COUNTY OF SUFFOLK

STEVE LEVY
SUFFOLK COUNTY EXECUTIVE

DEPARTMENT OF PUBLIC WORKS

THOMAS LAGUARDIA, P.E.
CHIEF DEPUTY COMMISSIONER

GILBERT ANDERSON, P.E.
COMMISSIONER

LOUIS CALDERONE
DEPUTY COMMISSIONER

MEMORANDUM

TO: Tim Laube
Clerk of the Suffolk County Legislature

FROM: Gilbert Anderson, P.E.
Commissioner of Public Works

DATE: October 1, 2009

RE: **Division of Vector Control**
2010 Annual Work Plan

Pursuant to Article VIII, Section C8-4, B(2) of the Suffolk County Administrative Code, enclosed please find a copy of the 2010 Annual Plan of Work for the Division of Vector Control for distribution to all members of the Legislature. This Annual Plan is consistent with the Findings of the Vector Control and Wetlands Management Long Term Plan and GEIS as approved by the Legislature in Resolution 285-2007 on March 20, 2007 and signed by the County Executive on March 22, 2007. As such, no further compliance under SEQRA is required.

A resolution for approval of the 2010 Plan of Work will be submitted to the Legislature by the County Executive's Office.

Thank you for your cooperation.

Attachments: Plan of Work, EAF, Long Term Plan Resolution with Findings

cc: Christopher E. Kent, Chief Deputy County Executive
Carrie Meek Gallagher, Director of Environmental Affairs
Thomas Laguardia, P.E., Chief Deputy Commissioner
Louis Calderone, Deputy Commissioner
Dominick Ninivaggi, Vector Control Superintendent
James Bagg, CEQ

RECEIVED
2009 SEP 31 A 8:34
COUNTY LEGISLATURE
SUFFOLK COUNTY, N.Y.
HAUPPAUGE

SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS
DIVISION OF VECTOR CONTROL

2010 ANNUAL PLAN OF WORK

The Suffolk County Department of Public Works, Division of Vector Control, is responsible under the County Charter for controlling mosquito infestations that are of public health importance. The Division's responsibility is to control mosquito infestations that significantly threaten public health, or create social or economic problems for the communities in which they occur. The Division meets its responsibilities in consultation with the Suffolk County Department of Health Services (SCDHS) and the appropriate federal, state and local agencies. This Plan of Work has been prepared pursuant to and in compliance with the Vector Control and Wetlands Management Long Term Plan and Generic Environmental Impact Statement (the Long Term Plan). The Long Term Plan was approved by the County Legislature as Resolution 285-2007 on March 20, 2007 and signed by the County Executive on March 22, 2007. The 2010 Annual Plan of Work is therefore governed by State Environmental Quality Review Act (SEQRA) Regulation 617.10(d)(1) which provides the following: "When a final generic EIS has been filed under this part (1) no further SEQR compliance is required if a subsequent proposed action will be carried out in conformance with the conditions and thresholds established for such actions in the generic EIS or its findings statement." This issue is also discussed in the Findings, appended hereto, pages 7 and 58. This Annual Plan complies with the reporting requirements in Executive Order 15-2007 (Suffolk County Vector Control Pesticide Management Committee) and Resolution 285-2007 (which adopts the Findings Statement for the Long-Term Plan). The reporting requirements of Resolution 285-2007 are satisfied within this Annual Plan, and the Pesticide Management Committee will submit a report to CEQ independently to satisfy Executive Order 15-2007.

2010 SUMMARY

1. Water Management: Water Management activities will conform to the guidelines outlined in the Long Term Plan and Finding statement's Wetlands Best Management Practices (BMP's). Because the Wetlands Stewardship Program is in its initial phases, 2010 water management will be limited to maintenance of existing structures as described in BMP's 2, 3 and 4 in the Findings Statement and Long Term Plan. Any other water management activity is not currently foreseen for 2010. Any water management work, other than measures specified in BMP's 2, 3, and 4, would have to undergo review under SEQRA, and would be subject to Suffolk County's Council of Environmental Quality (CEQ) review, as well. As per the attached Findings, machine ditch maintenance will be minimal (a maximum of 50,000 linear feet, and probably significantly less). Notice of all machine maintenance work will be provided to CEQ, prior to commencing the work.

2. Larval Control: Perform approximately 15,000 inspections of larval sites. Treat approximately 30,000 acres with Vectobac (*Bacillus thuringiensis israelensis* or *Bti)*, Vectolex (*Bacillus sphaericus*) or Altosid (methoprene).

3. Adult Control: Conduct adult control when infestations are severe and widespread and/or necessary to respond to the presence of pathogens.

4. Research and Surveillance: Collect and process 10,000-12,000 larval and adult mosquito samples, depending on mosquito populations and viral activity. Collect and process approximately 50,000 mosquitoes for arbovirus surveillance. Evaluate the effectiveness of treatments. Perform special studies of problem areas, such as identifying the sources of unusual infestations or finding larval habitats of problem species.

Technical and Institutional Framework for Vector Control

To achieve this goal, the Division employs an integrated control program. Control measures are employed in a hierarchical manner that emphasizes prevention, and are guided by a surveillance program to ensure that control measures are only directed to address a clear need. Control proceeds from the more permanent, generally more "environmentally friendly" measures such as water management and biological control through the highly specific larvicides, and uses chemical controls such as adulticides only after other measures prove to be either insufficient or not feasible. This integrated approach is recognized as the most effective and environmentally sound manner in which to conduct a mosquito control program.

Because mosquitoes are of public health importance, the Division works closely with SCDHS. SCDHS operates the Arthropod-Borne Disease Laboratory, with operational support provided by the Division. The laboratory conducts surveillance for mosquito populations and disease activity. The results of this surveillance are used to guide and evaluate the Division's control work. During times of a public health threat, the Division comes under the operational control of SCDHS. SCDHS is also responsible for other activities related to mosquitoes and the public health, such as medical surveillance, sanitation, environmental monitoring, community outreach and public education.

The New York State Department of Health (DOH) provides important support to the program by analyzing mosquito samples for pathogens, providing technical advice and determining when a public health threat exists. DOH also provides significant assistance with public education, as well as financial aid for vector surveillance and control. Because mosquito control involves work in environmentally sensitive areas and the use of pesticides, environmental compliance and protection are important components of the program. The Division is heavily regulated and subject to inspection under a series of New York State Department of Environmental Conservation (DEC) permits, as well as regulations pertaining to the use of pesticides and licensing of applicators. Close contact is maintained with DEC, United States Fish and Wildlife Services (USFWS) and other agencies throughout the year to ensure that all work is conducted to a high environmental standard.

2009 PROGRAM COMPONENTS

WATER MANAGEMENT: All field personnel (36), 20 trucks, 6 trailers, 6 tracked vehicles and 2 drainage pipe cleaners conduct this component. It is performed from January 1 to April 30, and October 1 to December 31 (approximate dates).

Water management is a functional way to reduce the need for pesticide applications. The Division expects to conduct water management in each of the County's ten towns. The work will be performed on a priority, as needed basis. Highest priority is assigned to larval habitats where infestations have the greatest potential for negative impact. In particular, areas that showed unexpectedly high infestations in 2009 will have high priority over the coming winter. Water management activities will be carried out in such a manner so that the primary goal of the work will be to protect the health of the marsh.

The purpose of water management is to minimize mosquito production through maintaining existing systems of ditches, culverts and other structures that drain off surface water and/or allow access to potential larval habitats by predatory fish. In some cases, the current ditch system has become an important component of the wetland as it exists today, and maintenance of the system is necessary to maintain tidal flow, fish habitat, or existing vegetative patterns. Much of this is maintenance work that may not require a permit, but is nonetheless conducted after consultation with the New York State Department of Environmental Conservation (DEC) to ensure consistency with conservation of the wetland. Sometimes, work to restore a system, even within its original configuration, requires a permit. In such cases, work is performed under permit and in cooperation with the DEC. Now that the Long Term Plan has been approved, all water management activities will be conducted with appropriate notification to and oversight by the Wetlands Stewardship Committee and Council for Environmental Quality (CEQ), as outlined in the Findings Statement of the Suffolk County Legislature that was adopted by Suffolk County Resolution 285-2007. Because the Wetlands Stewardship Committee is in the initial stages of its work, water management in 2010 will be limited to maintenance activities described in the Wetlands Best Management Practices (BMP's). Existing pipes and culverts may be replaced in place and in kind (BMP 2). There will be cleaning of a maximum of 200,000 linear feet of upland and freshwater wetland ditches with hand labor to maintain the flow of water in mosquito habitats (BMP 3). Machine maintenance of ditches in tidal wetlands will be limited to the minimum needed to maintain those ditches or other structures that provide tidal flow or otherwise serve a critical ecological or public health need, and will total no more than 50,000 linear feet (BMP 4).

CONTROL OF MOSQUITO LARVAE: All field personnel conduct larval control during the active mosquito season. Most crews conduct ground larviciding, while a heavy equipment crew assists in helicopter larvicide applications. This component is conducted during the active mosquito season of May 1 to September 30 (approximate dates). Larval control is most often employed when water management has not been able to completely prevent mosquito production. It also is used when water management has not been conducted or is not appropriate.

Larval control is the Division's second most important control method. Ground crews visit known larval habitats, check for the presence of larvae, obtain larval specimens for identification in the laboratory and apply larvicide if necessary. Field crews also eliminate larval habitats by unclogging pipes, removing containers or otherwise eliminating standing water. While the acreage of these sites is small, their proximity to residential areas makes them important. Ground crews also respond to complaints from the public. Over 90% of the larvicide used by the Division is applied in the major salt marshes and other wetlands, by helicopter. These marshes are surveyed at least weekly, or after flood tides. If larvae are discovered, a contract helicopter applies larvicide. For salt marshes and similar habitats, either liquid Bti (*Bacillus thuringiensis israelensis*) or liquid Altosid (methoprene) is applied, based on larval stage, temperature, and weather conditions. Larval control is used only if inspection of a site reveals or has the potential for significant larval production.

The larval control products to be used in 2010 and the conditions under which they are used are described as follows:

Altosid Liquid Larvicide concentrate (methoprene, EPA 2724-446) – Aerial application to tidal and freshwater marshes.

Altosid Liquid Larvicide (methoprene, EPA 2724-392) – Ground application to tidal and freshwater marshes, as well as other temporarily flooded areas.

Altosid Pellets (methoprene, EPA 2724-448) – Ground application to intermittently or permanently flooded areas such as freshwater swamps, catch basins, drainage areas and recharge basins, provided that they are not fish habitats.

Altosid XR-G (methoprene, EPA 2724-451) – Ground or aerial application to tidal wetlands; ground application to intermittently flooded freshwater areas; aerial application in freshwater areas in response to Eastern Equine Encephalitis (EEE) or West Nile Virus (WNV) with case-by-case approval by DEC.

Altosid XR Briquets (methoprene, EPA 2724-421) – Catch basins and other drainage or artificial structures that are not fish habitats. XR briquets will be used in May and June, with follow up treatments using Vectolex or Altosid pellets as necessary.

Valent BioSciences Vectobac CG (Bti, EPA 73049-19) – Ground application to intermittently flooded freshwater and tidal areas.

Valent BioSciences Vectolex CG (*B. sphaericus*, EPA 73049-20) – Aerial or ground application to freshwater and tidal areas that hold water for more than 7 days, such as ditches, impounded marshes, swamps, ponds; catch basins in July and August.

Valent BioSciences Vectobac 12 AS (Bti, EPA 73049-38) – Aerial application to tidal and freshwater marshes; ground application to intermittently flooded areas such as tidal and freshwater marshes.

Summit B.t.i. Briquets (Bti, EPA 6218-47) – Catch basins, ground depressions, artificial sites.

The equipment to be used for larval control includes various trucks for crew transportation, samplers such as dippers and mosquito traps, truck-mounted hydraulic sprayers, backpack sprayers and granular blowers, plus specially-equipped helicopters for larvicide applications on areas too large or inaccessible for ground treatment. All pesticide applications will use DEC-

registered materials and be conducted under appropriate DEC permits and in accordance with label directions and other relevant State and Federal law.

The Division has developed technical guidelines for larval surveillance and control that determine where and when larvicides are used and what materials are chosen for a particular situation. These guidelines emphasize the use of bacterial products when possible and reserve methoprene for those situations where bacterial products are unlikely to be effective. As per the Findings for the Long Term Plan and Executive order 15-2007, the Pesticide Management Committee will report on the results of its review of literature on methoprene and potential impacts, as well as on research sponsored by the County. The County is committed to implementing a Pesticide Reduction Action Plan, that will seek to further accelerate pesticide reduction. As part of this Pesticide Reduction Action Plan, the County will continue to work with technical experts to further refine protocols related to larval monitoring and larvicide usage, consistent with the Long-Term Plan and GEIS. The County is not aware of any new data, studies or reports which contravene research, reports and Findings of the Long Term Plan with respect to larval treatment guidelines or thresholds. Therefore, those Findings are still valid, and control this Annual Plan.

In accordance with the Division's priorities and goals, approximately 1,500 of the 2,077 major larval habitats known to the Division will be surveyed and controlled if necessary throughout the active season. These known habitats consist primarily of freshwater wetlands and salt marshes, as well as roadside ditches, recharge areas and other non-wetland sites. The remaining major larval habitats and the 100,000+ artificial larval sites will be controlled on a complaint basis, as resources permit. Maps showing major larval habitats requiring control are on file at the Division's office in Yaphank.

CONTROL OF ADULT MOSQUITOES: This control method is conducted from approximately June 1 through September 15. It is done on an overtime basis; because the need for it is so highly variable it is not efficient to dedicate staff full time to it. This is a tertiary form of control, and the smallest component of the program. It is carried out only when adult infestations constitute an immediate threat of mosquito-borne disease (as determined by SCDHS) or there is a severe and widespread infestation of vector species, as determined by surveys and/or public complaints, in consultation with SCDHS. When virus has not been detected in a community, adulticiding is conducted when the Division can identify an area where there is 1) evidence of mosquitoes biting residents (such as complaints to the Division or requests by public officials); 2) the Division can confirm the existence of a problem by trap counts, landing rates or other staff observations; 3) control is technically and environmentally feasible and 4) the problem is unlikely to resolve itself (through dispersal or weather changes) or may spread without intervention. While the need for adult control can be reduced by the other program components, it is not possible to control all larval sites in Suffolk County for several reasons. Higher than normal rainfall can increase the need for adult control and some sites cannot be expeditiously treated due to independent permitting requirements, as is the case for larval habitats in the Wilderness portions of Fire Island. In addition, new or unexpected larval habitats always seem to occur, despite the best efforts of the program. It is not appropriate to treat for adult mosquitoes in every area where residents express a concern. Adult control is conducted only when it is clear, based on

complaints, Division surveillance and SCDHS consultation, that a substantial portion of a community is infested with vector species or there is a threat of mosquito-borne disease. Then, the entire affected area is treated. This strategy treats relatively few areas, but those that are treated receive sufficient control to reduce the problem. The guidelines for adult control will be those described in the GEIS Findings Statement.

Adult control can be deemed to be necessary under two separate operational scenarios. One is defined as a "Vector Control" (public health nuisance) application; the other is defined a "Health Emergency" application. In either case, pesticide use decisions are only made on the basis of scientifically-determined surveillance data.

Vector Control adulticide applications are made to reduce large numbers of human biting mosquitoes. Criteria for conducting a Vector Control treatment include:

1. Evidence of mosquitoes biting residents (there is no problem unless people are affected):
   - Service requests from public - mapped to determine extent of problem.
   - Requests from community leaders, elected officials.
2. Verification of problem by SCVC (service requests must be confirmed by objective evidence):
   - New Jersey trap counts higher than generally found for area in question (at least 25 females of human-biting species per night).
   - Centers for Disease Control (CDC) portable light trap counts of 100 or more.
   - Landing rates of one per minute over a five minute period.
   - Confirmatory crew reports from problem area or adjacent larval habitats.
3. Control is technically and environmentally feasible (pesticides should only be used if there will be a benefit):
   - Weather conditions predicted to be suitable (no rain, winds to be less than 10 mph, temperature to be 65°F or above).
   - Road network adequate and appropriate for truck applications.
   - Legal restrictions on the treatment of wetlands, open water buffers, and no-spray list members in the treatment zone will not create untreated areas that would prevent adequate coverage to ensure treatment efficacy.
   - There are no issues regarding listed or special concern species in the treatment area.
   - Meeting label restrictions for selected compounds will not compromise expected treatment efficacy.
4. Likely persistence or worsening of problem without intervention (pesticides should not be used if the problem will resolve itself):
   - Considerations regarding the history of the area, such as the identification of a chronic problem area.
   - Determination if the problem will spread beyond the currently affected area absent intervention, based on the life history and habits of the species involved.
   - Absent immediate intervention, no relief from the problem can be expected.
   - Crew reports from adjacent larval habitats suggest adults will soon move into populated areas.
   - Life history factors of mosquitoes present – i.e., if a brooded species is involved, determining if the brood is young or is naturally declining.

- Seasonal and weather factors, in that cool weather generally alleviates immediate problems, but warm weather and/or the onset of peak viral seasons exacerbate concerns.
- Determining, if the decision is delayed, if later conditions will prevent treatment at that time or not. Conversely, adverse weather conditions might remove most people from harm's way.

In essence, criteria 1 and 2 are necessary thresholds which must be met, prior to a treatment being considered, while criteria 3 and 4 are countervailing factors that would indicate treatment is not required despite the presence of an infestation. With enhanced surveillance, there will be rigorous, numeric validation of mosquito control infestation near a potentially affected population in all cases. Treatment will not occur unless criteria 1 and 2 are satisfied through a combination of surveillance indicators, although not all surveillance techniques may be feasible in every setting and situation. The County is not aware of any new data, studies or reports which contravene research, reports and Findings of the Long Term Plan with respect to adulticide treatment guidelines or thresholds. Therefore, those Findings are still valid, and control this Annual Plan.

Vector Control applications will normally be made by truck. Necessary public notices will be issued in a timely manner (normally, at least 24 hours pre-application), and appropriate precautions will be made to meet DEC restrictions on applications, and to avoid "No Spray" properties. If necessary to protect sensitive resources, buffer areas will be provided between the sensitive area and the application equipment. A 150-foot buffer from freshwater wetlands will be provided to avoid the need for DEC Article 24 (Freshwater Wetlands) permits unless a permit or other authorization from DEC has been received. For this and future Annual Plans of Work, the County will continue to review the issue of buffers, in cooperation with DEC and CEQ.

The need for Health Emergency treatments is determined by the New York State Department of Health West Nile Virus Response Plan for mosquito-borne disease. Because of the persistent presence of WNV in the County, the County perpetually begins each year in Risk Category 2. The New York State Department of Health has determined that there is an ongoing threat to the public health from West Nile Virus, and no longer declares health threats on a year-by-year basis for WNV. As indicators of pathogen presence accumulate (positive dead birds, positive pools of mosquitoes), the Commissioner of the SCDHS determines the need for control measures. If the risk assessments made by SCDHS indicate that risks to the residents of an area of the County are no longer tolerable, the Commissioner will, in conjunction with DEC and SCVC, determine the optimal treatment area to reduce risks of disease transmission to people. In 2009 and previous years, an Emergency Authorization were requested from DEC if freshwater wetlands were involved to eliminate the need for an Article 24 (Freshwater Wetlands) permit. An application has been made to DEC to issue an Article 24 permit to allow adulticide applications in freshwater wetlands or adjacent areas if necessary to protect the public health and replace the use of Emergency Authorizations. If this permit is issued, it will control the use of adulticides in and adjacent to freshwater wetlands in 2010 instead of Emergency Authorizations. If issued as proposed, the permit will cover Health Emergency applications throughout the County and will also allow Vector Control applications in and adjacent to some freshwater wetlands in heavily developed areas of southern Brookhaven. Appropriate required public notices will be issued.

Pre-application mosquito sampling will be conducted (for efficacy determinations). If, as is almost always the case for Health Emergency applications, an aerial application is proposed, a helicopter using the Adapco Wingman guidance system will be used to optimize the delivery of the pesticide.

Efficacy measurements will be made following as many adulticide applications as weather conditions and resources allow. The Long-Term Plan also calls for the establishment of resistance testing for the more commonly used compounds.

