WETLAND STEWARDSHIP STRATEGY

Prepared for:

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APPENDICES

1.0 Introduction

This WSS (Wetland Stewardship Strategy) was developed by the LKB Team (Lockwood, Kessler & Bartlett, Inc. and its subconsultants: Dru Associates, Inc., Hatch Mott MacDonald and Aqua-Niche, Inc.) for the Suffolk County WSP (Wetland Stewardship Program), and under the supervision of the SCDEE (Suffolk County Department of Environment and Energy). As of January 2012, the SCDEE is now the Suffolk County Department of Economic Development and Planning (SCDEDP), which is reflected throughout this document.

The purpose of this WSS is to provide the County with a stewardship strategy that 1) can be applied to all 17,000 acres of salt marsh in Suffolk County; 2) is consistent with related New York State and County laws, regulations and requirements; 3) utilizes existing publicly available information; 4) does not duplicate or contradict other County environmental programs; and 5) can be accomplished through County personnel and resources.

The WSS aims to provide the structure of a plan for the maintenance of salt marshes and improvement of salt marshes under degraded conditions. Degraded salt marshes can be characterized by large areas of invasive common reed Phragmites (*Phragmites australis*), waterlogging, extensive mudflat formation and panne erosion, high salt marsh mosquito production, and long-term vulnerability to sea level rise. The implementation of the Best Management Practices (BMPs) (in Appendix 7, Revised BMP Manual, of the Final Generic Environmental Impact Statement of the Suffolk County Vector Control and Wetlands Management Long Term Plan, or FGEIS) under this WSS aims (1) to improve tidal regime and flux between estuary and marsh, (2) to allow improved tidal exchange in the marsh interior, (3) to enhance conditions for proper marsh accretion and resilience to sea level rise, (4) to provide high quality habitat for salt marsh biota, and (5) to enable biological control of larval salt marsh mosquitoes and of Phragmites. The expected beneficial outcomes of the WSS for the salt marsh environment include: increased cover, health, and vigor of native vegetation; improved nutrient fluxes buffering; enhanced use of the marsh by wildlife including estuarine nekton; and reduction in mosquito production. With improved conditions for native vegetation and proper sediment capture, the marsh is expected to be resilient to sea level rise.

This WSS serves as an outline of possible methods for salt marsh maintenance and/or improvement in the County, to be updated by the County during the remaining years of the Long Term Plan, which ends in March 2019.

2.0 Related County Laws, Regulations and Requirements

In addition to the Suffolk County Vector Control and Wetlands Management Long Term Plan, accessed on-line at: http://apps.suffolkcountyny.gov/health/suffolkvectorplan/pdf/final/Revised%20Long-Term%20Plan.pdf, the key County laws, regulations and requirements related to this WSS are 1) County Resolution No. 285-2007, 2) the Revised BMP Manual, and 3) the SCVC Annual Plan of Work. Copies of these three documents are incorporated into this WSS as Appendices C, D and E, respectively.

This WSS was developed pursuant to the County 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*). The Resolution 1) recognized the need for a WSS to address the management needs of the 17,000 acres of salt marsh in the County, 2) supported the concept of a WSC (Wetland Stewardship Committee) to oversee development of the WSS, and to follow project review procedures by Suffolk County's Council on Environmental Quality (CEQ) and the Suffolk County Legislature, and 3) required that a WSS be developed within three years in conjunction with the First Triennial Report. The Statement of Findings of the Suffolk County Vector Control and Wetlands Management Long Term Plan (Long Term Plan) states that the purposes of this Long Term Plan are to 1) control mosquitoes, 2) reduce pesticide usage, and 3) manage and protect wetlands. A major goal is to reduce larviciding by 75 percent, as measured in acres treated, over the course of twelve years. Currently, approximately 4,000 acres of salt marshes in the County are routinely larvicided. Another goal is to continue to reduce adulticiding. In the subsection titled "Wetlands Management" in Section B (Overview) of the Statement of Findings, it is stated that the following measures will be instituted under the Long Term Plan to mitigate the potential effects of wetlands management projects:

- For the first three years of the Long Term Plan, implementation will focus on low-impact BMPs 1-4. While BMPs 1-4 will be generally classified as Type II actions under SEQRA (State Environmental Quality Review Act), they may be subject to further review if deemed necessary by the CEQ.
- BMPs 5-15 will automatically trigger additional environmental review. BMPs 5-15 will be deemed Unlisted or Type I actions to ensure appropriate review under SEQRA by CEQ. Proposed modifications to the Long Term Plan may be subject to further environmental review.
- The WSC, chaired by the SCDEDP, will be a key part of the Long Term Plan and will review and provide recommendations on all projects using BMPs 10-15.
- In 2010, the First Triennial Report, including recommendations from the WSS will be prepared with the Second Triennial Report due late in 2013.
- The Long Term Plan emphasizes marsh health and preservation in design, implementation, and assessment of all wetland management projects.
- All necessary permits will be acquired, which will require formal project review.

