings. Similarly, any modification of the original project will require a permit.

Thank you for the opportunity to comment.

Sincerely,

John W. Pavacic
Regional Permit Administrator

JWP/jp

cc: Peter A. Scully, Regional Director, NYSDEC Region 1
Karen Graulich, Regional Manager, Marine Habitat Protection, NYSDEC Region 1
Charles T. Hamilton, Natural Resources Supervisor, NYSDEC Region 1
Robert Marsh, Regional Manager, Bureau of Habitat, NYSDEC Region 1
Daniel Rosenblatt, Regional Manager, Bureau of Wildlife, NYSDEC Region 1

Chart Guthrie, Regional Manager, Bureau of Freshwater Fisheries, NYSDEC Region 1
Vincent A. Palmer, Pesticide Control Specialist III, Bureau of Pesticide Management, NYSDEC Region 1
Anthony Cava, Regional Solid and Hazardous Materials Engineer, NYSDEC Region 1
Karen Chytalo, Bureau of Marine Resources, NYSDEC, East Setauket
Charles DeQuillfeldt, Bureau of Marine Resources, NYSDEC, East Setauket
Kim Shaw, Bureau Supervisor, SC Department of Health Services, Office of Ecology, Bur. of Environmental Mgt.

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United States Department of the Interior

NATIONAL PARK SERVICE
FIRE ISLAND NATIONAL SEASHORE
120 2nd Street
Patchogue, New York 11772
(631) 289-4810

IN REPLY REFER TO:

July 18, 2006

L-7621(Mosquito Management Plan)

Mr. James Bragg
Chief Environmental Analyst
Council on Environmental Quality
H. Lee Denison Building
Hauppauge, New York 11787

Dear Mr. Bragg;

The NPS is very impressed with the amount of work and analysis that has gone into the Long-Term Plan DGEIS and commends the County for its efforts to decrease human health risks, restore wetlands and reduce the overall amount of adulticide and larvacide use within the county. I would also like to thank the County for the opportunity to review and comment on the Suffolk County Vector Control and Wetlands Management Long-Term Plan, Draft Generic Environmental Impact Statement (DGEIS). The National Park Service (NPS), Fire Island National Seashore (FIIS) has been involved with this planning effort since September 2002.

From the very beginning we have stated that it will be extremely important for the County to follow the NPS-National Environmental Policy Act (NEPA) guidelines and policies in order to secure a permit from the NPS to initiate any kind of adulticiding or larvaciding activities within the boundaries of the FIIS. Over the years, various scenarios involving the extent to which the plan would have to conform to NPS impact analysis guidelines have been discussed in the Technical Advisory Committee (TAC) meetings (the NPS is a voting member of the TAC).

In the final analysis, the TAC recommended, and the NPS and County concurred, that preparation of a separate plan and NEPA Environmental Assessment for the area of Fire Island within the jurisdiction of the NPS needed to be accomplished. The NPS and Suffolk County are now in discussions regarding preparation of the specific plan for FIIS.

Since a specific plan is being prepared for FIIS (which includes the William Floyd Estate in Mastic Beach), and since the NPS has no specific jurisdiction over any other lands within Suffolk County, the NPS is providing general comments regarding this DGEIS. Our main reason for providing comments is to focus on areas of the County's Plan where there might be inconsistency issues/concerns related to what the NPS plan will be proposing. We want the County to be aware that the plan developed for FIIS will be different and very possibly inconsistent with what the County Plan is now proposing for all other areas of Suffolk County.

The main reason for the differences, relates specifically to what is allowed to be accomplished within the boundaries of an NPS area based solely on NPS Management Policies. The policies, as they are now written, have strict resource protection and NEPA procedural standards. The comments below relate specifically to areas of probable inconsistency between the County Plan and what we will more than likely be proposing for the FIIS Mosquito Management Plan.