The Long-Term Plan proposed a general reliance on resmethrin, a synthetic pyrethroid, as the adulticide pesticide. Resmethrin has been found to be an effective pesticide for mosquito control, can be used for ultra-low volume applications for truck and aerial delivery, undergoes rapid decay in the environment, and, as discussed below, has few identified non-target effects when applied as proposed under the Long-Term Plan. Sumithrin, a similar pyrethroid, is proposed to be the primary back-up to resmethrin, and the primary pesticide for any hand-held applications (the resmethrin label is currently interpreted as not permitting hand-held applications). The Long-Term Plan also identifies two other pyrethroids, permethrin and natural pyrethrins, as potential adulticide compounds. Neither is preferred; however, permethrin is a more widely available product that is manufactured by more than one company, and so may continue to be available under conditions when the patented, less-widely used pyrethroids may not be. Natural pyrethrins are identified as a potentially useful compound because its label allows for use over agricultural areas. In addition to the pyrethroids, malathion, an organophosphate pesticide, was identified as a potential adulticide. Malathion would be used under very specialized conditions, such if thermal fogging were needed, daylight applications were called for, or if resistance testing indicated pyrethroid applications would be ineffective in meeting the goals of the application. All of these pesticides would be applied at the maximum label rate, as that is the best way of achieving effective mosquito control and is helpful in avoiding the development of pesticide resistance. The adulticides included in this Annual Plan have been fully evaluated in the GEIS for the Long-Term Plan, and this Annnual Plan is fully consistent with the attached Findings. For future Annual Plans of Work, the County will continue to review available pesticides and alternatives.

PUBLIC EDUCATION: Mosquito problems resulting from larval habitats around homes and yards, containers, drains and the like, is generally brought to the Division's attention through residents' requests for service. Control of these "domestic" mosquitoes is promoted through education and appeal to individual property owners. Given the WNV threat posed by these mosquitoes, especially *Culex pipiens*, SCDHS has taken on a leading role in public education. SCDHS has an Educator to assist in this effort, and Sanitarians are utilized to require property owners to clean up potential mosquito larval sites. Public education includes the distribution of pamphlets, telephone contact, site visits, media exposure and presentations to various citizens' groups and associations. In addition, the Division offers assistance to residents in eliminating sources of mosquitoes on their property, and leaves "door hangers" with educational information at properties they visit. Upgrades to the Division computer systems and cooperation with Health Services and MIS have allowed the establishment of a Web page on the Internet. The appearance

of the exotic, container-breeding species *Aedes japonicus and Aedes albopictus* means this component will take on increasing importance, since the public's cooperation will be needed to control these larval habitats.

PUBLIC NOTIFICATION AND THE "NO-SPRAY" REGISTRY: In 2000, the County passed new laws to improve required public notification for adult mosquito control. As a result, there is now an increased use of the media and extensive outreach to local officials. The Health Services Web site is used to post spray maps. For each adulticide application, over 150 faxes are sent to various officials and other interested parties. Newsday and News12 post spray schedules and maps. It is important to recognize that adulticide applications are very sensitive to the weather, especially aerial pyrethroid applications. The need to inform the public will need to be balanced with the need to conduct operations promptly, within weather windows and before the problem spreads and more acreage needs treatment. It is usually not appropriate to provide more than 24 hours notice in most cases, because beyond that time, weather forecasts are not very reliable. Attempts to provide more than 24-hour notice often result in many spray operations being announced and then cancelled. These cancellations are very confusing to the public. Despite these difficulties, the County provides 48-hour notice for aerial adulticide applications whenever possible.

The Division maintains a "no-spray" registry of residences where adult mosquito control is not desired. During ground applications the application unit is shut off 150 feet prior to passing such a residence and not turned on until 150 feet after. For aerial control, a system has been devised for identifying and avoiding areas with a minimum radius of ¼ mile, more than 65% of the area is residential and where more than 35% of the residences are on the registry. This registry represents an effort to balance the desires of those residents who want control of adult mosquitoes with those who oppose the use of pesticides. At this writing, the "no-spray" registry lists several hundred properties, most of which are in areas where serious infestations are rare. When control is required to deal with a public health emergency, the Commissioner of SCDHS can override the list. Even then list members are telephoned prior to applications in their area. In addition to this legally required registry, the Division maintains listings of beekeepers and organic farms. Beekeepers' properties are generally avoided or beekeepers are notified before treatments so that they can protect their hives.

SURVEILLANCE AND RESEARCH: All control operations are based on information obtained from surveillance and research. This operation will be performed by one Health Services Laboratory Chief, one DPW Entomologist, one DPW Biologist, two Health Services Entomologists, one Programmer/Analyst, one Vector Control Supervisor, two DPW Laboratory Technicians, two auto equipment operators and eight vehicles. The two Automotive Equipment Operators become part of this activity from May through September. Two student interns will also provide valuable assistance during the summer. Knowledge of mosquito populations, species composition and arbovirus activity is used to guide and evaluate control measures. Arbovirus surveillance allows the Division, in cooperation with the County and State Health Departments, to gauge the potential for disease transmission and take appropriate action.

A) Mosquito population surveillance: Approximately 12,000 larval and adult mosquito surveys are analyzed each year. These surveys are necessary for locating infestations, directing control efforts and evaluating the effectiveness of those efforts. The mosquito species that breed in various locations are determined from larval samples. Numbers of adult mosquitoes in residential areas are estimated from a network of approximately 29 New Jersey light traps in fixed locations throughout the County. New Jersey traps provide a dead sample three to five times per week. Some 50,000 mosquitoes per year from these traps are identified and counted. In addition, virus surveillance is based on live mosquitoes captured in portable CDC traps (see below).

B) Arbovirus surveillance in mosquitoes: Viral surveillance will be directed primarily at two pathogens, EEE and WNV. Surveillance will be conducted according to the latest CDC and State DOH guidelines, modified for Suffolk County's unique environment. To monitor virus activity, CDC light traps and gravid traps are placed on a weekly or rotating basis at various locations throughout the County. These sites are chosen based on their history of viral activity or the presence of viral indicators such as the finding of birds with WNV in the area. The Division collects and processes approximately 50,000 live, adult mosquitoes annually for viral analysis. In 2010, the samples will be sorted by species, frozen, and sent to Albany for arbovirus analysis in the State DOH laboratory.

C) Bird and other surveillance: SCDHS, State DOH, DEC and CDC monitor other WNV indicators such as unusual bird deaths or the number of dead birds sighted in an area. The presence of WNV-positive birds is a strong indicator of virus activity in an area. The County picks up selected dead birds for WNV testing. The County conducts a rapid, field test (the RAMP test) and sends the birds to a NY State DEC lab for necropsy and more sophisticated virus testing. There are also indications that the number of dead bird sightings in an area is a surrogate indicator of risk. There will also be SCDHS monitoring of hospitals and outreach to physicians to quickly detect any human cases.

D) Efficacy monitoring: While the Division has always monitored the effectiveness of the control program in a variety of ways, there will be an increased effort in this area, based on trial work to develop methods conducted in 2007. In particular, trapping of adult mosquitoes before and after adulticide events will be conducted using carbon dioxide baited CDC light traps. While the number of adult mosquitoes in New Jersey traps and other traps is a key indicator of the overall success of the larval control program, additional effort will be directed toward before and after sampling of treated areas to confirm the efficacy of the treatment methods used. For methoprene applications, this requires bringing pupae from the treated areas back to the laboratory to determine if they emerge, something that is very labor intensive.

E) Special surveys and field investigations: Building on work conducted under a US Department of Agriculture grant, the Division's Entomologist has been conducting special surveys to better understand the biology and distribution of the important WNV bridge vector, *Culex salinarius*, in Suffolk County. This species is difficult to distinguish from other *Culex spp.* under the microscope, and its numbers have probably been underestimated in the

past. Surveys in 2007 established that high numbers of the adults of this species can be found in coastal areas such as southern Islip and Brookhaven. Larvae have been found in numbers in the upper reaches of salt marshes, and it appears to inhabit both relatively natural marshes such as those around the Carmans River, as well as degraded wetlands in East Patchogue and Oakdale. This work was published in 2008 and will provide a clearer understanding of what control methods are appropriate to prevent WNV transmission by this species. The Entomologist and other staff also conduct special surveys to determine the source of mosquito problems when these turn up in places where they are not expected. For instance, a survey was conducted that found the larval habitats causing an early season infestation in Belle Terre, allowing larval crews to prevent further trouble through the summer. Given the somewhat unpredictable ways mosquitoes seem to find to cause problems for Suffolk residents, it is important that the Division retain a flexible ability to investigate issues as they come up.

F) Support for Wetlands Stewardship activities: Vector Control continues to provide support for monitoring and other investigations related to Wetlands Stewardship activities. In particular, Division staff assists in the monitoring of the Integrated Marsh Management (IMM) project at Wertheim National Wildlife Refuge. In addition, the Division will assist the Wetlands Stewardship Program in identifying and evaluating prospective sites for future IMM projects, particularly those that will help meet Long Term Plan goals for pesticide use reduction.

G) Other provisions of the Work Plan notwithstanding, Vector Control may participate in limited research, monitoring, and demonstration projects in cooperation with other levels of government such as the State, Towns or federal agencies such as the US Fish and Wildlife Service or Army Corps of Engineers. These activities, which are not part of this Plan, will be subject to separate permitting and SEQRA compliance, and would be subject to CEQ and Wetlands Stewardship Committee review as well.

Pesticide Use in 2009

The Findings Statement for the Long Term Plan requires Vector Control to provide an annual report of pesticide use to the Legislature. In compliance with this requirement, the table below summarizes the use of pesticides by the Division in 2009. The acres treated are compiled by multiplying the total used by the standard dose. In a Duplex treatment, the same acres are treated with both products. The corrected acres represent the total actually treated by subtracting acres of Duplex mix from the total larvicide use to avoid counting the same treatment twice.

Product	Active ingredient	Amount used	Units	Air/Ground Application	2009 Acreage
Larvicides					
Altosid Liquid Larvicide (5% methoprene)	Methoprene	12.38	gal	Ground	396
Altosid Liquid Larvicide concentrate (20%methoprene)	Methoprene	146.5	gal	Aerial	18752
Altosid pellets	Methoprene	313	lbs	Ground	63
Altosid XR-G	Methoprene	320	lbs	Ground	64
Valent BioSciences Vectobac 12 AS	Bti	3191	gal	Air/Ground	25528
Summit Bti briquets	Bti	660	ea	Ground	2
Valent BioSciences Vectobac CG	Bti	3105	lbs	Ground	311
Valent BioSciences Vectolex CG	*B. sphaericus*	15146	lbs	Ground	1010
Altosid XR briquets	Methoprene	34887	ea	Ground	80
Larvicide total					46205
Duplex Vect 12AS + Altosid 20%	methoprene+Bti tank mix	(included above)		Aerial	14400
Corrected acreage	Total - Duplex				31805
Adulticides					
Scourge 18/54	resmethrin	117	gal	Ground/Air	24960
Anvil 10+10 ULV	sumithrin	16.5	gal	Ground	3520
Adulticide acreage					28480

Project ID:

SUFFOLK COUNTY
SHORT ENVIRONMENTAL ASSESSMENT FORM
For UNLISTED ACTIONS Only
6 NYCRR Part 617.20
STATE ENVIRONMENTAL QUALITY REVIEW

Part I-PROJECT INFORMATION (to be completed by Applicant or Project Sponsor)

1. APPLICANT /SPONSOR
Suffolk County DPW, Division of Vector Control

2. PROJECT NAME
Vector Control 2010 Annual Plan of Work

3. PROJECT LOCATION
Municipality **Throughout the County**

County **Suffolk**

4. PRECISE LOCATION (Street address and road intersections, prominent landmarks, etc., or provide map)
Mosquito larval habitats and residential areas, as determined by surveillance. Maps and other information are on file at the Vector office in Yaphank.

5. IS PROPOSED ACTION:
☐ New ☐ Expansion ☐ Modification /alteration **The project is the annual plan for the County's ongoing mosquito control program, to be conducted pursuant to the Vector Control and Wetlands Management Long Term Plan and GEIS (the Long Term Plan).**

6. DESCRIBE PROJECT BRIEFLY:
The project is an integrated mosquito control program as described in the Long Term Plan.

7. AMOUNT OF LAND AFFECTED:
Initially _____ acres Ultimately _____ acres **Acres treated varies according to results of surveillance.**

8. WILL PROPOSED ACTION COMPLY WITH EXISTING ZONING OR OTHER LAND USE RESTRICTIONS?
X☐ Yes ☐ No If No, describe briefly

9. WHAT IS PRESENT LAND US IN VICINITY OF PROJECT?
☐ Residential ☐ Industrial ☐ Commercial ☐ Agriculture ☐ Park/Forest/Open Space ☐ Other
Describe: **Mosquito control takes place in all types of areas.**

10. DOES ACTION INVOLVE A PERMIT APPROVAL, OR FUNDING, NOW OR ULTIMATELY FROM ANY OTHER GOVERNMENTAL AGENCY (FEDERAL, STATE OR LOCAL)?
X☐ Yes ☐ No If yes, list agency(s) and permit/approvals **Use of larvicides requires a variety of NYDEC permits, including Article 15 (Aquatic Pesticides), Article 24 (Freshwater Wetlands) and Temporary Revocable Permits of NYDEC lands. Use of adulticides in or adjacent to freshwater wetlands requires an Article 24 permit or Emergency Authorization. Water management may require NYDEC Article 24 or Article 25 (Tidal Wetlands) permits, and also may require Army Corps of Engineers permits.**

11. DOES ANY ASPECT OF THE ACTION HAVE A CURRENTLY VALID PERMIT OR APPROVAL?
y☐ Yes ☐ No If yes, list agency name and permit/approval **Article 24 permits are in place for larvicides in 2010. The proposed activities are also being conducted under the approved Long Term Plan.**

12. AS A RESULT OF PROPOSED ACTION WILL EXISTING PERMIT/APPROVAL REQUIRE MODIFICATION?
☐ Yes X☐ No

I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE TO THE BEST OF MY KNOWLEDGE

Applicant/sponsor Name: **Dominick V. Ninivaggi, Superintendent** Date: **September 16, 2009**

Signature: _____

If the action is in the Coastal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment

Continue to Part II

PART II - ENVIRONMENTAL ASSESSMENT (To be completed by Agency)

A. DOES ACTION EXCEED ANY TYPE I THRESHOLD IN 6 NYCRR, PART 617.4? If yes, coordinate the review process and use the FULL EAF.
X☐ yes ☐ No Comment: **Coordinated review has already been conducted for the Vector Control and Wetlands Management Long Term Plan, a full EAF and a full GEIS have been prepared and approved for that Plan. This Annual Plan is fully consistent with the March 22, 2007 Findings for the GEIS and as such, no further SEQRA review is necessary.**

B. WILL ACTION RECEIVE COORDINATED REVIEW AS PROVIDED FOR UNLISTED ACTIONS IN 6 NYCRR, PART 617.6? If No, a negative declaration may be superseded by another involved agency.
X☐ yes ☐ No **Coordinated review and GEIS have already been conducted, and this Annual Plan is fully consistent with the March 22, 2007 Findings for the GEIS. As such, no further SEQRA review is necessary.**

C. COULD ACTION RESULT IN ANY ADVERSE EFFECTS ASSOCIATED WITH THE FOLLOWING: (Answers may be handwritten, if legible)

C1. Existing air quality, surface or groundwater quality or quantity, noise levels, existing traffic patterns, solid waste production or disposal, potential or erosion, drainage or flooding problems?
Explain briefly: **no**

C2. Aesthetic, agricultural, archaeological, historic, or other natural or cultural resources; or community or neighborhood character?
Explain briefly: **no**

C3. Vegetation or fauna, fish, shellfish or wildlife species, significant habitats, or threatened or endangered species?
Explain briefly: **no**

C4. A community's existing plans or goals as officially adopted, or a change in use or intensity of use of land or other natural resources?
Explain briefly: **no**

C5. Growth, subsequent development, or related activities likely to be induced by the proposed action?
Explain briefly: **no**

C6. Long term, short term, cumulative, or other effects not identified in C1-C5?
Explain briefly: **no**

C7. Other impacts (including changes in use of either quantity or type of energy)?
Explain briefly: **no**

D. WILL THE PROJECT HAVE AN IMPACT ON THE ENVIRONMENTAL CHARACTERISTICS THAT CAUSED THE ESTABLISHMENT OF A CEA?
☐ yes X☐ No If Yes, explain briefly:

E. IS THERE, OR IS THERE LIKELY TO BE, CONTROVERSY RELATED TO POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS?
X☐ yes ☐ No If Yes, explain briefly: **Full EIS was prepared with extensive public input and review, with approval by the County Legislature after extensive hearings.**

PART III - DETERMINATION OF SIGNIFICANCE (To be completed by Agency)

INSTRUCTIONS: For each adverse effect identified above, determine whether it is substantial, large, important or otherwise significant. Each effect should be assessed in connection with its (a) setting (i.e. urban or rural); (b) probability of occurring; (c) duration; (d) irreversibility; (e) geographic scope; and (f) magnitude. If necessary, add attachments or reference supporting materials. Ensure that explanations contain sufficient detail to show that all relevant adverse impacts have been identified and adequately addressed.

X Check this box if you have identified one or more potentially large or significant adverse impacts which **MAY** occur. Then proceed directly to the **FULL EAF** and/or prepare a positive declaration. **A full EAF and GEIS have already been prepared.**

☐ Check this box if you have determined, based on the information and analysis above and any supporting documentation, that the proposed action **WILL NOT** result in any significant adverse environmental impacts **AND** provide on attachments as necessary, the reasons supporting this determination:

Suffolk County Department of Public Works, Division of Vector Control
Name of Lead Agency

Dominick V. Ninivaggi
Print or Type Name of Responsible Officer in Lead Agency

Superintendent
Title of Responsible Officer

Signature of Responsible Officer in Lead Agency

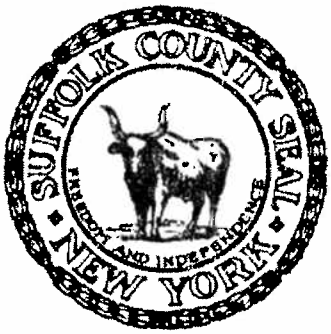
Signature of Preparer (If different from responsible officer)

September 16, 2009
Date

SUFFOLK COUNTY VECTOR CONTROL AND WETLANDS MANAGEMENT

LONG - TERM PLAN

GENERIC ENVIRONMENTAL IMPACT STATEMENT
STATEMENT OF FINDINGS



Steve Levy
Suffolk County Executive

Department of Environment and Energy
Carrie Meek Gallagher
Commissioner

Department of Public Works
Gilbert Anderson, P.E.
Commissioner

Department of Health Services
Humayun J. Chaudhry, D.O., M.S.
Commissioner

Department of Public Works, Division of Vector Control
Dominick Ninivaggi
Supervisor

PROJECT MANAGEMENT
Project Manager: Walter Dawydiak, P.E., J.D.
Chief Engineer, Division of Environmental Quality, Suffolk County Department of Health Services

Adopted March 22, 2007

SUFFOLK COUNTY VECTOR CONTROL AND WETLANDS MANAGEMENT

LONG - TERM PLAN

GENERIC ENVIRONMENTAL IMPACT STATEMENT
STATEMENT OF FINDINGS

Table of Contents

Statement of Findings 1
A. Introduction 2
B. Overview 2
C. Procedural Requirements 9
D. Long-Term Plan Overview 10
E. Reasonable Alternatives Considered 33
F. Long-Term Plan Potential Significant Impacts and Identified Mitigation 39
G. Requirements for Further Environmental Reviews 57
Appendix 1 to the Statement of Findings: Contents of the Triennial Report 61
Appendix 2 to the Statement of Findings: Structure of the Wetlands Stewardship Committee 67
Appendix 3 to the Statement of Findings: Adopting Resolution 1150-2007 69

List of Figures

Figure 1. Overall Hierarchy of Proposed Best Management Practices 25
Figure 2. Review Process for Management Activities with No or Minimal Impacts 26
Figure 3. Review Process for Management Activities with Minor Impacts 27
Figure 4. Review Process for Management Activities with the Potential for Significant Impacts 28
Figure 5. Review Process for Management Activities with the Potential for Major Impacts 29
Figure 6. Review Process for Interim Management/Ongoing Maintenance Activities 30

List of Tables

Table 1. Management Activities with No or Minimal Impacts 41
Table 2. Management Activities with Minor Impacts 42
Table 3. Management Activities Usually More Likely to Have Potential Significant Impacts 43
Table 4. Management Activities with the Potential for Major Impacts 44
Table 5. Interim Management/Ongoing Maintenance Actions 45
Table 6. Bee Risk Quotients, Study Area Maximum Average Pesticide Concentrations 53
Table 7. Bee Risk Quotients, Study Area Mean Pesticide Concentrations 53
Table 8. Orders of flying insects that contain many/certain insects that are generally similar in size or smaller than mosquitoes (0.15 inches) 55

STATEMENT OF FINDINGS
SUFFOLK COUNTY VECTOR CONTROL AND WETLANDS MANAGEMENT
LONG-TERM PLAN

Preparation/Submission Date:	February 1, 2007
Issuance Date:	As of adoption by the Suffolk County Legislature
SEQRA Classification:	Type 1
Lead Agency:	County of Suffolk Suffolk County Legislature William H. Rogers Building 725 Veterans Memorial Highway Smithtown, NY 11787
Contact Name:	Mr. James Bagg Chief Environmental Analyst Council on Environmental H. Lee Dennison Building 100 Veterans Memorial Highway Hauppauge, NY 11788 (631) 853-5203
Location:	Countywide, but excluding the Orient Point Mosquito Control District and Fire Island National Seashore

A. Introduction

The subject action is the Suffolk County Vector Control Wetlands Management and Long-Term Plan (herein the Long-Term Plan; October, 2006). This Statement of Environmental Findings has been prepared in accordance with the environmental review requirements of the State Environmental Quality Review Act (SEQRA), as set forth in 6 NYCRR Part 617 and Chapter 279 of the Suffolk County Charter. This statement of findings has been prepared to demonstrate that:

1. the procedural requirements of SEQRA have been met;
2. the proposed Long-Term Plan was selected from among the reasonable alternatives as the choice that minimized potential impacts; and
3. as required by 6 NYCRR Section 617.11(d), consistent with social, economic and other essential considerations from among the reasonable alternatives available, the action is one that avoids or minimizes adverse environmental impacts to the maximum extent practicable. Adverse environmental impacts will be avoided or minimized to the maximum extent practicable by incorporating as conditions to this Statement of Findings those mitigative measures that were identified as practicable.