The County has complied with the above Long Term Plan requirements as follows:

- During the first three years of the Long Term Plan, salt marsh management activities were limited to the work performed by SCVC (Suffolk County Department of Public Works, Division of Vector Control) under their approved Annual Plan of Work, which includes use of specific low-impact Interim BMPs that are consistent with Long Term Plan BMPs 1-4.
- The WSC, chaired by the SCDEDP, was established and the LKB Team was retained to develop this WSS and assist the County with other aspects of its WSP. A series of meetings was held (Copies of the minutes from the WSC meetings are provided in Appendix A of this WSS).
- The First Triennial Report was prepared in 2010, and was submitted to the CEQ on February 16, 2011 (A copy of the First Triennial Report is provided in Appendix B).

In accordance with the subsection titled “Wetlands Management Component of the Long Term Plan” in Section D (Long Term Plan Overview) of the Statement of Findings, the term “maintenance” as defined in these BMPs is further clarified/classified as follows:

- No material alteration of marsh hydrology, tidal circulation characteristics, vegetation or animal populations shall occur as part of any maintenance activity.
- Maintenance should involve only existing water features in a marsh and cannot be used to expand any feature in length, width or depth.
- Suffolk County can remove blockages/obstructions in a ditch or impairments to tidal flow in accordance with conditions identified in the FGEIS.
- Maintenance cannot expand a ditch network.
- Maintenance shall avoid enhancement of storm water conveyance.

Besides the BMPs, other key County requirement related to the WSS is the SCVC Annual Plan of Work, which describes the yearly methods and procedures used on a continuing basis to control mosquitoes.

The County already has a number of environmental awareness and public outreach programs in place. Therefore, to avoid duplication of effort, this WSS does not include programs of this type.

3.0 Applicable Publicly Available Information

One of the key goals of this WSS is to be cost-effective by utilizing applicable publicly available information, which has already been developed for other purposes. The key information identified to date consists of the publicly available sources of current and historical aerial photographs, New York State’s, the County’s and LKB’s archives of historical aerial photographs and the County’s LIDAR (Light Detection and Ranging) dataset.

Additionally, new data will be available as the New England Interstate Water Pollution Control Commission (NEIWPCC) is currently conducting the project: "Long Island Tidal Wetlands Trends Analysis and Wetland Loss Characterization Matrix", and it is expected to be finalized and available to the public in 2014.

At this time, the following types of aerial photos are available for use:

Current/Recent Coverage:
- NYSGIS (New York State Geographic Information System) Color Infrared (2007 or most recent)
- NYSGIS Natural Color (2007)
- Satellite imagery available through Google Earth (Fall 2010 or most recent)

Historical Coverage:
- County-owned images (e.g., 1930s)
- Town-owned images (various years)
- LKB images (1950s through 1990s)

Examples of these sources of information are provided in Appendix F. Information that may become available in the future will be incorporated into this WSS as appropriate. For example, Dowling College has indicated it may be able to provide a plane for aerial photography flights, with Lamont Doherty Earth Observatory possibly providing an aerial photo camera.

At this time, it is anticipated that these datasets will be utilized as follows:

- The most recent NYSGIS color infrared aerial photos will be utilized for detailed assessment of current/recent salt marsh health conditions as they are have the highest resolution (6-inch pixel) and the highest degree of vegetative-related contrast. Salt marsh health can be assessed in conjunction with SCWAMM (Suffolk County Wetland Assessment and Management Model) being developed for the WSP. Refer to Section 5.1 and Appendices L and M for further information on SCWAMM.
- The Google Earth images will be utilized to perform initial assessment of current conditions at a salt marsh, and to qualitatively assess the results of restoration projects.
- The historical coverage will be utilized to identify larger-scale changes at a salt marsh over time and document past alterations. The specific image(s) utilized will be site-specific.
- The County's LIDAR data will be utilized to establish the boundary of a salt marsh, and identify the small-scale variations in topography to assist in diagnosing topography-related issues and designing restoration projects.