One issue that has been of major importance to the NPS throughout the planning process relates to the use of nuisance mosquito complaints as adulticiding criteria. This is one area where because of NPS Policies, mosquito management within the boundaries of the park will be inconsistent with the County's strategy. NPS policies do not allow for control of nuisance pests unless there is a specific health. Whereas the County Plan has a decision tree to allow for adulticiding without the threat of disease.

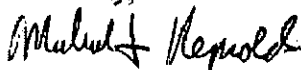
The FIIS plan will not be proposing any bio-control methods that bring in non-native species to areas of the park. If bio-controls methods do end up being proposed, it will be after an analysis is performed to ensure that 1) species used will be of the same genetic stock and 2) that increasing populations of a species will not impact existing conditions.

Larvaciding criteria may end up also being different with the park than for the rest of the County, and therefore represents another place where the County Plan will end up being inconsistent with the NPS plan.

Another area where the County Plan may be inconsistent with what is developed for NPS areas, relates specifically to wetland areas that have been ditched. The plan that will be developed for FIIS, will discuss marsh restoration but only in the generic sense. Meaning that the plan will state in one way or another, that until the NPS is confident that the ditched marshes are causing a significant change in natural wetland functions, and until we are confident that there is a viable restoration technique, we will not be proposing any mosquito ditch/marsh restoration actions in the plan.

Again, we commend the County for developing such a comprehensive plan and for it's detailed impact analysis. We look forward to continuing our planning efforts related to mosquito management for Fire Island National Seashore and the William Floyd Estate. If you have any questions please contact Michael Bilecki at (631) 687-4760.

Sincerely,



Michael T. Reynolds
Superintendent



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION



July 18, 2006

Mr. James Bagg
Chief Environmental Analyst
Council on Environmental Quality
H. Lee Dennison Building
Hauppauge, NY 11787

Re: Comments on Suffolk County Vector Control and Wetlands Management Long Term Plan and EIS (DGEIS) with emphasis on water management

Mr. Bagg,

First, I would like to commend the crafters of this DGEIS for the comprehensiveness of this document. I am sure this has been an exhaustive undertaking the results of which will have far reaching implications to any agency in the United States involved in vector control and tidal wetlands management. I have commented on certain aspects of this draft document over the past year upon request. Therefore I will limit my comments here to water management for mosquito control and wetland restoration.

I am in favor of the use of the term "Progressive Water Management" as a holistic approach to actively address wetland restoration and mosquito control (as opposed to the more passive approach of marsh "reversion"). I caution against using the terms Progressive Water Management and Open Marsh Water Management (OMWM) interchangeably for reasons I will explain shortly. It is important to keep this distinction. The Connecticut Wetlands Habitat and Mosquito Management (WHAMM) Program employs a similar plan of action called Integrated Marsh Management or IMM. IMM is a holistic approach to wetlands' management similar to an IPM approach but with broader wetland applications. IMM not only addresses salt marsh mosquito control (using OMWM and other source reduction techniques, surveillance, judicious use of larvacides and adulticides, personal protection and public education), but invasive vegetation (i.e., Phragmites) control, tidal flow restoration (e.g., culvert replacement and tide gate manipulations), fill removal to restore wetland functions and values, wetland wildlife habitat enhancement, and education (a very important component). So think of Progressive Water Management as the umbrella program under which OMWM is a component thereof.

I would suggest exercising caution in the use of the term "Open Marsh Water Management" or OMWM. In the last decade, the term OMWM has been used generically (and sometimes erroneously) to refer to almost any type of wetland management technique. OMWM is, first and foremost, a source reduction technique used in saltmarsh mosquito control. As the name implies, it is used in the "open marsh" that is regularly influenced by tidal action with no impediment from dikes, culverts or water control structures. It can be used in previously grid-ditched or unditched marshes as an alternative to pesticide applications for mosquito control. OMWM by itself is not "wetland restoration" in the pure sense and therefore, the two terms should not be used synonymously. However, in addition to usurping salt marsh mosquito ovipositioning sites and providing habitat for larvivorous fishes, with a concomitant reduction or elimination in pesticide use, it can be used to restore or enhance selected wetland functions and values.



**STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION**



There are a number of publications discussing the various designs used in OMWM so I won't go into detail here.

Furthermore, OMWM is not a panacea (not that the DGEIS suggests this) but is another tool in an IPM approach to controlling mosquitoes. It is not used, nor should it be implied, that OMWM can be used in any situation. Where applicable, it is certainly a viable alternative for providing effective, long-term mosquito control. Connecticut has used OMWM in its Mosquito Management Program for over 20 years and, as a result, has eliminated the need to routinely larvacide over 2000 acres of tidal wetlands. These OMWM systems are still controlling mosquitoes, we've seen reduced pesticide applications, we've realized considerable cost savings to our program and the sites are being used by a myriad of waterbirds, invertebrates and fish.

I realize there is opposition to using OMWM in Suffolk County. I suggest some of this may be due to semantics and an inappropriate use of the term to mean more than it should. There will always be some that oppose any type of mosquito control or wetland manipulation. It should be noted that those that oppose the use of OMWM, lacking other practicable alternatives, default to the perpetuation of continued pesticide use (or perhaps even increased use as the old parallel grid ditches fill in and potentially create new mosquito breeding areas). Again, OMWM is not the end-all but should be considered a viable option in any vector control/water management program.

I appreciate the opportunity to comment on this very important document.

Sincerely,

Roger J. Wolfe
Mosquito Management Coordinator
CT DEP WHAMM Program
Franklin WMA
391 Rt. 32
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TOWN OF HUNTINGTON



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FRANK P. PETRONE, Supervisor
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100 MAIN STREET, HUNTINGTON, N.Y. 11743-6991

CONSERVATION BOARD
631-351-3398

July 24, 2006

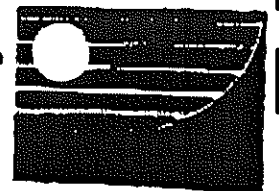
Mr. James Bagg
Chief Environmental Analyst
Department of Planning
H. Lee Dennison Building
Hauppauge, NY 11788

Re: Suffolk County Vector Control and Wetlands Management Long-Term Plan and Generic Environmental Impact Statement

The Huntington Conservation Board has reviewed the Suffolk County Vector Control and Wetlands Management Long-Term Plan and its associated Draft Generic Environmental Impact Statement (DGEIS). This Plan was developed by the County in an effort to reduce impacts to human health and the environment from mosquitoes and their management, and to potentially create some environmental benefits through more enlightened vector control technologies. It is obviously a very thorough examination of the topic, and the County is to be commended for the seriousness with which it developed the Plan and assessed the potential for impacts.

There are only a few localized areas in Huntington that experience noxious adult mosquito biting problems, usually for short periods of time. This is in contrast to more extensive areas on the South Shore where swarms of very aggressive biting mosquitoes can make the outdoors unbearable for considerable parts of the summer. However, Huntington does have a mosquito disease problem, due to West Nile virus. At the time the work for the Long-Term Plan began (2003), parts of Huntington were the only place in the County that had been sprayed twice for the purpose of reducing West Nile virus transmission risks.

The DGEIS suggests that it is possible that impacts from West Nile virus could be greater than those experienced to date, in the absence of a control program. The estimates presented in the DGEIS are certainly a worst case scenario (suggesting up to 18 people county-wide might die each year), but the modeling of virus transmission does show that it is not likely that continued exposure to the virus will lead to general immunity from the virus. Therefore, it seems likely that there will continue to be a health threat in the County from West Nile virus for the foreseeable future. Although the case is only made indirectly in these documents, it is reasonable to assume that the sum of the elements of the mosquito control program that is currently in place does reduce disease risks, and that the proposed improvements to that program will re-