B. Overview

Purpose/Goals

Suffolk County has developed this Long-Term Plan to control mosquitoes (protect public health), reduce pesticide usage, and manage and protect wetlands. A major goal is to reduce larviciding by 75 percent, as measured in acres treated, over 12 years; currently, 4,000 acres of tidal wetlands are routinely larvicided. Another key goal is to continue to reduce adulticiding. In recent years, less than two percent of Suffolk County has received non-emergency adulticide treatments.

Description of Action

The Long-Term Plan enhances integrated pest management, including increased surveillance (including pre-adulticide, and post-adulticide efficacy), operational improvements (e.g., catch basin larviciding), and expanded public education/outreach. Strict numeric mosquito criteria will

be used to justify every non-Health Emergency adulticide treatment. The use of technology has also been optimized. For example, the Adapco Wingman spray technology is used to minimize pesticide usage, and geographic information systems have been improved.

Wetlands management will be critical in reducing larvicide usage. As part of the program, no new ditches will be created, and routine use of machine ditch maintenance has ceased. During the first three years, implementation of the Long-Term Plan will focus on low-impact water management without significant changes to the wetland ecology. Wetlands functions and values will be the paramount objective for all wetland management projects.

In the longer term, a Wetlands Stewardship Committee strategy will address the assessment and management needs of all 17,000 acres of tidal wetlands in Suffolk.

At a minimum, the Long-Term Plan will be updated on a triennial basis, with the first update due in 2010. The triennial report will contain detailed information on effectiveness of implementing a broad variety of recommendations related to public health, vector control, and water management (see Appendix 1 for format and examples of specific indicators). Any significant changes to the Plan may be subject to further environmental review (see section G).

Impact Analysis

A comprehensive environmental review was conducted for the potential impacts of the Long-Term Plan. As discussed in Section F, there is no data or analysis which documents that implementation of the Long-Term Plan will have any potentially significant adverse impacts (with the possible exception of adulticide impacts to non-target insects which are believed to be minor and can be mitigated, as well as Wetlands Best Management Practices 5 through 15, which would be subject to additional environmental review if proposed). Successful implementation of the Plan will, however, result in significant beneficial impacts (e.g., pesticide reduction).

Potential environmental impacts were reviewed for all aspects of the program, through exhaustive literature searches, local experiments (including collection of extensive monitoring data) and demonstration projects, and a comprehensive, quantitative risk analysis. Vector control and water management programs, and impacts, were evaluated for numerous jurisdictions.

The pesticides analysis results can be summarized as:

- Human health: negligible impacts (acute, chronic, or carcinogenic) from any larvicide or adulticide agent.
- Ecological impact: no significantly increased risks for impacts for mammalian, avian, or reptilian wildlife from any pesticide. Possible risks for aquatic impacts were associated only with the adulticides permethrin and, potentially more so, malathion. However, models indicate that the increased risk for invertebrate impacts does not propagate up the food chain, and a sophisticated ecosystem model showed recovery to be complete by the following spring.

Bees are the standard for understanding agricultural pesticide impacts to flying insects and, based on theoretical potential effects to bees, all adulticides posed a potential risk to non-target flying insects. However, vector control adulticides are generally not applied when bees are flying (day time). No study has attributed significant impacts to insect populations from vector control adulticides at the concentrations and methods in which they are applied. Also, the literature suggests that effects of transient stressors on insect populations are fleeting, with populations recovering within days. Mitigation measures contained in the Long-Term Plan are expected to minimize any potential impacts to non-target flying insects.

The water management impact assessment found that there should be no significant impacts from careful, site-specific application of the selected Best Management Practices. For the first three years of the Long-Term Plan (through early 2010), implementation of the Long-Term Plan will focus on low impact Best Management Practices (BMPs 1-4, including de minimis ditch maintenance and maintenance/repair of existing culverts). Any other BMPs (including BMPs 5-15) will automatically trigger additional environmental review.

The Long-Term Plan involves a new approach to the management of Suffolk County's coastal marshes, and there will be no new ditch construction, no routine ditch maintenance of the overall grid ditch system, and minimal, limited machine ditch maintenance (expected to be annually limited to 50,000 linear feet, affecting less than 50 acres of marsh) in conjunction with projects where it is necessary to preserve or enhance important ecological functions in tidally restricted areas.

Mitigation

Mitigation is discussed in detail in Section F. Mitigation is summarized as follows, in terms of integrated pest management, water management, and pesticide usage.

Integrated Pest Management

The Long-Term Plan mitigates potential impacts because it enhances many aspects of the current Integrated Pest Management approach, including:

- Public outreach will be bolstered. In particular, there will be targeted education efforts in areas that have a greater probability of receiving adulticide applications.
- Surveillance efforts (pre-spray and post-spray efficacy) will increase, including increasing the number of traps used and the number of set-outs made. New Jersey Light Traps will increase from 27 to 30, and CDC trap-nights are expected to increase from 80 to 105 trap nights per week, at peak). Surveillance results will be better communicated to the public as a means of justifying program decisions.
- Current efforts to reduce mosquito breeding in catch basins and other storm water systems will be increased. Catch basin monitoring will increase, with the goal of increasing from 10,000 to 40,000 inspections per year.
- Focus will be increased on reducing the number of tires that litter the County. These sites serve are key habitats for important disease vectors, and so these efforts clearly reduce the risks of disease transmission.
- Biocontrol use will be mitigated through the use of disease-free, native fish, whenever possible (although the use of disease-free fathead minnows is also a possibility), and through strict observance of restrictions to ensure fish do not escape to other water bodies and do not threaten endangered species or significant habitats.

Wetlands Management

Water management was the cause of many comments from interested parties. It is of prime importance that wetlands management be organizationally and functionally separated from vector control. To mitigate potential effects from any wetlands management project, the following measures will be instituted.

- For the first three years of the Long-Term Plan (through early 2010), implementation of the Long-Term Plan will focus on low impact Best Management Practices (BMPs 1-4, including de minimis ditch maintenance and maintenance/repair of existing culverts).
- Any other BMPs (including BMPs 5-15) will automatically trigger additional environmental review. While BMPs 1-4 will be generally classified as Type II Actions, they may be subject to further SEQRA review if deemed necessary by DEE and/or CEQ. BMPS 5-15 will be deemed Unlisted or Type 1 Actions to ensure appropriate SEQRA review.
- A Wetlands Stewardship Committee, chaired by the Suffolk County Department of Environment and Energy, will be a key part of the Long-Term Plan, and this Committee will provide recommendations on all projects using BMPs 10-15, and can review any other project its membership wishes to consider.
- In 2010, the first triennial report will include recommendations from the Wetlands Stewardship Committee strategy; at that point, any Long-Term Plan modifications may be subject to further environmental review (see section G).
- The Long-Term Plan now emphasizes marsh health and preservation in design, implementation, and assessment of all wetlands management projects.
- All necessary permits will be acquired, which will require a great deal of formal project reviews.

Pesticide usage

Pesticide impacts are mitigated in several ways, as follows.

- Implementation of the long-term plan is expected to result in decreasing need to use larvicides (an eventual 75 percent reduction is a Long-Term Plan goal).
- Precise triggers (trap counts or landing rates) are required to be met before any Vector Control adulticide applications.
- Efficacy testing will be a significant element of the Long-Term Plan, and these data should provide justification for the pesticide use that does occur.

- Use of the Adapco Wingman technology will optimize aerial adulticide applications (maximize mosquito control while minimizing pesticide usage)
- Continued consultation with New York State Department of Environmental Conservation (NYSDEC) and other resource agencies will ensure that all pesticide applications avoid impacts to endangered species and minimize impacts to settings of particular concern, whether through the use of setbacks, adjustments in application timing, or avoidance of specific areas.
- The plan report now appears to want to lessen such buffers, which right now are 100-150 feet. CEQ feels the buffers are necessary, though if more nuanced applications are proven to avoid non-target impact/drift, CEQ will be willing to consider such evidence as part of the long term strategy.

It is important to emphasize that the Long-Term Plan will be an adaptively managed Plan. The Steering Committee and the advisory committees (Citizens and Technical) are expected to continue to function, and issues can continue to be addressed, even if they arise or are realized after this iteration of the Plan has been completed.

Further Environmental Review

The triggers for further environmental review which are specified herein constitute the minimum conditions under which additional environmental review would be initiated. At any time, the County could commence additional environmental review based on substantial new technical information.

Further environmental reviews (see Section G) are possible under at least two circumstances: adoption of the Annual Plan of Work, and in relation to wetlands management projects. Both are summarized below.

Annual Plans of Work

On an annual basis, the Council on Environmental Quality will review Annual Plans of Work and make a recommendation with respect to the State Environmental Quality Review Act to the Suffolk County Legislature. Annual Plans of Work that comply with the form and content of the Long-Term Plan generally should not require further environmental review. If an Annual Plan

of Work diverges from the Long-Term Plan, whether in terms of the scope of particular elements, or in terms of specific products or approaches to vector control, then all or part of the Annual Plan may be subject to further environmental review, at the determination of the Suffolk County Legislature and/or other involved agencies.

In general, annual plans need to focus on the use of surveillance to determine where mosquito problems exist, and to primarily employ source reduction tools to reduce the impact of mosquitoes on people. The implementation (over time) of the techniques for wetlands management developed in the Best Management Practices manual, as outlined in the Wetlands Management Plan may be a source reduction tool.

Specific triggers for additional SEQRA reviews have been detailed. These triggers include:

- failure to include public education and outreach steps to educate residents and visitors on the means that are available to avoid mosquito bites and diseases associated with mosquitoes
- inadequate mosquito population or disease surveillance
- failure to commit to respond to all mosquito complaints using personnel appropriately trained to identify and mitigate sources of mosquito problems
- failure to use the review processes outlined in the Wetlands Management Plan for wetlands management projects
- proposed use of a non-native biocontrol organism not already resident in Suffolk County natural environments
- proposed use of a larvicide other than Bacillus thuringenesis var israelensis (Bti), Bacillus sphaericus, or methoprene
- proposed use of an adulticide other than resmethrin, sumithrin, permethrin, natural pyrethrins, or malathion
- identification of a preferred adulticide agent other than resmethrin or sumithrin
- use of BMPs 5-15.

Wetlands Management

Most wetlands management projects will be subject to further environmental review. Projects utilizing Best Management Practices 1 through 4, as determined by DEE, (none to Minimal Impacts) will not, unless unusual site-specific conditions are cause for concern; all others will.

The triggers for further environmental review which are specified in the FGEIS and below in Section G constitute the minimum conditions under which additional environmental review would be initiated. At any time, the County and/or the Council on Environmental Quality could commence additional environmental review based on substantial new technical information.

C. Procedural Requirements

Suffolk County Department of Public Works (SCDPW) prepared an Environmental Assessment Form (EAF) for the development of a Vector Control and Wetlands Management Long-Term Plan and submitted the EAF to the Council on Environmental Quality (CEQ) on May 2, 2002. On May 15, 2002, the CEQ issued a recommendation for a Positive Declaration to the Suffolk County Legislature. The Legislature issued the Positive Declaration at its meeting on August 6, 2002.

A draft Scoping document was prepared by Suffolk County Department of Health Services (SCDHS). The draft Scope was circulated for public review beginning August 7, 2002. A public Scoping hearing was held on September 10, 2002, at the Suffolk County Legislative Building in Hauppauge. This hearing was conducted by the CEQ, acting on behalf of the County Legislature, as authorized by Chapter 279 of the Suffolk County Administrative Code.

The CEQ held open the public Scoping record until September 25, 2002, in order to afford the opportunity for additional written comments regarding the scope of the DGEIS. All written comments received through that date, as well as minutes and summaries from the various meetings conducted as part of the Scoping process, were collected together and published by the County.

The Final Scope was published August 1, 2003, and was adopted by the Legislature by Resolution 1122 on December 16, 2003. The resolution was signed by County Executive Robert Gaffney on December 18, 2003.

A Draft Generic Environmental Impact Statement (DGEIS) for the Suffolk County Vector Control and Wetlands Management Long-Term Plan was submitted to CEQ on May 3, 2006. It was accepted as complete by CEQ at its May 17, 2006 meeting. At that meeting, CEQ set a 60 day comment period (through July 17, 2006) and also announced that two public hearings would be held. Public hearings were thus held, on Thursday, June 29, 2006, from 6 to 9 pm, at the Maxine S. Postal Legislative Auditorium, Riverhead, and on Thursday, July 6, 2006, from 10 am to 1 pm in the Rose A. Caracappa Legislative Auditorium, Hauppauge, before members of CEQ, with CEQ Chair Dr. R. Lawrence Swanson presiding.

At the CEQ meeting held on August 9, 2006, CEQ determined that the comments received in writing and at the hearings were substantive in nature, and forwarded a recommendation to the Legislature that it cause to have a Final Generic Environmental Impact Statement (FGEIS) prepared. The Legislature, at its meeting on October 17, 2006, passed resolution 1103-2006 authorizing the preparation of a FGEIS. The resolution was signed by County Executive Steve Levy on October 20, 2006.

The FGEIS was received by CEQ on November 9, 2006. The FGEIS Supplement was sent to the CEQ on January 4, 2006. All documents were forwarded to the Legislature for review and consideration together with comments from CEQ, and considered at the January 29, 2007 meeting of the Environmental, Planning and Agriculture Committee (EPAC) of the Suffolk County Legislature. These findings incorporate the direction from the Legislature.

To the extent that these Findings may contain measures (e.g., mitigation) which are not already explicitly in the Plan, the Plan is deemed to be amended to incorporate these Findings. If any provisions in the Findings are potentially inconsistent with the Plan, the provisions of the Findings are deemed to prevail.

D. Long-Term Plan Overview

Introduction

On August 6, 2002, the Suffolk County Legislature adopted a "Positive Declaration" on the County's proposed Vector Control and Wetlands Management Long-Term Plan. The Legislature subsequently appropriated funding to conduct the program, resulting in SCDPW (as fiscal manager) and SCDHS (as project manager) preparing and issuing a Request for Proposals (RFP) for the preparation of a Long-Term Vector Control and Wetlands Management Plan together with any associated environmental reviews.

An open and public process was undertaken to generate a Long-Term Plan and to perform the environmental impact assessment of the Long-Term Plan. Elements of public participation and input included:

- Formation of project committees such as the Technical Advisory Committee (TAC), the Citizens Advisory Committee (CAC), the Wetlands Subcommittee, and the Monitoring Subcommittee. These formally constituted committees (the TAC and CAC) and more informal groups provided venues and means for comment and review of project work products, and for feedback and input on the development of the Long-Term Plan to be made.
- Reviews of various project work products by nationally recognized technical experts (organized by the TAC).
- The Best Management Practices Manual and Wetlands Management Plan were released in draft form for public review in July 2005. The Long-Term Plan was released for public review in September 2005. On the basis of received public comments, the Long-Term Plan and the associated Wetlands Management Plan and Best Management Practices Manual were revised, and released in draft form again in December 2005. At that time, a draft version of the DGEIS was also released for public comment and review.
- Following the receipt of comments, the County once again revised the Long-Term Plan, the Wetlands Management Plan, and the Best Management Practices Manual. These documents, together with a revised DGEIS, were formally submitted to the CEQ on May 3, 2006.

- Following the public comment period on the DGEIS, the Long-Term Plan, the Wetlands Management Plan, and the Best Management Practices Manual were again revised, with the updated versions released in October 2006. On November 9, 2006, the FGEIS was delivered to CEQ, as a response to comments made on the DGEIS.

Therefore, it is clear that the Long-Term Plan and its associated environmental reviews are the product of an open and very public process, one in which several substantial revisions have been made following extensive public input to generate draft plans and analyses. The Plan was revised several times, on a voluntary basis, by the County.

In addition, Suffolk County commissioned its consultant, Cashin Associates, PC, and its team of subconsultants to conduct extensive fieldwork and local data collection, including local experimentation and environmental characterizations. These efforts included:

- Designing, permitting, constructing, and monitoring a progressive water management project at Wertheim National Wildlife Refuge, in conjunction with US Fish and Wildlife Service (USFWS) and the County.
- Designing, permitting, and conducting the Caged Fish experiment of larvicide and adulticide impacts under environmentally relevant conditions, documenting all aspects of the applications and subsequent fate and transport, and testing for biological effects, in conjunction with the County and the US Geological Survey (USGS).
- Identifying and characterizing 21 local wetlands (Primary Study Areas) to serve as a basis for determining environmental impacts associated with water management.
- Identifying and characterizing four sentinel areas of the County to allow for careful modeling of the risks to human health and the environment from proposed pesticide applications.
- Conducting an assessment of the potential for mosquito control ditches to convey land-based pollutants to the surrounding estuaries.
- Testing for changes in invertebrate communities at five pairs of salt marshes from extended exposure to mosquito control larvicide formulations.

- Determining the long-term vegetation characteristics at two south shore salt marshes, and relating changes in vegetation patterns to extrinsic environmental changes, such as ditching, changes in land use, major storms, and similar factors.
- Monitoring turtle use of upland mosquito ditches near Napeague Harbor, and surveying for their presence in three similar settings.
- Surveying additional stormwater control structures beyond those identified by preliminary County assessments for the potential to breed mosquitoes that might impact human health.
- Testing innovative mosquito control formulations and devices in County environments.
- Constructing a Geographical Information System (GIS) database of local vector control information along with other relevant County environmental data sets.
- Designing and preparing to implement a test of remote sensing capabilities to ascertain vegetation geographical patterns and temporal trends in County salt marshes.

This information was released to the public through 27 separate publications associated with the Literature Search, additional reports connected with other tasks of the project, construction and maintenance of a project website where all relevant information, publications, and presentations were posted, professional presentations at local, national, and international meetings, and through production and dissemination of a project specific newsletter.

Nuisance versus Disease

The Long-Term Plan attempted to distinguish between mosquito control conducted to control nuisance, and mosquito control conducted to prevent human health impacts. However, such a distinction proved to be impracticable. The Plan was successful, however, in describing approaches geared to "Vector Control" (control in the absence of a detected pathogen; synonymous, for purposes of the Long-Term Plan, with the term "Public Health Nuisance Control"), as differentiated from actions associated with "Emergency Response."

It is noted the Long-Term Plan approach is consistent with Public Health Law. The law reflects the position that a severe infestation of mosquitoes that results in large numbers of people receiving many bites is clearly not a "healthy" situation, even if no specific disease is transmitted. State and County Public Health Law describe a mosquito infestation as a "public health nuisance," whether or not pathogens have been detected. A public health nuisance is, by definition, a condition that can adversely affect public health.

It is not possible to distinguish specific mosquito control steps for human health protection from all other mosquito control actions. For instance, West Nile virus (WNV) occurs and reoccurs across nearly all the County in most years. Nearly all human-biting mosquitoes found in the County have the potential to transmit WNV. Source reduction, wetlands management, larval control efforts, and wetland management techniques can reduce the potential for infection by reducing the pool of mosquitoes that can transmit disease. However, since female adult mosquitoes that have fed at least once are the only mosquitoes that carry WNV, the application of these techniques that limit the production of adult mosquitoes necessarily occurs prior to the mosquitoes becoming infected.

WNV impacts in the County are believed to be much less than they might in the absence of such control measures. Modeling suggests that West Nile virus incidence rates could be an order of magnitude higher in the absence of vector control (i.e., potentially tens of deaths, and hundreds of serious illnesses, annually). It is quite probable that other factors, such as the composition of the County's mosquito population, also impacts the infection rate here. However, the control program also has a role in shaping the mosquito population, so that again it is difficult to separate out clearly the impact of the control program from other factors. The terminology used for control of adult mosquitoes may appear to support a distinction between nuisance and disease control, but that is not so. "Health Emergency" adulticide applications are made when the Commissioner of the SCDHS, acting under authority granted by the New York State Department of Health, determines that immediate risks to human health need to be reduced, by reducing adult mosquito populations in a certain area because there is a particularly high risk of transmission of disease to humans. The implication is that other applications are not made to reduce health risks. However, the Long-Term Plan has accurately designated these other kinds of adulticide applications "Vector Control" applications (i.e., control vectors with potential to adversely affect public health, prior to detection of WNV or other pathogens). The terminology is intended to

underline that all human-biting mosquitoes in the County are potential vectors of disease (most often, WNV), and that the reduction of large numbers of these mosquitoes will reduce overall disease risks. This clear connection between the reduction of large numbers of human-biting mosquitoes and decreases in disease risk is the reason that all aspects of the County control program are seen to be part of an overall disease control effort. It is true that alleviation of impacts to residents' and visitors' quality of life does follow from adulticide applications, and this is an important benefit of the program. This brief discussion focuses on West Nile virus. As discussed in the Long-Term Plan and GEIS, an integrated vector control program is credited to manage risks from other diseases and Eastern Equine Encephalitis.

Content of the Vector Control Long-Term Plan

Those aspects of the Vector Control portion of the Long-Term Plan were developed as an implementation of Integrated Pest Management. Integrated Pest Management is a means of addressing pest problems that uses a hierarchical approach where those activities that have greater impact on the organisms but potentially have fewer environmental or human health risks are assayed first, and where actions taken are commensurate with the problem.

The scope of the Long-Term Plan includes all of Suffolk County. However, Orient Point Mosquito Control District is responsible for vector control in that portion of the County. In addition, implementation of mosquito control in Fire Island National Seashore will require completing a separate permit application and environmental review process, and, due to its status in the national park system, may require some additional considerations that do not apply to the remainder of Suffolk County.

The hierarchical elements of the Vector Control component of the Long-Term Plan are:

- Public education and outreach

  Public education and outreach is central to the effectiveness of the Long-Term Plan. The Long-Term Plan will re-enforce existing efforts that allow residents and visitors to avoid being bitten by mosquitoes, and that address mosquito breeding problems determined through responses to citizen complaints. The Long-Term Plan calls for expansion of general public outreach through program presentations, brochures, and web site maintenance, and will target the areas of the County, predominantly along the south shore, where adulticide

applications have been made more frequently. Specific efforts to improve catch basin maintenance and to address tire litter are expected to provide dividends in terms of reductions of disease risks. The County will maintain its "Do Not Spray" registry and will expand its efforts to educate Suffolk County residents regarding specific elements of the vector control program.

- Scientific surveillance

A central tenet of Integrated Pest Management is that information is necessary in order to determine appropriate actions. The Vector Control Long-Term Plan surveillance program is intended to generate necessary information in sufficient quantity and in a timely manner so that the activities of the vector control program are optimized. Surveillance generally determines two parameters concerning the local mosquito population. One is number and speciation, generally called population surveillance. The second is pathogen presence, which is generically called disease monitoring.

Population surveillance looks to assess larval and adult populations. Larval populations are determined at set stations, where crews collect samples with laboratory confirmation of numbers and speciation. Crews also seek for breeding sites in response to citizen complaints. The County will maintain its existing larval population sampling efforts, and endeavor to respond to all complaints within three days. Adult populations are assessed through trapping, primarily. The fixed New Jersey trap network will be expanded by three under the Long-Term Plan, and, if adult control is proposed, special population sampling using CDC light traps will be undertaken prior to any application to ensure numerical triggers are exceeded. In addition, post application sampling will be conducted to measure efficacy. In some circumstances, landing rates will be used either in place of trapping or as an adjunct to trapping efforts.

Disease surveillance generally uses CDC gravid or CDC light traps. The initial set out of CDC traps will be expanded to 35 weekly set outs, and will be proportionately increased as the season progresses. The County will continue to send its pools of potentially infected mosquitoes to the State Department of Health for testing, although the Long-Term Plan recommends the construction of a Bio-Safety Level 3 laboratory in Suffolk County so that testing may occur more quickly and be conducted on more potential pools than is currently

possible. Dead birds will continue to be collected, tested for WNV presence locally, and tested for a larger range of pathogens at the State laboratory.

Generally, SCVC will assume responsibility for population surveillance, and the Suffolk County Department of Health Services Arthropod-Borne Disease Laboratory (ABDL) will be responsible for disease surveillance. SCVC and the ABDL will continue to work closely together and share responsibilities to ensure that the primary mission of public health protection is adequately supported.

A discussion of surveillance results will be included in Annual Plans of Work. Detailed reporting and analysis of surveillance data will be included in each Triennial Report.

- Source control

Source control means to eliminate conditions conducive to mosquito breeding. This is a focus of public outreach efforts. It is also the most effective method of mosquito control conducted in response to public complaints. The County already has a strong program to encourage residents to take steps to drain standing water from containers near houses, to ensure pools are properly maintained, and to replace water in birdbaths at frequent intervals. The County will expand these efforts by addressing issues such as used tire management and catch basin maintenance with other local governments, and will expand the storm water facility maintenance program to private concerns such as shopping centers or apartment complexes. These efforts are especially important as the house mosquito (*Culex pipiens*) is believed to be the prime vector for WNV in Suffolk County (other mosquitoes are also significant risk factors for WNV transmission, as well).

- *Wetlands Management*

The Long-Term Plan reconfirms the existing County commitment to abandon ditching as a means of wetlands management for mosquito control, and to avoid machine ditch maintenance except in the most limited of circumstances. In the longer run, the Long-Term Plan has identified the utilization of more progressive wetlands management in salt marshes (as defined in the Best Management Practices Manual) as one element in increasing effective control of mosquitoes and decreasing the potential for environmental impacts associated with vector control. Potential reductions of 75 percent in larvicide use, reductions in adulticide

use, and improvements in important salt marsh ecological functions are all thought to result from careful and considered application of the Best Management Practices in select coastal marshes in the County.

Concerns raised by interested and involved parties have resulted in much more thorough review and appraisal of wetlands management as a means of vector control. For the first three years of the Long-Term Plan, only minor and relatively no impact projects will be considered by the County (see Figure 1, Figures 2-3, and Figure 6). Any project that is usually more likely to have potentially significant impacts or major impacts (Best Management Practices 5 to 15; Figures 4-5) will be subject to additional review under SEQRA. In addition, any project involving machine maintenance of existing ditches, structures, waterways, or other features associated with wetlands will be noticed to CEQ, either through submission of a copy of the permit application for the project, or submission of a project description detailed enough to serve as a NYSDEC permit application.

- Biocontrols

Biocontrols are not a major facet of the County program. This is largely due to the potential for environmental impacts from the invasive and aggressive *Gambusia* fish which has served the County as its primary biocontrol for several decades, and so the necessity to restrict biocontrols to settings where the fish will almost certainly not impact natural water bodies. In addition, many settings where biocontrols would serve good purposes for mosquito control are ecologically sensitive, often because they are largely predator-free. The Long-Term Plan proposes to substitute fathead minnows (*Pimephales promelas*) for *Gambusia*, as the minnow as been identified as a more benign species should it escape to natural water bodies. The County will also follow developments in other jurisdictions regarding other promising organisms that are shown to consume mosquitoes, such as certain freshwater copepods (potential biocontrols for catch basins). However, the County will be very cautious in implementing biocontrol use, to ensure that sensitive environments are not disrupted through the introduction of predator species.

- Larval control

The Long-Term Plan reaffirms the County commitment to only using pesticides when scientifically-collected information supports its use, in the context of Integrated Pest

Management principles. Surveillance data regarding the species and stages of immature mosquitoes along with information on the time of year and conditions at the prospective treatment site will be used to determine if use of one of two bacterial pesticides, *Bacillus thuringiensis var israelensis* (Bti) or *Bacillus sphaericus* (Bs), or the insect growth hormone mimicker methoprene, is appropriate. At times, the County may use a "duplex" treatment of Bti and methoprene, as well. Application rates will always be at label maximums. This insures maximum effectiveness for the application, and is important to reduce the development of resistance in treated populations. For regularly sampled locations, the primary determinant of the need to larvicide will be "presence/absence" over an appropriate subset of sampling points. The Long-Term Plan also identifies the potential to develop numerical triggers through analysis of data sets as augmented by continuing sampling, through the creation of a GIS (Geographical Information System) database of historical sampling results as part of the Plan development process. The County will continue to apply larvicides by helicopter to marshes that have large expanses of breeding, although it is anticipated that implementation of the Wetlands Stewardship Strategy (to be developed by the Wetlands Stewardship Committee under the direction of SCDEE) will help to significantly reduce larviciding needs. Other larvicides will be applied by field crews in response to surveillance data generated by citizen complaints or regular surveillance of smaller breeding locations. To check *Culex pipiens* populations further, the County will expand its surveillance of catch basins to some 40,000 (or more) sites each year. Time release formulations of methoprene, or, sometimes, Bs, will be used to prevent the emergence of adult mosquitoes at these sites.

The Long-Term Plan requires the establishment of an efficacy program and also sampling to determine if resistance is being generated in treated populations.

- Adult control

Control of adult mosquitoes is the least favored means of mosquito control. Adulticide use signals the failure of all other potential treatment means, and is the last option for program managers. The County always endeavors to minimize its use of adulticide products.

Adult control can be deemed to be necessary under two separate operational scenarios. One is defined as a "Vector Control" (public health nuisance) application; the other is defined a

"Health Emergency" application. In either case, pesticide use decisions are only made on the basis of scientifically-determined surveillance data.

Vector Control adulticide applications are made to reduce large numbers of human biting mosquitoes. Criteria for conducting a Vector Control treatment include:

1. Evidence of mosquitoes biting residents (there is no problem unless people are affected):

    - Service requests from public - mapped to determine extent of problem
    - Requests from community leaders, elected officials

2. Verification of problem by SCVC (service requests must be confirmed by objective evidence):

    - New Jersey trap counts higher than generally found for area in question (at least 25 females of human-biting species per night).
    - CDC portable light trap counts of 100 or more.
    - Landing rates of one per minute over a five minute period.
    - Confirmatory crew reports from problem area or adjacent breeding areas.

3. Control is technically and environmentally feasible (pesticides should only be used if there will be a benefit):

    - Weather conditions predicted to be suitable (no rain, winds to be less than 10 mph, temperature to be 65°F or above).
    - Road network adequate and appropriate for truck applications.
    - "No- treatment" wetlands, wetlands and open water buffers, and no-spray list members will not prevent adequate coverage to ensure treatment efficacy.
    - There are no issues regarding listed or special concern species in the treatment area.
    - Meeting label restrictions for selected compounds (such as avoiding farmland) will not compromise expected treatment efficacy.

4. Likely persistence or worsening of problem without intervention (pesticides should not be used if the problem will resolve itself):

- Considerations regarding the history of the area, such as the identification of a chronic problem area.
- Determination if the problem will spread beyond the currently affected area absent intervention, based on the life history and habits of the species involved.
- Absent immediate intervention, no relief from the problem can be expected.
- Crew reports from adjacent breeding areas suggest adults will soon move into populated areas.
- Life history factors of mosquitoes present – i.e., if a brooded species is involved, determining if the brood is young or is naturally declining.
- Seasonal and weather factors, in that cool weather generally alleviates immediate problems, but warm weather and/or the onset of peak viral seasons exacerbate concerns.
- Determining, if the decision is delayed, if later conditions will prevent treatment at that time or not. Conversely, adverse weather conditions might remove most people from harm's way.

In essence, criteria 1 and 2 are necessary thresholds which must be met, prior to a treatment being considered. With enhanced surveillance, there will be rigorous, numeric validation of mosquito control infestation near a potentially affected population in all cases. Treatment will not occur unless criteria 1 and 2 are satisfied through a combination of surveillance indicators, although not all surveillance techniques may be feasible in every setting and situation.

Vector Control applications will normally be made by truck. Necessary public notices will be issued in a timely manner (normally, at least 24 hours pre-application), and appropriate precautions will be made to meet NYSDEC restrictions on applications, and to avoid "No Spray" properties (including all farms).

The need for Health Emergency treatments is determined by the New York State Department of Health West Nile Virus Response Plan for mosquito-borne disease. Because of the persistent presence of WNV in the County, the County perpetually begins each year in Tier II. As indicators of pathogen presence accumulate (positive dead birds, positive pools of mosquitoes), the Commissioner of the SCDHS will petition the Commissioner of the State Department of Health to declare a Health Emergency. If the petition is granted, and the risk assessments made by SCDHS indicate that risks to the residents of an area of the County are no longer tolerable, the Commissioner will declare a Health Emergency. In conjunction with NYSDEC and SCVC, SCDHS will determine the optimal treatment area to reduce risks of disease transmission to people. An application will be made to NYSDEC for NYSDEC to issue an Emergency Authorization to permit adulticide applications that might otherwise violate the State Freshwater Wetlands Regulations. Appropriate required public notices will be issued. Pre-application mosquito sampling will be conducted (for efficacy determinations). If, as is almost always the case for Health Emergency applications, an aerial application is proposed, a helicopter using the Adapco Wingman guidance system will be used to optimize the delivery of the pesticide.

Efficacy measurements will be made following every adulticide application. The Long-Term Plan also calls for the establishment of resistance testing for the more commonly used compounds.

The Long-Term Plan proposed a general reliance on resmethrin, a synthetic pyrethroid, as the adulticide pesticide. Resmethrin has been found to be an effective pesticide for mosquito control, can be used for ultra-low volume applications for truck and aerial delivery, undergoes rapid decay in the environment, and, as discussed below, has few identified non-target effects when applied as proposed under the Long-Term Plan. Sumithrin, a similar pyrethroid, is proposed to be the primary back-up to resmethrin, and the primary pesticide for any hand-held applications (the resmethrin label is currently interpreted as not permitting hand-held applications). The Long-Term Plan also identifies two other pyrethroids, permethrin and natural pyrethrins, as potential adulticide compounds. Neither is preferred; however, permethrin is a more widely available product that is manufactured by more than one company, and so may continue to be available under conditions when the patented, less-widely used pyrethroids may not be. Natural pyrethrins are identified as a potentially useful

compound because its label allows for use over agricultural areas. In addition to the pyrethroids, malathion, an organophosphate pesticide, was identified as a potential adulticide. Malathion would be used under very specialized conditions, such if thermal fogging were needed, daylight applications were called for, or if resistance testing indicated pyrethroid applications would be ineffective in meeting the goals of the application. All of these pesticides would be applied at the maximum label rate, as that is the best way of achieving effective mosquito control and is helpful in avoiding the development of pesticide resistance.

Each year, SCVC will prepare and submit to CEQ and the Legislature a report on its pesticide use in the previous calendar year. The report will document actions taken to minimize the use of pesticides. It will summarize any notable scientific findings regarding the pesticides used by the program. The report will also identify any research or product development that may lead to selections of alternatives to the compounds selected by SCVC over that time period. The report will also review the thresholds used for Vector Control application consideration, and determine if those thresholds were appropriate to achieve the goals of protecting public health and the environment.

Wetlands Management component of the Long Term Plan

The Long-Term Plan establishes a Wetlands Stewardship Committee. The Suffolk County Department of Environment and Energy (SCDEE) will chair the committee. NYSDEC permits and reviews will be required for nearly every project. No project requiring a NYSDEC permit will be allowed to proceed without explicit review and approval of SCDEE, meaning that permit applications and Wetlands Stewardship Committee considerations will not begin without SCDEE vetting of the proposed project. Any project that is usually more likely to have potential for major impacts (Best Management Practices 10-15), or any other project, using Best Management Practices 5 through 9 that the Wetlands Stewardship Committee membership determines to need review, will undergo the review and recommendations of the Wetlands Stewardship Committee of the project goals, design, and impact assessment. Any project requiring a NYSDEC permit will be noticed to CEQ. Thus, any project except for the most minor will undergo extensive scrutiny and analysis prior to any alteration of the marsh.

If the DEE adopts any of the BMPs 2-4 as part of [their] its stewardship strategy, then "Maintenance as define in BMPs 2-4 needs further clarification [classification].

a) No material alteration of marsh hydrology, tidal circulation characteristics, vegetation or animal populations shall occur as part of any maintenance activity.

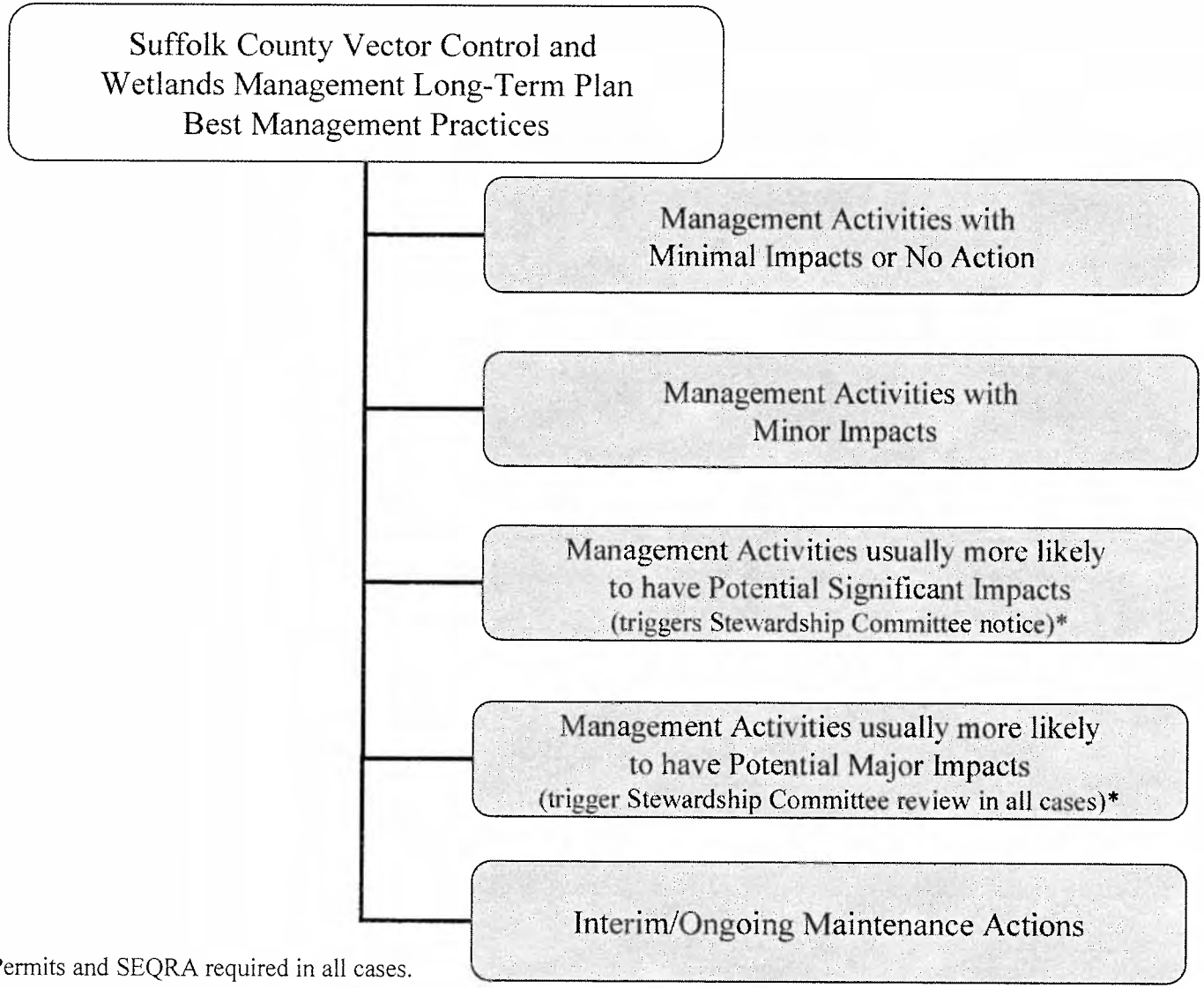
b) Maintenance should involve only existing water features in a marsh and cannot be used to expand any feature in length, width or depth.

c) Suffolk County can remove blockages/obstructions in a ditch or impairments to tidal flow in accordance with conditions identified in the FGEIS.

d) Maintenance cannot expand a ditch network.

e) Maintenance shall avoid enhancement of storm water conveyance.

Figure 1. Overall Hierarchy of Proposed Best Management Practices



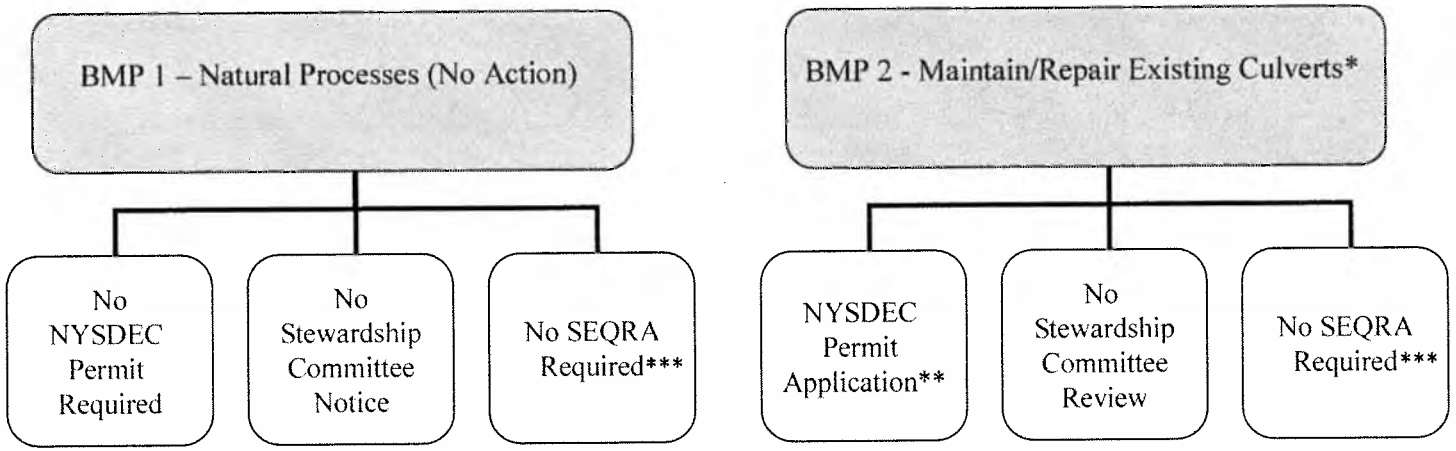
* DEC Permits and SEQRA required in all cases.