duce risks further. Of further interest is the notion that risks from the introduction to the County of another novel mosquito-borne disease will be reduced, if an effective and comprehensive control program is already in place. This resonates today, given anxieties regarding potential effects from "bird flu" (the Conservation Board is aware that bird flu is not transmitted by mosquitoes, but uses this as an example of public concerns regarding new disease threats). Therefore, the Conservation Board supports the concept of having a mosquito control program in place in Suffolk County, in order to reduce current impacts from mosquitoes, and to guard against additional risks from invasive diseases. A mosquito control program based on Integrated Pest Management seems to be soundest, as is generally proposed by the County. The Conservation Board thinks that the first three elements, education and outreach, surveillance, and source reduction, need to be stressed in Huntington. Field work conducted in the Town as part of the Long-Term Plan program showed that catch basins and recharge basins can support *Culex pipiens* mosquitoes, which are thought to be the prime vector for West Nile virus. The Board is aware in storm water structures can support mosquito colonization, posing potential for illness in areas such as Dix Hills, where surface waters are not common, but West Nile virus has often been detected in dead birds, mosquitoes, and people. The Conservation Board would like to see an emphasis on the implementation of efforts to improve storm water structure maintenance throughout the Town, and to have a robust diagnosis and follow-up sampling program to support this effort. We note that maintaining storm water structures will also help, in certain areas, to control impacts to the Sound from storm water run-off, as an additional benefit. We support continuation of County program of inspector responses to complaints, with its emphasis on eliminating breeding areas in the vicinity of homes and businesses.

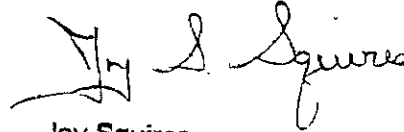
The water management program, which is the part of the Plan that seems to have generated the most controversy, appears to be focused on other areas of the County outside of Huntington. No salt marsh in the Town is on the priority list of aerially-larvicided sites, and the largest salt marsh in Town, Crab Meadow, is said to have no vector control problems, and so to be a candidate for natural reversion as a management means. Nonetheless, Crab Meadow has also been identified by many other planning documents as a good site for marsh restoration, and we note that it appears the marsh management resources of the County may be available for ecological restoration work as well as for mosquito control. The Conservation Board would like to see a cooperative restoration program supported by the County for Town marshes in general, and Crab Meadow in particular.

The Conservation Board notes with regret that the Plan calls for the continued use of certain selected pesticide agents to control both larval and adult mosquitoes. Although the Impact Statement found no environmental impacts associated with larvicide use, no human health impacts associated with either larvicides or adulticides, and no significant impacts associated with the use of these adulticides, the Conservation Board believes that minimizing pesticide use and employing control alternatives to pesticides is a basic environmental management principle that will only result in long-term human health and ecological benefits. The Conservation Board is willing to work with natural resource personnel in the Town to compile lists of sensitive areas (and the reasons for these areas' environmental sensitivity), so that the County can implement a more refined approach to any pesticide use in the Town.

The Conservation Board finds the proposed policies outlined in the Long-Term Plan to be a reasonable means of addressing a difficult problem, and that implementation of the Long-Term Plan should achieve its overall intent of balancing environmental and human health concerns. We found the Environmental

Impact Statement to be a good (although very long) discussion of the relevant issues associated with the Plan, and found its statements, research, and presentation to be persuasive. The Conservation Board recommends that the County support implementation of the Plan, and also recommends that County Legislators from the Town of Huntington approve the Plan and its associated DGEIS.

Very truly yours,



Joy Squires
Chairperson

JSS:DT:ak

- cc: Jon Cooper, Suffolk County Legislator
- Lou D'Amaro, Suffolk County Legislator
- Steve Stern, Suffolk County Legislator
- Huntington Supervisor Petrone
- Members of the Huntington Town Board
- Anthony Aloisio, Director, Department of Planning and Environment
- Joseph Anastasia, Director, Department of Maritime Services

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