Figure 2. Review Process for Management Activities with No or Minimal Impacts

S.C. Vector Control and Wetlands Management Long-Term Plan

Review Process for Wetlands Activity

NO ACTION & MINIMAL IMPACT



* Replacement in-kind with substantially identical culvert.

** Notice will also be sent to Town and Trustee jurisdictions.

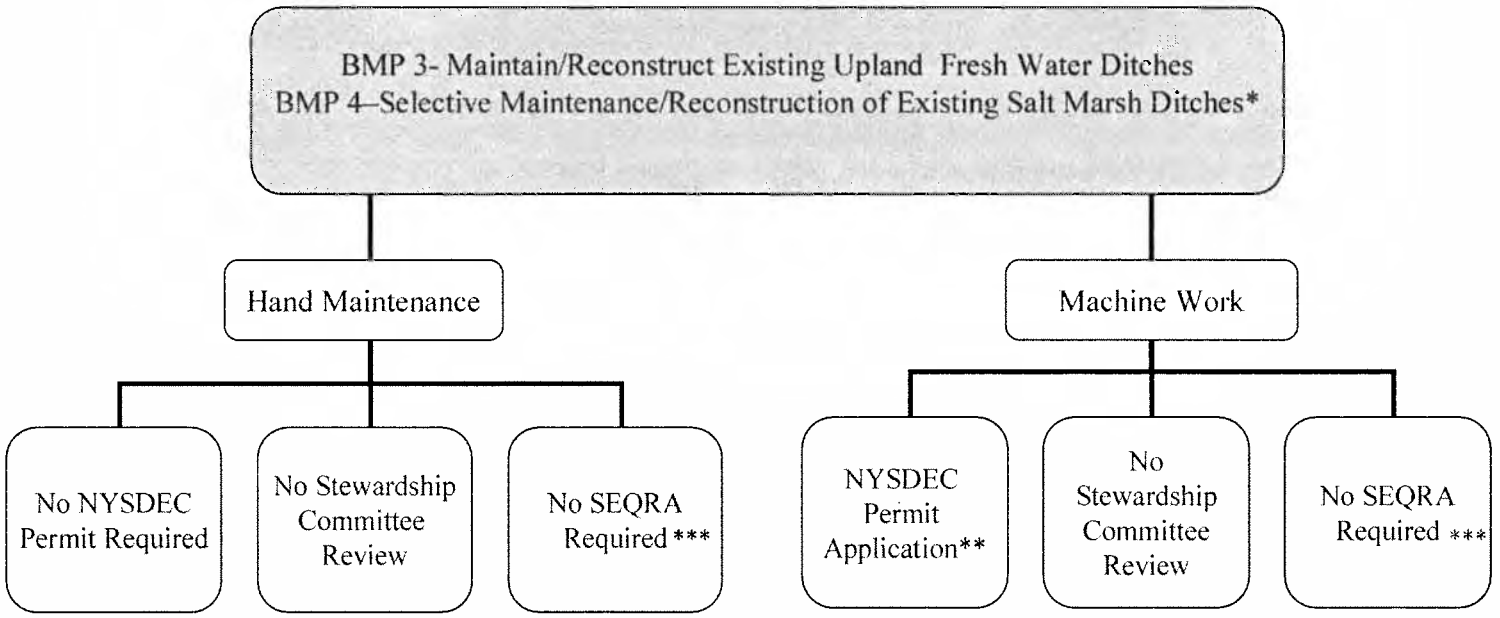
*** BMP 1-4 may require SEQRA review if deemed appropriate by DEE/CEQ.

Figure 3. Review Process for Management Activities with Minor Impacts

S.C. Vector Control and Wetlands Management Long-Term Plan

Review Process for Wetlands Activity

MANAGEMENT ACTIVITIES WITH MINOR IMPACTS

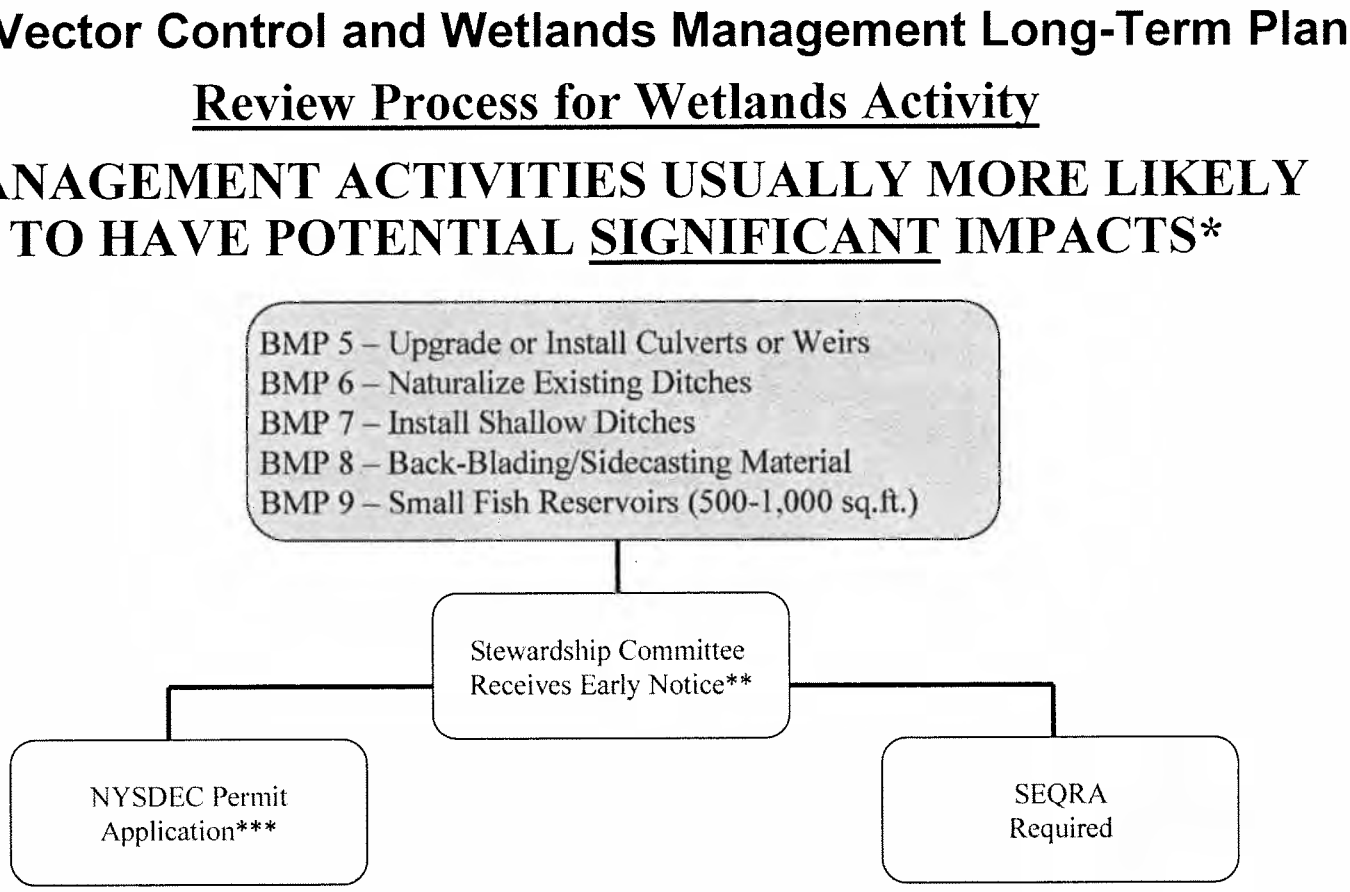


* Minimal machine maintenance when required for critical public health or ecological purpose (50,000 feet/year, 50 acres maximum, 1 acre minimum).

** Notice will also be sent to Town and Trustee jurisdictions.

*** BMP 1-4 may require SEQRA review if deemed appropriate by DEE/CEQ.

Figure 4. Review Process for Management Activities with the Potential for Significant Impacts

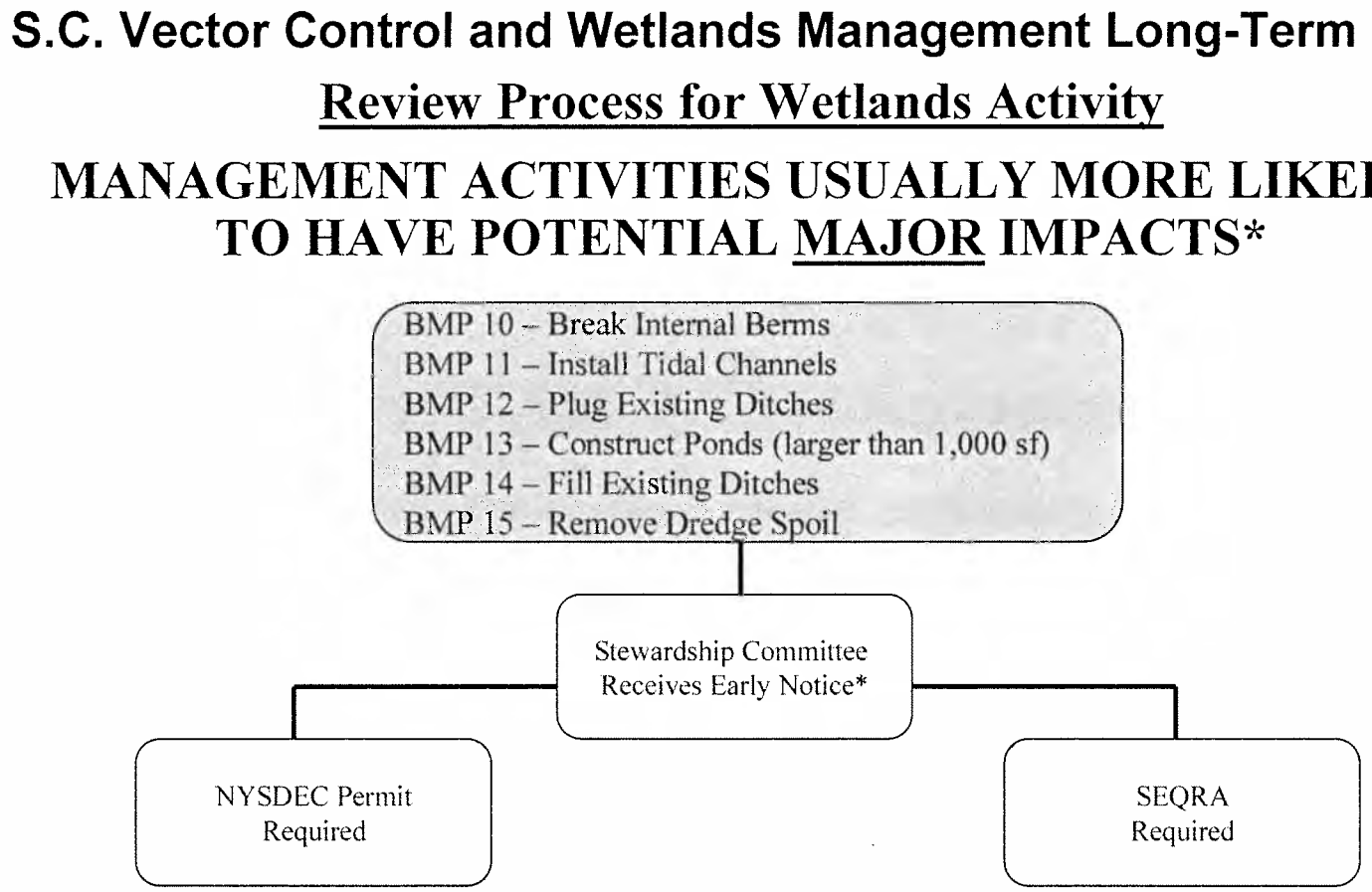


* In former plan drafts, BMP's 5-9 were designated "minor impacts" unless they affect 15 or more acres. In the current plan all are deemed usually more likely to have "potential significant impacts," irrespective of size. Impacts may be beneficial not necessarily adverse.

** Stewardship Committee can submit comments to project sponsor and/or SEQRA lead agency prior to project approval. Stewardship Committee meetings can also occur, as needed.

*** Notice will also be sent to Town and Trustee jurisdictions.

Figure 5. Review Process for Management Activities with the Potential for Major Impacts



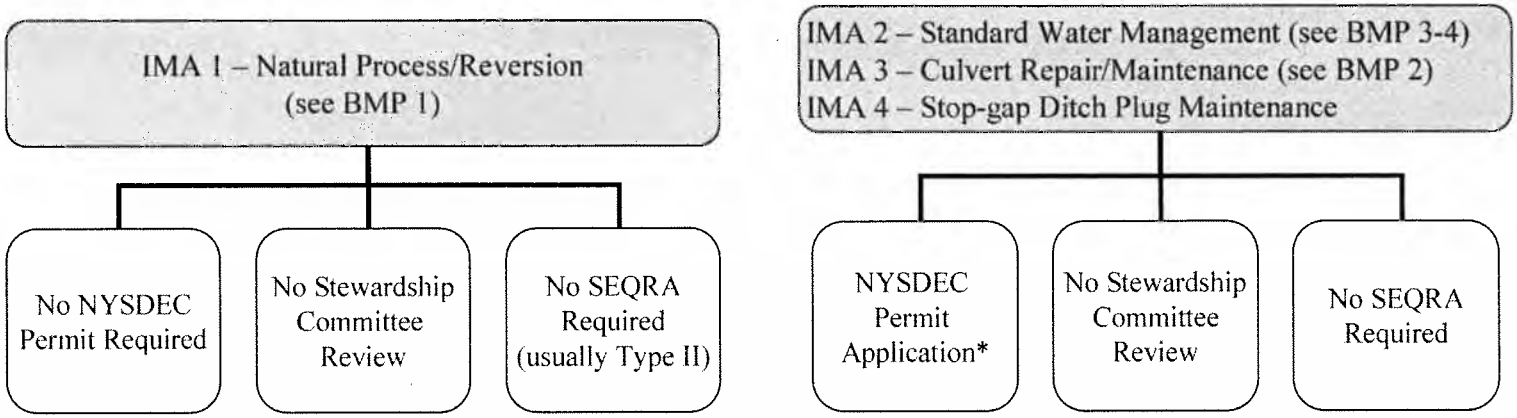
* Includes representation from local jurisdictions.

Figure 6. Review Process for Interim Management/Ongoing Maintenance Activities

S.C. Vector Control and Wetlands Management Long-Term Plan

Review Process for Wetlands Activity

INTERIM MANAGEMENT/ONGOING MAINTENANCE ACTIVITIES (IMA)



* Notice will also be sent to Town and Trustee jurisdictions.

In addition, over the first three years of the Long-Term Plan, the Stewardship Committee is charged with developing more rigorous indicators for marsh health for Suffolk County, and using them to assess marsh health and develop a strategy to manage all of the counties 17,000 acres of salt marsh (not just the 4,000 acres of vector control concern). SCDEE will oversee the development of this strategy. Marsh health (functions and values) and the preservation of marshes are to be paramount considerations in evaluating any potential project.

The Wetlands Stewardship Committee is envisioned in the Long-Term Plan to have the following composition:

Estuary programs:
- Long Island Sound Study (LISS) representative
- Peconic Estuary Program (PEP) representative
- South Shore Estuary Reserve (SSER) representative

State
- New York State Department of Environmental Conservation (NYSDEC) Region I
- NYSDEC Bureau of Marine Resources
- New York State Department of State (NYSDOS)

County
- County Legislature
- County Executive
- Suffolk County Department of Health Services (SCDHS)
- Suffolk County Department of Public Works (SCDPW)
- Suffolk County Department of Environment and Energy (SCDEE) (chair)
- Suffolk County Department of Planning
- Suffolk County Department of Parks
- Council on Environmental Quality (CEQ)

Local
- Town representative (based on project location)
- Trustee's representative (based on project location)

Non-governmental Organizations
- Two appointed by County Legislature
- Two appointed by County Executive

Any agency or entity that initiates a project that is before the committee, cannot vote on that project.

Appendix 2 more completely describes the functions of the Wetlands Stewardship Committee.

The Long-Term Plan identified priority sites for consideration of wetlands management (approximately 4,000 acres of salt marshes), and also identified other sites where no marsh

management for vector control purposes appeared to be appropriate (also approximately 4,000 acres). The Long-Term Plan, in the context of the Integrated Marsh management program developed by the Wetlands Stewardship Committee under the direction of SCDEE, proposes to assess the priority sites and the remaining 9,000 acres of other coastal marshes over the next 12 years or so to determine whether marsh management (possibly with a vector control element) is appropriate.

Other important Long-Term Plan elements

SCVC and the Arthropod Borne Disease Lab (ABDL) have redefined areas of operation under the Long-Term Plan, with SCVC focusing on population dynamics and control, and the ABDL concentrating on disease surveillance and determination of the need for adulticide treatment to reduce health risks. Each division has been slightly reorganized, and the County has committed to providing the personnel necessary for the organizations to meet their duties under the Long-Term Plan. The Long-Term Plan also emphasizes the need for continuing professional education to maintain the current top-notch standing of these organizations and to support continuing review and reporting on program elements.

The Long-Term Plan is not envisioned to be a static document. Means for continuing adaptive management are outlined in the Plan, including, obviously, incorporation of the findings of the Wetlands Stewardship Committee into the Wetlands Management element of the Plan. In addition, to meet the need for continuing evolution of the Long-Term Plan, and also to meet important public outreach goals, the production of a Triennial Report has been proposed. Its outline is attached as Appendix 1 to this Findings Statement.

E. Reasonable Alternatives Considered

In accord with the requirements of SEQRA, the environmental review of the Long-Term Plan considered reasonable alternatives to the Long-Term Plan.

- No Action (continue the existing program)

SEQRA requires that a "no action" alternative be considered. If no changes were made to the existing situation, then the existing mosquito management program would be continued.

The existing program is an Integrated Pest Management program, but the Long-Term Plan has identified ways that it could be improved. The ways that the existing program would be improved include:

- An expanded and improved education program
- An expanded surveillance program
- Potential construction of a local BioSafety Level 3 laboratory
- Improved GIS capabilities for data management
- Improved source reduction, including an emphasis on tire management and storm water facility maintenance
- Implementation of a more ecologically sound and yet more effective water management program
- Selection of a better biocontrol agent than *Gambusia* fish
- Proposed implementation of numerical triggers for larviciding
- Establishing goals for larvicide reductions through more effective water management
- Purchase and installation of the Adapco system for aerial adulticide applications
- Establishing clear and precise numerical triggers for Vector Control treatments
- Creating pesticide efficacy programs
- Establishing resistance testing

- Establishing clear distinctions for the complementary roles of SCVC and the ABDL
- Creating mechanisms by which the Long-Term Plan can be modified as needs dictate

Thus, the No Action alternative is clearly inferior to the Long-Term Plan.

- No Mosquito Control

A considered alternative was one where no mosquito control was to be conducted. This alternative was found to be insufficiently protective of human health. A model of WNV prevalence in the theoretical absence of mosquito control found that tens of deaths might occur each year, with more than one hundred additional cases requiring hospitalization. In addition, because careful implementation of progressive water management can augment important salt marsh functionalities, potential ecological benefits would be lost. Human health and environmental impacts from pesticide use (see Section F below), which would be avoided under this alternative, were not found to be of the same magnitude as the potential human health impacts from disease. The potential for ecological impacts from water management are mitigated by processes established for programmatic and project level reviews (see Section D above and Section F below).

- Alternative IPM approaches

Various permutations of the overall Long-Term Plan approach were considered. They included:

- No water management at all

  This is to adopt a marsh reversion policy for all marshes throughout the County. The environmental analysis suggested that, for certain marshes, allowing ditches to infill could increase mosquito breeding. In addition, for certain marshes, allowing the ditches to infill would reduce tidal circulation, and therefore lead to reduced functioning as a salt marsh. Therefore, having no water management at all would lead to potentially greater human health impacts because of increased mosquito breeding, and decreases in important ecological functions.

- Selective ditch maintenance

Experiences in other jurisdictions suggests that there are water management alternatives that potentially are more effective as mosquito control means, have potentially fewer environmental impacts, and should augment certain marsh functionalities such as fish production and water bird use of the marsh. This suggests that ditch maintenance is an inferior means of conducting water management.

- Ditch maintenance of all ditches

This alternative is based on the notion that structures should be maintained as they were constructed to be. However, it is clear that not all ditches are needed for mosquito control purpose. It is also likely that some ditches have had negative environmental impacts on certain marshes. Therefore, a universal policy of ditch maintenance is also an inferior means of mosquito control and of marsh management.

- Alternative larvicide compounds

Three alternatives were considered: ethoxylated fatty alcohols, Temphos, and Golden Bear Oil. Temphos clearly has the potential for greater ecological impacts to non-target aquatic invertebrates compared to Bti, Bs, and methoprene. The other two compounds are not as well studied. However, they appear to have the potential for non-target organism impacts, and do not appear to meet operational needs for SCVC. Therefore, these three compounds were evaluated to be inferior choices.

- No larvicide use in fresh water settings, with no methoprene use in salt water settings

Based on efficacy data, it is clear that mosquito breeding would be increased under this choice. The County has found that increased mosquito populations increase risks of disease transmission. Therefore, selecting this alternative would increase the risk of human disease. The analysis was not able to quantify the increase in risks, however. Selection of this alternative is based on the environmental benefits of reduced larvicide use outweighing the increase in human health risks. Although no use of pesticides is risk free, the quantitative risk analysis found that the proposed Long-Term Plan use of Bti, Bs, and methoprene should result in no changes to ecological conditions, as the modeling

suggested the exposure of organisms to these pesticides would be below thresholds where impacts were found to occur. Therefore, it is likely that no discernable environmental benefits would ensue, and so the risk increase to human health is likely to be much greater than (and incommensurate with) any potential ecological benefits. In fact, significantly increased adulticide usage could occur as a result. This makes this alternative inferior to the Long-Term Plan.

o Alternative adulticide compounds

Four alternatives were considered: naled, fenthion, chloripyrifos, and deltamethrin. Qualitative risk assessments were conducted of these compounds. Naled, fenthion, and chloripyrifos are organophosphate pesticides. US Environmental Protection Agency studies suggest they are likely to have more non-target impacts than the pyrethroids selected for the Long-Term Plan. They thus represent inferior choices to resmethrin and sumithrin (the preferred Long-Term Plan adulticides). Deltamethrin is also a synthetic pyrethroid. The qualitative analysis of deltamethrin suggested it should have ecological and human health impacts that are similar to the selected pyrethroids. Because no information surveyed suggested it would have lower impacts than the selected pyrethroids, it was not selected as an alternative that should be preferred over the Long-Term Plan choices.

o Use of Mosquito Magnets in Davis Park

Mosquito Magnets and other mosquito traps have been found to be effective in some testing. However, local tests conducted under the Long-Term Plan did not find that they deterred mosquitoes from reaching a target area. Therefore, establishing an array of such traps across the barrier beach to reduce infiltration of mosquitoes to the community was thought to be technically flawed.

o Adulticide only for Health Emergencies

Four study areas were considered for the quantitative risk assessment. Two areas (Dix Hills, with one application, and Manorville, with two applications) were evaluated under Health Emergency scenarios. Mastic-Shirley (10 applications) was evaluated for a mix of Health Emergency and Vector Control applications, and Davis Park (14 applications)

was evaluated for Vector Control applications only. Increasing the number of applications did not increase risks above impact thresholds for most of the scenarios and compounds evaluated. Potential impacts to terrestrial insects were found under all scenarios and for all pesticides (see Section F below). Potential impacts to aquatic invertebrates were found for the higher use scenarios for permethrin and malathion, but not for resmethrin and sumithrin. More sophisticated ecological modeling suggested that any permethrin impacts would be of short duration, and would not affect ecological conditions in the following season (these results were thought to be valid for malathion, as well). The only potential risk found to be greater than threshold limits for human health was found for the highest potential release of malathion in Davis Park, and this risk increase could be mitigated by washing the exposed vegetables (a "community gardener" scenario was modeled for all risk assessment areas, even though it was understood that conditions on Fire Island do not allow for extensive vegetable gardens). Thus, only under the highest use scenario with the highest potential exposure concentration was there even a suggestion that Vector Control applications might lead to greater impacts than Health Emergency applications. Thus, the risk assessment generally found the potential for increased risks associated with Health Emergencies and Vector Control applications to be similar (and negligible). Therefore, there would be only slight risk benefits to be achieved by eliminating Vector Control applications. The analysis by the County, however, finds that increased numbers of mosquitoes tends to increase risks of disease transmission. Therefore, there is a risk benefit for human health from decreased disease risks when Vector Control applications are made. Therefore, eliminating Vector Control applications would not only decrease quality of life, but it would increase human health risks, and provide only negligible risk advantages. This made it an inferior alternative.

- Adulticide only after human illness

This programmatic choice is logically flawed. For one, adulticides are used to avoid human illness. In this scenario, the illness has already occurred. Secondly, it needs to be understood that there is often a week or more lag between the time of infection and diagnoses of illness. Because mosquitoes often have high mortality rates (especially for brooded mosquitoes), the mosquitoes that may have been responsible for the illness may

already be dead when the illness is determined. Therefore, it will often be the case that treatment decisions will be made for reasons other than the targeted mosquitoes having caused illness. If so, those treatment criteria could be used prior to the onset of illness. Because the mosquitoes that caused illness are not likely to still be present, it is clear that eliminating mosquitoes that caused people to become ill is not the direct cause of the proposed adulticide application. This means other criteria must be used to determine where and when the application will be made. If other criteria are used, then these self-same criteria could have been applied prior to the onset of illness, with the effect of potentially preventing impacts to human health. In nearly all mosquito control situations with a virus like WNV that has a long lag between induction of illness and diagnosis of the disease, and where brooded mosquitoes are important to the risk of transmission, past human cases are a poor criterion on which to base mosquito control decisions, and the more important criteria that measure current risks from virus presence are not affected by incidences of disease. Therefore, disease occurrence in humans is a suboptimal trigger for treatment.

- No adulticiding

Information collected in the impact assessment suggests that adulticiding is effective at killing adult mosquitoes. If virus is circulating in these mosquitoes, their deaths will decrease risks to people from mosquito-borne disease. The analyses carried out on adulticide applications suggest that no significant increases in risks to the environment or human health result from judicious use of these pesticides. Therefore, avoiding the use of adulticides does not result in significant risk reductions. On the contrary, it could result in significant risk increases for mosquito-borne disease impacts.

F. Long-Term Plan Potential Significant Impacts and Identified Mitigation

Introduction

Suffolk County, through its consultant, Cashin Associates, and the team of subconsultants assembled by Cashin Associates, has conducted a most thorough and complete evaluation of potential impacts of the proposed Long-Term Plan. As detailed above in Section C, the overall approach to this project provided for a robust feedback system whereby initial findings were commented on and criticized, leading to revised and improved programs and analyses of the proposed programs. Not only were traditional methods of environmental analysis used (such as the literature search and modeled risk analysis), but local and unique experiments, assessments, and demonstration projects were undertaken to strengthen the development of the project and its environmental impact analysis.

Several elements are key to the findings regarding the proposed Long-Term Plan. These are:

- The 27 volume literature search
- The quantitative risk assessment of potential ecological and human health impacts of the proposed Long-Term Plan pesticides, using four exemplar areas of the County with different application scenarios, conducted by Integral Consulting.
- The Caged Fish experiment of fate and transport and potential impacts to sentinel organisms for methoprene and resmethrin under operational conditions in salt marsh ditches, under the direction of Professor Anne McElroy, Stony Brook University.
- The Wertheim National Wildlife Refuge demonstration of progressive water management practices and their potential to create environmental benefits and meet mosquito control needs, with the cooperation of USFWS.
- A model of potential human health impacts from WNV in the absence of local mosquito control, based on serological data collected in New York, Ohio, and Ontario.

Hundreds of samples of air, water, sediment, and biota were taken, with samples analyzed to the low part-per-trillion level, the lowest known detection limit ever attained. Numerous other efforts from this three-year study contributed to the conclusions reached here.

The contributions of volunteers were extremely important, and shaped the results presented here. These volunteers included citizens and government and academic professionals from outside of the project, who served on the various committees and who analyzed project output and draft and provisional documents.

Impacts and Mitigation

The following specifies potentially significant impacts that may be incurred with the adoption of the Long-Term Plan by the Suffolk County Legislature, and also identifies mitigation of these potential impacts.

- Education and Outreach

The Long-Term Plan identified the potential for impacts associated with counseling the public to use DEET to avoid mosquito bites. Although it is not clear that any health impacts result from the use of DEET, the Long-Term Plan repeats the advice of the State Department of Health and urges the public to use caution when applying DEET to skin, and to ensure label directions are followed. Any potential impacts associated with DEET use are mitigated by reductions in disease risk associated with its effective deterrence of mosquito bites.

- Source Reduction

Collection of littered tires can increase waste management requirements, and the maintenance of storm water structures can also generate somewhat problematic materials. The scope of these problems, in light of waste management as a whole County-wide, is not great. The impact of problems associated with these waste streams is mitigated by the potential for improved mosquito management, especially in the reductions of risks to human health.

- Water Management

The Long-Term Plan identifies 15 Best Management Practices and four Interim Management/Ongoing Maintenance Activities (Tables 1 through 5) that could be conducted in coastal marshes to further mosquito control purposes. The following five tables summarize the possible impacts associated with each, and also identify mitigation for each potential impact (identified in the Tables as "Potential Benefits").

Table 1. Management Activities with No or Minimal Impacts

BMP	Action	Factors to Consider	Potential Benefits	Possible Impacts	Equipment to be used	General Compatibility With Tidal Wetlands 6 NYCRR Part 661
BMP 1.	Natural processes (reversion/no action)	- Default option - Land owner prefers natural processes to proceed unimpeded - Natural reversion is actively infilling ditches - No existing mosquito problem	- Return to pre-ditch hydrology - More natural appearance/processes - Requires no physical alterations	- Possible increase in mosquito breeding habitat, creation of problem - Loss of ditch natural resource values - Loss of tidal circulation - Phragmites invasion if fresh water is retained on marsh - Drowning of vegetation if excess water is held on marsh	Not applicable	NPN
BMP 2.	Maintain/repair existing culverts	- Flooding issues - Are existing culverts adequate for purpose? - Are existing culverts functioning properly?	- Maintain existing fish and wildlife habitats - Maintain tidal flow and/or prevent flooding	- Continue runoff conveyance into water bodies - Roads & other associated structures	- Hand tools (minor maintenance) - Heavy equipment for repair	GCp

Please note that other jurisdictions besides NYSDEC may also regulate activities in wetlands.

NPN = Uses Not Requiring a Permit
GCp = Generally Compatible Use- Permit Required

Table 2. Management Activities with Minor Impacts

BMP	Action	Factors to Consider	Potential Benefits	Possible Impacts	Equipment to be used	General Compatibility With Tidal Wetlands 6 NYCRR Part 661
BMP 3.	Maintain/ reconstruct existing upland/ fresh water* ditches	- Flooding issues - Are existing ditches supporting flood control? - Are existing ditches needed for agricultural uses?	- Maintain existing fish and wildlife habitats and hydrology - Prevent or relieve flooding - Support turtle habitat - Provide fish habitat	- Continue runoff conveyance? - Perpetuate existing degraded conditions - Excess drainage	- Hand tools (minor maintenance) - Heavy equipment for reconstruction (rare)	NPN, GCp (6 NYCRR Part 663)
BMP 4	Selective Maintenance/ Reconstruction of Existing Salt Marsh Ditches	- Local government issues and concerns resolution - SCDHS Office of Ecology review - Mosquito breeding activity - Land owners long-term expectations - Overall marsh functionality - Ditch maintenance is to be selective and minimized	- Enhance fish habitat - Maintain existing vegetation patterns - Maintain existing natural resource values - Allow salt water access to prevent/control Phragmites - Reuse pesticide usage	- Perpetuate ongoing impacts from ditching (lack of habitat diversity)	- Hand tools (minor maintenance) - Heavy equipment for reconstruction	NPN, GCp

Please note that other jurisdictions besides NYSDEC may also regulate activities in wetlands.

NPN = Uses Not Requiring a Permit
GCp = Generally Compatible Use- Permit Required

Table 3. Management Activities Usually More Likely to Have Potential Significant Impacts

BMP	Action	Factors to Consider	Potential Benefits	Possible Impacts	Equipment to be used	General Compatibility With Tidal Wetlands 6 NYCRR Part 661
BMP 5.	Upgrade or install culverts, weirs, bridges	- Flooding - Flow restrictions - Associated marsh impacts - Cooperation from other involved departments	- Improve tidal exchange and inundation - Improve access by marine species - Increase salinity to favor native vegetation - Improve fish habitat & access	- Negative hydrological impacts - Changes in vegetation regime	- Heavy equipment required	GCp, P, PiP
BMP 6.	Naturalize existing ditches	- Grid ditches - Mosquito breeding activity - Landowner needs - In conjunction with other activities	- Increase habitat diversity - Increase biofiltration - Improve fish habitat and access by breaching berms	- Hydrology modification - Minor loss of vegetation - Possible excess drainage	- Hand tools (minor naturalization) - Heavy equipment for major	GCp
BMP 7.	Install shallow spur ditches	- Mosquito breeding activities - Standard water management not successful (continued larviciding)	- Increase habitat diversity - Allow higher fish populations - Improve fish access to breeding sites	- Drainage of ponds and pannes - Hydraulic modification - Structure not stable	- Preferably hand tools	GCp
BMP 8.	Back-blading and/or sidecasting material into depressions	- Mosquito breeding activities - Standard water management not successful (continued larviciding)	- Improve substrate for high marsh vegetation - Compensate for sea level rise or loss of sediment input - Eliminate mosquito breeding sites	- Excessive material could encourage Phragmites or shrubby vegetation - Materials eroded so that application was futile	- Heavy equipment required	Usually NPN or GCp; could be PiP or I
BMP 9.	Create small (500-1000sq. ft) fish reservoirs in mosquito breeding areas	- Mosquito breeding activities - In conjunction with other water management - Natural resource issues	- Increase wildlife habitat diversity/natural resource values - Improve fish habitat - Eliminate mosquito breeding sites - Generate material for back-blading	- Convert vegetated area to open water with different or lower values	-Heavy equipment required	PiP

Please note that other jurisdictions besides NYSDEC may also regulate activities in wetlands.
NPN = Uses Not Requiring a Permit
GCp = Generally Compatible Use- Permit Required
P = Permit Required
PiP = Presumptively Incompatible Use- Permit Required
I = Incompatible Use

Table 4. Management Activities with the Potential for Major Impacts

BMP	Action	Factors to Consider	Potential Benefits	Possible Impacts	Equipment to be used	General Compatibility With Tidal Wetlands 6 NYCRR Part 661
BMP 10.	Break internal berms	- Water quality (poor) - Standing water (mosquito breeding) - Impacts on structural functions	- Allow access by marine species - Prevent waterlogging of soil and loss of high marsh vegetation - Improve fish access to mosquito breeding sites - Prevent stagnant water	- Changes in system hydrology - Excessive drainage of existing water bodies - Introduction of tidal water into areas not desired	- Hand tools (minor) - Heavy equipment (major)	Pip
BMP 11.	Install tidal channels	- Improve water quality - Tidal ranges and circulation - Increase salinity (invasive vegetation) - Natural resources enhancement	- Improve tidal exchange - Improve access by marine species - Increase salinity to favor native vegetation - Improve tidal inundation - Improve fish habitat	- Changes in system hydrology - Excessive drainage or flooding of uplands - Increase inputs from uplands into water body	- Heavy equipment	PiP
BMP 12.	Plug existing ditches	- Improve fish habitat - Tidal ranges and circulation - Prevent upland inputs - Natural resources enhancement	- Return to pre-ditch hydrology & vegetation - Reduce pollutant conveyance through marsh - Provide habitat for fish & wildlife using ditches - Retain water in ditch for fish habitat - Deny ovipositioning sites	- Changes in system hydrology - Reduce tidal exchange - Reduce fish diversity in ditches due to lack of access - Impoundment of freshwater could lead to freshening & Phragmites invasion - Possible drowning of marsh vegetation	- Heavy equipment	PiP or I
BMP 13.	Construct ponds greater than 1000 sq.ft.	- Landowner's needs - Water fowl habitat - Natural resources enhancement - Aesthetic improvements	- Increase habitat values for targeted species and associated wildlife - Improve habitat for fish - Eliminate mosquito breeding sites	- Changes in system hydrology - Convert vegetated areas to open water with different and possibly lower values	- Heavy equipment	PiP
BMP 14.	Fill existing ditches	- Landowner's needs - Aesthetic improvements - To restore pre-ditch hydrology - Vegetated areas	- Return to pre-ditch hydrology and vegetation - Reduced likelihood of pollutant conveyance through marsh - Create vegetated habitat to replace that lost by ditches or by other alterations - Deny mosquito breeding habitat by eliminating stagnant ditches	- Potential to create new breeding habitats if ditches are not properly filled or by making the marsh wetter - Loss of ditch habitat for fish, other marine species & wildlife using ditches - Loss of tidal circulation - Phragmites invasion if freshwater is retained on marsh - Drowning of vegetation if excessive water is held on marsh	- Heavy equipment	PiP or I
BMP 15.	Remove dredge spoils	- Increase wetland habitat	- Convert low-value upland to more valuable wetland habitats - Eliminate mosquito breeding sites	- Could result in new breeding sites if not carefully designed - Major change in local topography	- Heavy equipment	PiP

Please note that other jurisdictions besides NYSDEC may also regulate activities in wetlands.

PiP = Presumptively Incompatible Use- Permit Required

I = Incompatible Use

Table 5. Interim Management/Ongoing Maintenance Actions

Interim Action	Action	Factors to Consider	Potential Benefits	Possible Impacts	Equipment to be used	General Compatibility with Tidal Wetlands 6 NYCRR Part 661
IMA 1.	Natural processes (No action reversion)	-Presumptive interim action	- Non-intervention in natural system	- Non-intervention in natural system	- Non-interventio n in natural system	- Non-intervention in natural system
IMA 2.	Selective ditch maintenance (Standard Water Management)	- mosquito breeding activity - water quality (poor) - improve fish habitat	- Enhance fish habitat - Maintain existing vegetation pattern - Improve fish access to breeding sites - Increase fish and wildlife habitat diversity - Increase biofiltration - Improve fish habitat and access by breaching berms	- Perpetuate ongoing impacts from ditches - Hydrology modification - Minor loss of vegetation - Possible excess drainage of marsh surface	- Hand tools (Minor) - Heavy equipment (Major)	NPN, GCp
IMA 3.	Culvert repair/maintenance when tidal restrictions are apparent	- improve water quality - restore pre-restriction hydrology -mosquito breeding activities	- Maintain existing habitat - Maintain existing flows and/or prevent flooding	- Continue runoff conveyance into water bodies - Potentially inadequate water transmission	- Heavy equipment	GCp
IMA 4.	Stop-gap ditch plug maintenance	- prevent upland inputs - increase wetland habitat - sustain fish and wildlife habitat	- Return to pre-ditch hydrology & vegetation - Reduce pollutant conveyance through marsh - Provide habitat for fish & wildlife using ditches - Retain water in ditch for fish habitat - Deny ovipositioning sites	- Reduce tidal exchange - Reduce fish diversity in ditches due to lack of access - Impoundment of freshwater could lead to freshening & Phragmites invasion - Possible drowning of marsh vegetation - Impermanent approach (likely to fail within 5 years)	- Heavy equipment	GCp

Please note that other jurisdictions besides NYSDEC may also regulate activities in wetlands.

NPN = Uses Not Requiring a Permit
GCp = Generally Compatible Use- Permit Required

Extensive experience in other jurisdictions such as New Jersey and Connecticut, suggests that careful site selection and professional implementation of these Best Management Practices tends to minimize the potential for negative impacts and increase the potential for benefits to accrue.

In addition to these efforts to mitigate impacts, Suffolk County will take the following actions to ensure that projects do not result in unwanted and unexpected negative environmental impacts:

- All water management projects are to be conducted on the basis that marsh health and marsh preservation are the primary project concern.
- All projects using Best Management Practices 5 to 15 (listed in Tables 3 and 4) will be subject to initial review through SCDEE and also will be subject to further environmental review.
- All projects will receive NYSDEC permits, as required, and undergo State environmental reviews, as required. Any project requiring a NYSDEC permit will be noticed to CEQ.
- The Long-Term Plan calls for the creation of a Wetlands Stewardship Committee. The Committee will be chaired by SCDEE. This Committee, as discussed in Section D, (and further outlined in Appendix 2) will be responsible for developing a definition of marsh health, and to use that definition to develop a County-wide marsh management plan that will be the basis of an Integrated Marsh Management program. The Integrated Marsh Management program will address all County marsh management needs, including those associated with vector control. The Wetlands Stewardship Committee will also be required to review and make recommendations on all projects that use Best Management Practices 10 to 15, and Best Management Practices 5-9 that the membership of the Committee determines requires further review.
- For the first three years of the Long-Term Plan, the County will only conduct water management projects that have the potential for minimal environmental impacts.
- All wetlands management projects will be developed, reviewed, and assessed on site-specific basis.

- Projects that do not meet goals and objectives after implementation will be subject to remedial activities to mitigate any potential impacts.

- Biocontrols

The Long-Term Plan identified potential impacts of the introduction of fish into certain fresh water habitats as a potential impact associated with the use of biocontrols. This is because certain predator-deficient environments allow for the development of aquatic invertebrates, insects, and amphibians. Some of the insects that can flourish in these environments are mosquitoes. Thus, it can seem to be worthwhile, from a mosquito control standpoint, to introduce mosquito larvae predators to reduce emergent populations. This would likely have negative impacts on other species, however. Therefore, the County will mitigate this potentially negative impact by limiting fish releases generally to locations where they have been used before. In addition, any expansion of fish releases will only occur after the locations have been reviewed and determined not to provide these kinds of "vernal pool" or "coastal plain pond"-type environments, and that any connected waters that the fish might migrate to also do not constitute such environments. This will be done for natural waters, and also for the various artificial waterways (such as recharge basins) that sometimes appear to need treatment.

- Larval Control

Comments were received on the County's proposed use of methoprene and its potential for environmental impacts. The comments tended to focus on two areas:

1) The County ignored important scientific findings in making its analysis

2) The County did not correctly interpret a study conducted in Minnesota

There is no study that was evaluated as part of the Long-Term Plan which suggested that methoprene, as used in vector control applications in Suffolk County (as per NYSDEC-approved label requirements), has significant adverse ecological impacts. To the contrary, the Long-Term Plan's comprehensive risk assessment found that methoprene has no such impacts. Therefore, these findings do not recognize these comments and potential impacts as being substantiated. No commenters have refuted the specific technical materials in the

DGEIS or the FGEIS. Some commentators have recommended that, as a matter of policy, methoprene should be eliminated from the County's vector control program, without scientific documentation of adverse impacts. The commentators have made the recommendation based on speculation that, in the future, scientists may document adverse methoprene impacts in our salt marsh. This basis of speculation is clearly contrary to SEQRA.

Michael Horst has published research regarding impacts of methoprene on various crustaceans since 1999. He has found serious impacts, especially to larval stages of crabs and lobsters. The following summarizes the findings of this environmental assessment with regard to Dr. Horst's research:

- Methoprene is applied in wetland areas, not where larval crabs and lobsters used by Dr. Horst are found. Blue claw crabs hatch offshore and only arrive in estuaries when they are close to being fully developed. It is unlikely any are present in salt marshes in larval forms. Lobsters hatch offshore, develop offshore, and live offshore. A modeling exercise, made to estimate the maximum amount of pesticides that could have been in Long Island Sound when the 1999 lobster die-off occurred, found the maximum amount of methoprene that could be present in the near offshore waters of the sound was measured in the parts per quadrillion, and the lowest concentration linked to effects are in the parts per billion.
- Dr. Horst tends to overestimate the concentration of methoprene that could be present in salt marsh ponds, ditches, and streams, and in estuarine waters, according to all other researchers in the field. He also finds effects that, sometimes, others cannot duplicate.
- Dr. Horst has identified effects from methoprene that other researchers have not found, and have not looked for. This is because he is concerned about impacts from methoprene effects on endocrine systems of organisms. It is possible that pesticides (and other chemicals) that affect endocrine systems are not being correctly evaluated. However, the work in this field is preliminary, and cannot and should not be used to draw conclusions regarding any environmental impacts, based on only a few, limited laboratory studies.

To more specifically illustrate problems with the methoprene research cited by commentators, Dr. Horst's 1999 research with crab larvae used concentrations up to 500 times higher that those levels present in real-world vector control applications. Dr. Horst's more recent work in 2005 with lobster larvae suggested that there was increased mortality in Stage II lobster larvae in experiments conducted utilizing concentrations of 1 to 2 ppb methoprene continuously during a 72 hour exposure. These results were not confirmed in concurrent Stony Brook University analyses.

In any case, one ppb methoprene exposures maintained continuously for 72 hours is an extremely unrealistic exposure. The Caged Fish Study, conducted as part of the Long-Term Plan, with independent verification by USGS, clearly demonstrated that the concentrations required to cause impacts found by the Horst laboratory do not persist in the water column. Nominal concentrations of methoprene rapidly decrease to near or below detection limits of 5 ng/L (0.005 ppb); most of this reduction occurs within two hours of application. In addition, the quantitative risk assessment found, with comfortable margins of error, that risks of ecological impact do not increase to any significant level when methoprene is applied as is anticipated under the Long-Term Plan. Field sampling of salt marshes around Suffolk County also found no differences in the presence or absence of keystone marsh species with the use or not of methoprene in the marshes.

Some have placed great reliance of reports from researchers in Minnesota that appear to show impacts from methoprene use in fresh water marshes. The Hershey group's studies, published in 1997 and 1998, looked at six years of data collected from 1989 to 1994. The research indicated that methoprene use was correlated with relative reductions in insect populations and diversity (primarily in the chironomids), compared to control sites (but note that all populations actually increased in numbers and diversity over the study period; the treatment site populations grew more slowly than the control site populations did). However, sampling of the same marshes in 1997 and 1998 found the effect was gone, although insecticide use was continued. These reports are interpreted by many, including Suffolk County, as indicating that methoprene was not the primary cause of the change in the marsh insect populations.

In summary, the Hershey results do not document potential adverse impacts of methoprene, particularly in terms of Suffolk County's vector control setting. Scientifically, the Minnesota results are equivocal. The results relied on by Hershey impacts were apparently anomalous, as variations in chironomid populations occurred only in later years of the study, with no apparent causal explanation. Confounding factors such as meteorological variations may have been the root of observed impacts on chironomids. Significantly, Hershey's results were not reproduced in subsequent studies and years (i.e., no impacts, despite continuing pesticide use). Finally, it is important to emphasize that, even though the Hershey study was rigorously evaluated, it is substantially irrelevant to the Suffolk County vector control program. Hershey's work was performed exclusively in fresh water systems, while Suffolk's use of methoprene is focused predominantly on salt marshes. As such, Hershey dealt with different use patterns and ecological settings than those present in Suffolk County.

Aerial applications of larvicides appear to have the potential to cause impacts to certain bird species. Aircraft, especially when flown low over a marsh, have been observed to startle resting and nesting birds, causing them to take flight. Research on the impacts of startling such birds at one or two week intervals, as can occur due to repeated applications of larvicide across a season, is sparse, and so the impacts to any such species is based on speculation.

This potential impact is mitigated in two ways through the Long-Term Plan. One is by identifying important populations, and then altering application techniques to avoid any startling. This is already the practice of SCVC when piping plover nesting sites may be in potential flight paths. SCVC has requested that local experts work more closely with it to identify any significant populations or environments that may be impacted by its operations; although the focus of this effort is on fresh water settings, the same experts may be useful in identifying at risk populations in salt marshes, and the times when they are most sensitive to disturbance. Secondly, it is hoped that full implementation of progressive water management across the salt marshes will lead to a reduction in aerial larviciding. This has been the experience in neighboring jurisdictions where these procedures are used regularly.

Generally, the potential for impacts from the use of larvicides will be mitigated by the proposed large-scale reduction in applications, as the need for such applications is reduced.

Another overall mitigation is the benefit to human health resulting from disease risk reductions when potential vector populations are reduced.

As mentioned above, potential impacts associated with larval controls in fresh water settings are going to be further mitigated by encouraging information exchange between experts with knowledge of at risk organisms or settings, and SCVC. As each party understands habitat needs of the organisms, and proposed treatments by SCVC, it is anticipated that alterations can be made in the means SCVC uses to control mosquitoes to minimize the potential for impacts. These alterations could be shifts in the time of day that applications are made, to avoidance of treatments for certain settings at certain times, to more studied selection of treatments and times or applications to optimize mosquito control while minimizing the opportunities for impacts to occur. SCVC has, for example, worked closely with NYSDEC to avoid treating any tiger salamander habitats at times when impacts might affect breeding, or development and emergence of young. This is true although there do not appear to be any reasons to believe larvicide applications directly affect amphibians.

The quantitative risk assessment, the scientific literature in general, and local field work all found no potential impacts from the use of the biorational larvicides selected by the County under its proposed application means. Nonetheless, the County will seek to minimize its use of pesticides in the program. This is for several reasons:

- Minimizing pesticide use complies with spirit of the County pesticide phase-out law
- Minimizing pesticide use complies with Integrated Pest Management, where other means of pest control are preferred to the use of pesticides
- Reliance on pesticides for mosquito control can lead to suboptimal control. Resistance might develop, weather or other factors may impede the delivery of the pesticide, or the application may fail to impact the targeted population as expected (for a number of reasons). Thus, the pesticide may not achieve the expected efficacy.
- The potential exists for impacts due to accidents or misapplications.
- All studies, experiments, and calculations involve some uncertainties; in the case of much of the work with mosquito control pesticides, there are certainly a number of

factors and conditions that have not been completely studied and understood. Therefore, there is still a potential for impacts from the use of these products.

Therefore, the County will continue to seek to reduce its use of these compounds wherever and whenever it is feasible to do so.

- Adult Control

In the course of modeling helicopter releases of adulticides, RTP Environmental discovered there was drift of the pesticides from the release point so that at least some of the material was deposited outside of the target zone. To mitigate this potential impact, the County purchased an Adapco Wingman system. This is a coupled weather station-modeling-aircraft guidance system, where real-time meteorological data are used to model potential draft patterns of released ultra-low volume pesticides, and flight patterns are instantaneously generated to optimize the delivery of the pesticides to the target zone. This modeling system was installed on the contract helicopter used by the County in late 2005.

The quantitative risk assessment found at the point in the model grid where pesticides concentrations were greatest in Davis Park, that some elevated risks for human health for a receptor called the "community gardener" are possible (the community gardener receptor was studied in all settings, although it is not feasible for someone on Fire island to have a large, extensive vegetable garden). A community gardener is someone who eats all of their vegetables and fruit in summer from home-grown produce (15 percent of all annual produce ingestion) and works in the garden. Such an individual receives a higher dose of pesticides from residues ingested on the vegetable and from dermal contact with contaminated plants. The exposure modeled is a chronic, non-cancerous toxicity associated with malathion only. The risk can be mitigated by washing produce. It is also mitigated because malathion is not a preferred pesticide for the Long-Term Plan, and exposures associated with the pyrethroids (including resmethrin and sumithrin) do not exceed concentrations of concern. Public education efforts will help to mitigate risks associated with home-grown produce ingestion.

The quantitative risk assessment determined that there could be impacts to night-flying insects based on air dispersion model output concentrations compared to significant concentrations that could cause effects on bees (see Table 6 and Table 7).

Table 6. Bee Risk Quotients, Study Area Maximum Average Pesticide Concentrations

Pesticide	Davis Park	Dix Hills	Manorville	Mastic-Shirley (aerial)	Mastic-Shirley (truck)
Permethrin	200	8	9	20	90
Resmethrin	90	4	4	8	40
Sumithrin	100	5	6	10	60
Malathion	200	30	20	50	100

(PBO effects included)

Table 7. Bee Risk Quotients, Study Area Mean Pesticide Concentrations

Pesticide	Davis Park	Dix Hills	Manorville	Mastic-Shirley (aerial)	Mastic-Shirley (truck)
Permethrin	7	3	2	7	2
Resmethrin	3	1	1	3	1
Sumithrin	4	2	1	4	1
Malathion	20	20	9	30	8

(PBO effects included)

A number of key factors may act to mitigate and in some cases entirely remove the potential for risks to honeybees and other non-target insects:

- Actual risks would be most likely to occur when insect activity coincides with the application timing, with risks being largely mitigated for daytime insects if spraying were to occur at night.
- Additional habitat preferences, activity patterns, and behavior could result in lower risks for certain non-target insects than those predicted in this evaluation. For example, many insects are active on the ground and may be below vegetation, which may intercept applied adulticides. Many insects, such as crickets, beetles, ants, and millipedes, spend a portion of their life cycle underground. If this period does not temporally coincide with the spray season, the potential for exposure could be significantly mitigated. Some flying insects, such as certain moths and dragonflies, rest at nighttime underneath plants or other structures, and therefore would be less likely to be exposed during nighttime applications. Certain insects may actively avoid sprayed areas, and it has been shown that permethrin has a strong repellant effect on honeybees, for example.
- Verification of the air modeling data showed that under "normal" atmospheric conditions, there was typically a three to one difference between predicted PBO values and measured PBO values; with unusual atmospheric conditions, the agreement was less good (an average of 14:1). The model overpredicts the pesticide concentrations. Conservatively, it seems reasonable to assert a slight overprediction

of three to five times on the basis of the air modeling, which suggests that under most atmospheric conditions resmethrin has little potential for impact to bees, using the study area mean concentrations as a basis for understanding impacts. The same would follow for sumithrin; similar conclusions follow for at least two of the permethrin results.

- Exposures and risks are predicted based upon instantaneous conditions, precluding the incorporation of degradation of adulticides. However, adulticides are generally not persistent in terrestrial environments. Because of the difficulty in measuring resmethrin concentrations in the field, it was conservatively assumed that the resmethrin to PBO ratio would remain constant. However, deposition samples collected on solid media and aqueous samples collected within 30 minutes of the pesticide applications all found that the resmethrin had significantly decreased in concentration relative to PBO. This strongly suggests that the degradation of resmethrin may reduce the predicted concentrations enough so that the concentration of concern for bees is not achieved under most conditions.

The combination of degradation of resmethrin and overprediction by the air modeling makes it conceivable that the predicted concentrations are at least an order of magnitude greater than may actually occur. This suggests there is not likely to be a potential impact for resmethrin to flying insects under the more conservative assumptions in Table 6 for any of the aerial application scenarios. Because sumithrin has been found to behave similarly to resmethrin in laboratory experiments, it may be that it, too, degrades very quickly relative to PBO. If that were the case, then aerial applications of sumithrin would likewise be of much less concern, even under the more conservative modeling scenario.

In very broad terms, the toxicity of an insecticide dose is proportional to the size of the affected insect. The pesticides used under the Long-Term Plan are intended to be toxic to mosquitoes. Therefore, insects of similar or smaller sizes are likely to be affected if they are also exposed to the pesticide. Table 8 lists the orders of flying insects found in the New York metropolitan area that are of similar or smaller size compared to mosquitoes.

Table 8. Orders of flying insects that contain many/certain insects that are generally similar in size or are smaller than mosquitoes (0.15 inches)

Order	Notes	Order Exemplars
Diptera	Some classify this order as larger than mosquitoes (mosquitoes belong to Diptera)	True flies – black flies, midges, fruit flies, houseflies, mosquitoes
Ephemeroptera	Often attracted to lights; short-lived; Paleoptera; some classify this order as larger than mosquitoes	Mayflies
Homoptera	Important herbivores	Aphids, scale insects, leaf hoppers, cicadas
Mecoptera	Seldom common; insect predators	Scorpion flies
Proscoptera	Many wingless; effective dispersers (often first colonizers of islands)	Bark lice
Strepsiptera	Only males fly; insect parasites	
Thysanoptera	Often destructive to plants	Thrips
Zoraptera	Termite-like; rare; winged individuals may be dispersal form	

There has only been one test of pyrethroid application impacts on flying insects; in that experiment, both the control and test sites experienced declines in populations, and both recovered within a week. Another test using a different class of adulticide also found recovery of the insect population within a week. This suggests that any effects on non-target organisms are likely to be short-lived; since the mechanism for recovery is likely to be in-migration, one caveat, thus, is that the treatment area sizes should be minimized.

Acute and chronic impacts to aquatic invertebrates were predicted for malathion under many evaluated scenarios, and for permethrin in one case through the quantitative risk assessment. No elevations in risk that are likely to cause impacts were predicted for the use of resmethrin or sumithrin. A sophisticated aquatic ecosystem model developed by the US Environmental Protection Agency was used to test whether permethrin use might result in ecological impacts (permethrin, rather than malathion, was tested because pyrethroids were identified as the preferred adulticide, and so testing a pyrethroid for impacts was deemed to be of greater value in predicting any ecological impacts from implementing the Long-Term Plan). The model found short-term declines in populations for a variety of organisms following modeled exposure to permethrin. However, all but one population recovered within several months of the cessation of applications, and the slower recovery of the remaining population did not lead to any ecological changes in the modeled system.

Mitigation of these potential impacts includes:

- Measurement of effects may be based on overpredictions of deposited concentrations (see just above)
- Pyrethroids, as represented by resmethrin, appear to degrade very rapidly (testing of pesticides in association with the Caged Fish experiment was only able to detect resmethrin in the water column immediately following applications)
- Historically, applications have only been made to small portions of the County. In 2003, which had more adulticide use of any year since 1999, only six percent of the County received an adulticide application. This means that any potential impacts are extremely limited in terms of geographical extent.

More generally, the County will also seek to mitigate potential impacts to those areas that commonly receive one (or more) Vector Control adulticide application in a season. Targeted outreach will stress the importance of avoiding exposure to mosquitoes, and in taking mitigating steps if exposure cannot be avoided. The Commissioner of SCDHS will also craft an advisory detailing the means that SCDHS recommends (or suggests) to minimize risks for potential impacts from exposure to adulticides. Washing of home-grown vegetables in areas where adulticides may be used more often will be an important outreach topic.

The small area of the County impacted by adulticides in any one year is a general mitigation of impacts. In addition, the strict compliance of SCVC with defined, numerical application triggers may reduce the number of applications, and will mitigate any public perceptions that applications are made on the basis of ambiguous criteria. Finally, implementation of progressive water management steps should provide more effective larval control than has been achieved using larvicides and ditch maintenance, which may decrease the need for adulticide applications.

The use of adulticides also provides ancillary benefits. Adulticide applications reduce risks for mosquito-borne disease and also reduce impacts to quality of life. This is because efficacy data clearly shows adulticides are effective means of reducing mosquito populations, although these populations may recover within several weeks in conditions allow. The collection of efficacy data in association with adulticide applications will allow the County to

clearly justify this element of the program. If the efficacy data do not support claims of population reductions, then the County will need to reexamine its use of this control tool.

The County will mitigate the overall impacts of its use of pesticides through an annual review. Elements of this review will include documenting the use of pesticides in the previous year, analysis of any relevant scientific findings on the products in use, and considered evaluation of alternatives in light of any new information (research or product development) since the previous year's report. The report will also discuss the application thresholds used to determine if Vector Control applications should be made, and determine if adjustments need to be made in light of human health and environmental considerations.

- Adaptive management

Suffolk County has made a public commitment to adaptively managing the Long-Term Plan. This is a clear mitigation of any impact associated with the Long-Term Plan. If the above analysis did not adequately identify a potential impact, or if some potential impact was overlooked in the environmental analysis, the ability to adjust the program to meet changed circumstances allows the Long-Term Plan to be modified. The list of issues to be addressed in the Triennial Plan, attached as an appendix to this Findings Statement, makes clear Suffolk County's determination to carefully assess the effectiveness and potential impacts of the Long-Term Plan.

G. Requirements for Further Environmental Reviews

Potential further environmental reviews for actions taken under the Long-Term Plan relate to at least two types of actions:

- adoption of the Annual Plan of Work by the County Legislature
- reviews of water management projects and BMPS 5-15

The triggers for further environmental review which are specified herein constitute the minimum conditions under which additional environmental review would be initiated. At any time, the County and/or the Council on Environmental Quality could commence additional environmental review based on substantial new technical information.

The adoption of these Findings by the Legislature (as Lead Agency) means the Legislature is satisfied that the potential impacts of the Long-Term Plan have been adequately reviewed. From this perspective, if an Annual Plan of Work complies substantively with the Long-Term Plan, then potential impacts of that annual plan will have been adequately considered, as well, and the Annual Plan of work would be deemed a Type II Action pursuant to SEQRA.

The primary criterion for determining if an Annual Plan of Work is not substantively in accord with the Long-Term Plan should be the annual plan's compliance with the overall approach of the Long-Term Plan, and, where specified, a failure to use particular actions, or a major deviation from an important specific set of actions. In general, annual plans need to focus on the use of surveillance to determine where mosquito problems exist, and to primarily employ source reduction tools to reduce the impact of mosquitoes on people. An important source reduction tool must be implementation (over time) of the techniques for water management developed in the Best Management Practices manual, as outlined in the Wetlands Management Plan. Any plan that proposes to manage mosquitoes without surveillance or to not use water management as a means of obtaining long-term control of mosquito problems will require additional environmental review.

Other criteria that would lead to additional environmental review of an annual plan would be:

- failure to include public education and outreach steps to educate residents and visitors on the means that are available to avoid mosquito bites and diseases associated with mosquitoes
- Inadequate mosquito population or disease surveillance
- failure to commit to respond to all mosquito complaints using personnel appropriately trained to identify and mitigate sources of mosquito problems
- failure to use the review processes outlined in the Wetlands Management Plan for water management projects
- proposed use of a non-native biocontrol organism not already resident in Suffolk County natural environments
- proposed use of a larvicide other than *Bacillus thuringenesis var israelensis* (Bti), *Bacillus sphaericus*, or methoprene

- proposed use of an adulticide other than resmethrin, sumithrin, permethrin, natural pyrethrins, or malathion
- identification of a preferred adulticide agent other than resmethrin or sumithrin

Environmental reviews may consist of a negative declaration if no significant environmental impacts will result (6 NYCRR §617.10(d) (3)) or a supplemental environmental impact statement if one or more significant adverse environmental impacts was not adequately addressed (6 NYCRR §617.10(d) (4)). Use of an expanded EAF may be appropriate when a negative declaration is proposed.

The adoption of these Findings by the Legislature (as Lead Agency) means the Legislature is satisfied that the potential impacts of the Long-Term Plan have been adequately reviewed. From this perspective, the classification of allowable water management actions (as described in the Best Management Practices manual) as "no to little" potential impacts, "minor" potential impacts, "usually more likely to have potentially significant" impacts, and "usually more likely to have major" potential impacts will have been accepted, and the descriptions of the potential for impacts (and the mitigation steps to avoid impacts) will have been deemed to be adequate.

Nonetheless, on a project by project basis, the following criteria need to be considered to determine if additional environmental reviews are warranted:

- the techniques to be employed have been classified as having the potential for potentially significant or major environmental impacts (BMPs 5-15)
- consultation with local authorities or review by the Wetlands Stewardship Committee finds there is a potential for environmental impacts under the proposed course of action
- review by the CEQ finds there is a potential for environmental impacts under the proposed course of action

Environmental reviews may consist of a negative declaration if no significant adverse environmental impacts will result (6 NYCRR §617.10(d) (3)) or a supplemental environmental impact statement if one or more significant environmental adverse impacts was not adequately addressed (6 NYCRR §617.10(d) (4)). In light of the extensive reviews of the techniques to be employed for water management in the GEIS and associated documents, use of an expanded

EAF to cite relevant sections of the GEIS or to report on local data collection efforts that justify the project may be appropriate if a negative declaration is proposed.

The triggers for further environmental review which are specified above constitute the minimum conditions under which additional environmental review would be initiated. At any time, the County could commence additional environmental review based on substantial new technical information.

Appendix 1 to the Statement of Findings: Contents of the Triennial Report

The following outline is intended to provide a preliminary overview of issues which will be analyzed to form the basis of the Triennial Report. The outline includes indicators (where available) which will be used to measure success. The content and format of the Triennial Report will be contingent on Steering Committee and Wetlands Stewardship Committee input which will be sought at the early stages of report preparation.

1) Executive Summary

The Executive Summary will provide an overview of the following issues, which will be addressed in detail in subsequent report sections.

- Public health (viral surveillance, human disease)
- Vector control (pesticide usage, water management, surveillance, etc.)
- Education/outreach
- Wetlands Stewardship Program – Accomplishments and Plans
- Potential Plan Updates and Amendments

2) Public Health

- Viral surveillance results
- Human health (cases and deaths from mosquito-borne diseases)

3) Vector Control Long-Term Plan Implementation

The report will integrate results from the Department of Public Works, Division of Vector Control and Department of Health Services, Division of Public Health.

A. Public Education and Outreach

Current Program:

- Recommend avoidance of the outdoors at dawn and dusk.
- Consider use of personal repellants (DEET, Bite Blocker, Picaridin, Oil of Lemon Eucalyptus).
- Maintain home environments that do not foster mosquito breeding.
- Distribute Publications such as "Fight the Bite" and "Dump the Water."
- Maintain County Web Site
  - Post spray events
  - Link to no spray list

Long-Term Plan Recommendations:

- Establish tire management education program to eliminate mosquito breeding habitat. Encourage other county departments and municipalities responsible for routine sanitation or maintenance activities to properly dispose of tires.
- Conduct farmer irrigation outreach-targeted education through Cornell Cooperative Extension.
- Encourage private storm water system maintenance.
- Conduct tailored outreach to municipal highway departments regarding storm water structures as mosquito habitat.

- Emphasize personal responsibility for reducing impacts from mosquitoes (avoiding mosquitoes whenever possible, wearing long-sleeves and pants, and using repellents).
- Improved efficacy reporting. Results made available to the public via the web and annual reports.
- Post efficacy reports on the SCVC website. Reports will summarize the results of mosquito control efforts measured before, during and after aerial spray event.
- Maintain the Citizens Advisory Committee.
- Create a listserv for adulticide application notifications.
- Integrate new web site into existing county site.
- Revise public notice/guidance.
- Participation in "Mosquito Awareness Week."
- Targeting specific communities (recommended in DGEIS comment period).
- Focusing on educating school-aged children (recommended in DGEIS comment period).

Indicators of Success

- Degree to which current program and Long-Term Plan recommendations are implemented. Implementation will be quantified, where possible. E.g.:
  - Partnerships established with towns for tire management plans.
  - Public education workshops which have been conducted.
  - Brochures and fact sheets disseminated to public.
  - Number of efficacy reports posted.
  - Programs targeted at specific communities and school-aged children.

B. Scientific Surveillance

Current Program:

- Presence or absence of larvae
- Collect and process 10,000-12,000 larval and adult mosquito samples
- Collect and process approximately 75,000 mosquitoes for arbovirus surveillance
- Integration of Geographic Information System (GIS) and Global Positioning System (GPS) technology for surveillance information
- 27 permanent NJ traps; 80 CDC trap-nights per week.

Long-Term Plan Recommendations:

- Increase surveillance capabilities.
- Increase staff for surveillance for both SCVC and the ABDL.
- Increase permanent NJ trap network to 30.
- Increase CDC trapping to 105 trap-nights per week.
- Conduct quantitative mosquito assessment prior to EVERY adulticide event.
- Conduct post-spray efficacy monitoring.

Indicators of Success

- Degree to which current program and Long-Term Plan recommendations are implemented. E.g.:
  - Number of staff-days dedicated to surveillance.
  - Number of mosquito samples processed.
  - Number of CDC light traps deployed and NJ traps maintained.
  - Number of pre-adulticide mosquito counts.
  - Annual reports on surveillance analysis, including post-spray efficacy.

C. Source Reduction/Control

Current Program:

- Public education program (above).
- Response to citizen complaints.
- Catch basin and recharge basin control efforts.

Long-Term Plan Recommendations:

- Expand surveillance of catch basins from 10,000 to 40,000 inspections.
- Augment education component (County tire collection effort, private storm water management system outreach effort, increase interaction between SCVC and highway departments)

Indicators of Success

- Catch basins inspected.
- Records on response to complaints.
- Improve waste management and county departments tire management

D. Biocontrols

Current Program:
Mosquito fish, (Gambusia spp.)

Long-Term Plan Recommendations:

- Fathead minnows; other disease free fish native to the area.
- Predacious Copepods

Indicators of Success

- Research alternatives and explore other states initiatives
- Same or increased level of biodiversity after introduction of biocontrol
- Reduced mosquito larvae counts in sampling

E. Larval control

Current Program:

- Biorational larvicides, Bacillus thuringiensis var. israelensis (Bti), Bacillus sphaericus (Bs), and methoprene
- Surveillance of the nearly 2,000 breeding points in the County

- 15,000 inspections of breeding sites and other surveillance findings (includes catch basins and sumps)
- Approximately 4,000 acres of the County's salt marshes aerial larvicided

Long-Term Plan Recommendations:

- Increased surveillance
- Surveillance of the 2,000 breeding points in the County
- 15,000 inspections of breeding sites and other surveillance findings
- Identify problem breeding sites
- Expanded catch basin and recharge basin larviciding
- Implementation of ecological controls
- Implementation of formal resistance testing and management
- Water management - 75% percent reduction goal in acreage treated

Indicators of Success

- Number of inspections/surveillance events.
- Area larvicided (frequency and extent).
- Record and analyze dip counts in relation to reduction in treatments (results).
- Annual larvicide efficacy reports (results).
- Reduced adulticide events expected after successful larvicide control in known problem areas.

F. Adult control (only if necessary)

Current Program:

- Resmethrin, sumithrin, malathion, permethrin and natural pyrethrin
- Adulticide-directed surveillance, decision-making procedures, and efficacy and resistance testing

Long-Term Plan Recommendations:

- Criteria for spraying
  - Evidence of mosquitoes biting humans – service requests mapped
  - Verification of problem-New Jersey trap counts > 25 females /night
  - CDC light trap counts > 100; Landing rates of one to five per minute
  - Control is technically feasible Weather conditions suitable (no rain, winds<10 mph, temperature 65 ° or above)
- Improved spray technology ("Adapco Wingman") to minimize pesticide application and optimize mosquito control.
- Augment the New Jersey light trap network from 27 to 30. Expand as resources allow (see surveillance).
- Increase the number of CDC light traps from 27 to 35. Expand as resources allow (see surveillance).
- Increase CDC trap-nights to 105 per week.
- Reduce adulticide usage (currently less than 2% of County in non-emergency situations).

Indicators of Success

- Reduction in adulticide usage.
- Efficacy tests post treatment indicate 90 – 99% population reduction.
- Efficacy tests posted annually on county web page and in annual reports.
- Aerial application efficacy released within a week or so of the application.
- Post Health Emergency reductions in the parity and infection rates for the target mosquito species (if staff and lab resources available).

G. Water Management:

Current Program

- Hand maintenance/machine maintenance limited to < 200,000 linear ft/yr
- Machine work limited to repair and replacement of existing structures
- No new machine ditching
- Machine maintenance limited to 50,000 ft/year (no more than 50 affected acres), and only when essential for public health or ecological reasons.
- Natural Process (No action/ reversion)
- Culvert repair/ maintenance when tidally restricted
- Stop gap ditch plug

Long-Term Plan Recommendations

- Develop a strategy for managing Suffolk County's 17,000 acres of tidal wetlands, irrespective of Vector Control concern (goal: 12-year implementation window).
- Reversion priorities, allowing natural processes to fill ditches (approx. 4,000 acres; no vector control).
- Candidates for possible restoration/water management (currently routinely larvicided; approx. 4,000 acres). Marsh health is paramount objective.
- Areas requiring more assessment (approx. 9,000 acres); low-impact best management practices are possible.
- The pre-existing policy of "no new ditching" will be continued.
- Less than four percent of the County's tidal wetlands (~ 600 acres) subject to machine ditch maintenance over the next decade.

Indicators of Success

Implementation of Plan recommendations (above).

4) Wetlands Stewardship Program – Accomplishments and Plans

Long-Term Plan Recommendations

- Develop a comprehensive assessment and management plan for the 17,000 acres of tidal wetlands within three years
- Ensure the protection and preservation of functions, values, and health
- Use Vector Control Wetlands Management Plan as foundation (Goodbred Report; primary study area results)
- Inventory/assess wetlands County-wide

- Review and evaluate major wetland restoration projects
- Implement early action demonstration projects
- Develop Long-term strategies

Indicators of Success

- Existence/adoption of strategy
- Acres/subsystems assessed
- Acres /subsystems restored
- Integrated plans implemented

5) Recommended Plan Updates and Amendments

Plan updates and amendments will be made, as needed. Updates may be recommended by involved agencies, the Citizens Advisory Committee, Technical Advisory Committee, and/or Wetlands Stewardship Committee. Updates require review/approval of the Steering Committee.

Appendix 2 to the Statement of Findings: Structure of the Wetlands Stewardship Committee

SUFFOLK COUNTY VECTOR CONTROL AND WETLANDS MANAGEMENT LONG-TERM PLAN

Wetlands Stewardship Committee (WSC) – Overview *

Membership (Tentative)

Estuary programs

Long Island Sound Study representative
Peconic Estuary Program representative
South Shore Estuary Reserve Program representative

State

New York State Department of Environmental Conservation Region I

New York State Department of Environmental Conservation Bureau of Marine Resources
New York State Department of State

Non-governmental Organizations (NGOs)

Two appointed by County Legislature
Two appointed by County Executive

County

County Legislature – Presiding Officer
County Executive
Suffolk County Department of Environment & Energy - will serve as Chair of Committee

Council on Environmental Quality

Suffolk County Department of Health Services

Suffolk County Department of Public Works

Suffolk County Department of Planning
Suffolk County Department of Parks

Town (only when projects proposed in a Town)

1 Supervisor and 1 Trustee rep

Nature of Committee; Support from Work Group, Agencies, and Contractor

The Stewardship Committee is comprised of policymakers, high-ranking agency officials, and NGOs from agencies and organizations with responsibility for wetlands management. The Committee will meet on a quarterly basis, or as needed to vote on wetlands management projects. The Committee will be supported by professional staff at the Suffolk County Departments of Environment, Health, and Public Works. Suffolk County Capital Program 8730 (Wetlands Planning) is also expected to support the Committee and the Wetlands Stewardship Program ("WSP," see below), via a contracted workplan. A "Wetlands Management Work Group," consisting of technical experts from agencies, NGOs, and academia, will meet more frequently, and will report to the Stewardship Committee. The work group will conduct many of the functions formerly performed by the Long-Term Plan's "Wetlands Subcommittee" (i.e., will guide monitoring, assessment, and project design).

Wetlands Stewardship Committee - Charges

- Oversee and make recommendation all major aspects of the Wetlands Stewardship Program.
- Meet to review and make recommendations on all proposed wetlands projects which propose use of Best Management Practices 10 through 15 in Long-Term Plan.

- Review and make recommendations on proposed wetlands projects which propose use of Best Management Practices 5 through 9 in Long-Term Plan, at Committee's discretion.
- Provide review and recommendations on the water management component of the Triennial Long-Term Plan Update. This update shall incorporate results of the Wetlands Stewardship Program.

The WSP is a cooperative effort between the Wetlands Stewardship Committee and various Suffolk County Departments (Environment and Energy as the committee chair, Health Services as Stewardship Program project manager, Public Works as project sponsor, and Planning and Parks as key partners). The WSP is charged with developing indicators of wetlands health, assessing wetland health, establishing preservation and restoration priorities, and designing and implementing pilot projects. The WSP will also coordinate activities among estuary programs.

Within three years, the WSP will develop a Wetlands Stewardship Strategy (WSS) to address the assessment and management needs of all tidal wetlands in Suffolk County (approximately 17,000 acres), not just those wetlands of concern with respect to vector control. Marsh health will be the paramount objective. The scope of WSC activity will generally be limited to tidal wetlands. However, freshwaters and freshwater wetlands which are closely hydrologically connected, and integral to a tidal wetlands subsystem, may be considered on a case-by-case basis. Federal, state, town and village jurisdictions are encouraged to participate in the Stewardship Committee (e.g., in terms of project review), but are not required to do so.

*Working outline, subject to establishment of final membership, by-laws and procedures by Suffolk County Dept. of Environment & Energy

Appendix 3 to the Statement of Findings: Adopting Resolution 1150-2007

Intro. Res. No. 1150-2007 Laid on Table 2/6/2007
Introduced by Deputy Presiding Officer Viloria-Fisher

RESOLUTION NO. 285 -2007, ADOPTING THE SUFFOLK COUNTY VECTOR CONTROL AND WETLANDS MANAGEMENT LONG-TERM PLAN AND A STATE ENVIRONMENTAL QUALITY REVIEW ACT FINDINGS STATEMENT FOR THE FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT

WHEREAS, it is the policy of Suffolk County to reduce or eliminate pesticide usage, to the extent practicable; and

WHEREAS, Suffolk County is committed to preserving and restoring its tidal wetlands, which have been dramatically altered by an extensive vector control grid ditch network which was substantially created in the 1930s; and

WHEREAS, the West Nile Virus threat highlighted the need to further optimize an already effective Vector Control Program, which is essential to protect public health, and also has important ancillary quality of life benefits; and

WHEREAS, in acknowledgement of the need to develop a comprehensive long-term vector control plan to protect public health and welfare, while reducing pesticide usage and enhancing wetlands which may be affected by Vector Control, in Resolution No. 688-2002, this Legislature authorized the development of a Suffolk County Vector Control and Wetlands Management Long-Term Plan (hereinafter "Long-Term Plan," dated October 2006, annexed hereto, incorporated by reference and made a part hereof), designated itself as lead agency under the State Environmental Quality Review Act (hereinafter "SEQRA", N.Y. Environmental Conservation Law Article 8) and its implementing regulations (subject to appropriate coordination), classified the action as Type I, and adopted a Positive Declaration for the Long-Term Plan, causing a Generic Environmental Impact Statement (hereinafter "GEIS") to be prepared; and

WHEREAS, this Legislature adopted the Final Scope for the Generic Environmental Impact Statement, pursuant to Resolution No. 1122-2003; and

WHEREAS, the Long-Term Plan and GEIS were prepared in a public and open process with extensive input and guidance from Citizens and Technical Advisory Committees, as well as the Council on Environmental Quality (hereinafter the "CEQ"), interested citizens of the County, and Local, State, and Federal agencies; and

WHEREAS, comments from agencies, advisory committees, the public, and the CEQ resulted in multiple voluntary iterations of the Long-Term Plan (including publications in September 2005, May 2006, and October 2006), and, as a result, the Plan has been substantially improved; and

WHEREAS, the Departments of Health Services, Public Works, and Energy and the Environment caused the preparation of a Draft GEIS in accord with the procedures and rules of SEQRA as defined in 6 NYCRR Part 617; and

WHEREAS, pursuant to Chapter 279 of the Suffolk County Charter, the Council on Environmental Quality evaluated the Draft GEIS and found it to be complete according to the standards set forth under SEQRA; and

WHEREAS, the Council on Environmental Quality then solicited public comments on the Draft GEIS, including holding two public hearings; and

WHEREAS, this Legislature, on the advice of the Council of Environmental Quality, found that comments received on the Draft GEIS were substantive in nature, requiring the preparation of Final GEIS, as per Resolution No. 1103-2006; and

WHEREAS, the Suffolk County Departments of Health Services, Public Works, and Energy and the Environment therefore caused the preparation of a Final Generic Environmental Impact Statement in accordance with the procedures and rules of SEQRA as defined in 6NYCRR Part 617; and

WHEREAS, the Final GEIS was filed with the Council on Environmental Quality and made available to the general public; and

WHEREAS, the Council on Environmental Quality forwarded the Long-Term Plan, the Final GEIS, and the Final GEIS Addendum, together with its comments and recommendations and those received from the public with this Legislature, for consideration at the January 29, 2007 meeting of the Environment, Planning and Agriculture Committee of the Suffolk County Legislature, as part of CEQ Resolution No. 08-07; and

WHEREAS, the Suffolk County Departments of Health Services, Public Works, and Energy and the Environment caused the preparation of a draft Findings Statement; now, therefore be it

1st RESOLVED, that the Legislature adopts the Long-Term Plan as an appropriate, comprehensive, long-term wet lands management and vector control plan to protect public health and welfare, while reducing pesticide usage and protecting wetlands; and be it further

2nd RESOLVED, that, pursuant to 6 NYCRR Part 617 and Chapter 279 of the Suffolk County Charter, the Legislature hereby adopts the Statement of Findings annexed hereto, incorporated by reference and made a part hereof, certifies that the requirements of SEQRA have been met, and certifies that, consistent with social, economic and other essential considerations, the proposed Long-Term Plan has been developed from among the reasonable alternatives available, as the choice that avoids or minimizes potential adverse, environmental impacts, to the maximum extent practicable; and be it further

3rd RESOLVED, that the Legislature certifies that adverse environmental impacts will be avoided or minimized to the maximum extent practicable by incorporation, as conditions within the Statement of Findings, where those mitigative measures that have been identified as practicable; and be it further

4th RESOLVED, that the Legislature finds that there is a need for a strategy to address the management needs of the County's 17,000 acres of tidal wetlands, not just the 4,000 acres of tidal wetlands of greatest concern to Vector Control; and be it further

5th RESOLVED, that the Legislature supports the Wetlands Stewardship Committee concept described in the Findings Statement, as a means of coordinating and overseeing future marsh management projects, as well as overseeing development of a strategy to address the management needs of the County's 17,000 acres of tidal wetlands, consistent with applicable laws; and be it further

6th RESOLVED, that the Commissioner of the Suffolk County Department of Environment and Energy, or her designee, is hereby authorized and directed to serve as Chair of the Wetlands Stewardship Committee, and to oversee development and implementation of appropriate procedures and by-laws of that Committee, including membership and voting, which procedures and by-laws shall be consistent with applicable laws; and be it further

7th RESOLVED, that the Suffolk County Department of Environment and Energy will prepare a report on Wetlands Stewardship Committee activities to this Suffolk County Legislature within three years, with said report containing a strategy to address the management needs of the County's 17,000 acres of tidal wetlands.

DATED: March 20, 2007

APPROVED BY:

/s/ Steve Levy
County Executive of Suffolk County

Date: March 22, 2007