The LKB Team also investigated the feasibility of utilizing computerized recognition of pixel intensity as a potential new rapid and cost-effective method of remotely mapping salt marsh features. They determined that this methodology is currently not a viable alternative for the County based on their and our understanding of its existing technology and available resources.

4.0 County Personnel and Resources

In accordance with the Long Term Plan, the WSC will provide overall guidance and oversight and recommendations for wetland management projects. The committee will be chaired by the SCDEDP. The WW (Wetlands Workgroup) will provide assistance on the more technical aspects of wetland management.

It is anticipated that work performed under the WSS will be funded by a combination of sources yet to be determined. Specific funding sources will be designated and a detailed budget will be developed once the scope of each of the specific WSS tasks listed below has been established.

5.0 Implementation Approach and Procedural Tasks

This WSS will be implemented in accordance with County Resolution No. 285-2007 and the Long-Term Plan, which 1) specify a period of 12-years from March 22, 2007, when the County Executive approved the Resolution, in order to implement the WSS; and 2) require updating the Long Term Plan and WSS every three years in conjunction with submittal of a Triennial Report. In accordance with these requirements, this WSS will be implemented in three, three-year-long phases coinciding with the three-year periods preceding the Second, Third and Fourth Triennial Reports, respectively.

The procedural tasks specified under each phase of this WSS are based on the Long Term Plan and take into account the information developed during years 1 through 3 of the Long Term Plan, including 1) the results of the work performed to date under the WSP, 2) the post-restoration monitoring results for the Wertheim Demonstration Project, and 3) the initial results of the restoration work performed by SCVC and the NYSDEC (New York State Department of Environmental Conservation) at Namkee Creek PSA (Primary Study Area) and Lyman Marsh in 2010. During the Long Term Plan process, PSAs which are known mosquito breeding sites underwent field observations augmented with aerial observations to generalize about certain kinds of marshes; in the instance of Namkee Creek PSA, it represented a south shore fringing marsh as does the Lyman Marsh. Similarities do exist among salt marshes in the County but each one must be assessed individually to determine the impact of local conditions including possible Sea Level Rise.

The WSP related work completed by the County during the first three years of the Long Term Plan is documented in Appendix G. The minutes of the WW meetings held to date are also provided in Appendix G.

The 15 BMPs are divided into four classes based on their potential impact on existing conditions, as summarized below:

<u>Class I BMPs (No or Minimal Impacts)</u>

- BMP 1 – Natural Processes (Reversion/No Action)
- BMP 2 – Maintain/Repair Existing Culverts

<u>Class II BMPs (Minor Impacts)</u>

- BMP 3 – Maintain/Reconstruct Existing Upland/Fresh Water Ditches
- BMP 4 – Selective Maintenance/Reconstruction of Existing Salt Marsh Ditches

<u>Class III BMPs (Potential Significant Impacts)</u>

- BMP 5 – Upgrade or Install Culverts, Weirs, Bridges
- BMP 6 – Naturalize Existing Ditches
- BMP 7 – Install Shallow Spur Ditches
- BMP 8 – Back-Blading and/or Sidecasting Material into Depressions
- BMP 9 – Create Small (500-1,000 sq. ft.) Fish Reservoirs in Mosquito Breeding Areas

<u>Class IV BMPs (Potential Major Impacts)</u>

- BMP 10 – Break Internal Berms
- BMP 11 – Install Tidal Channels
- BMP 12 – Plug Existing Ditches
- BMP 13 – Construct Ponds Greater than 1,000 sq. ft.
- BMP 14 – Fill Existing Ditches
- BMP 15 – Remove Dredge Spoils

For each of the above four classes, descriptions of factors to consider, are potential benefits, possible impacts, equipment to be used, and general compatibility with State tidal wetland regulations summarized in Appendix H, Tables 2 through 5, respectively. This information will be used to determine which BMPs will be utilized at a given salt marsh located in the County.

The Long Term Plan also recommended that these BMPs be implemented incrementally over the twelve years of the Long Term Plan, so that their actual impacts could be assessed. There is compelling and conclusive evidence that large scale projects utilizing BMPs 1–14, as part of a fully reviewed plan with post restoration sampling, can be effective. Refer to Rochlin et al, The post-restoration monitoring results for the Wertheim Demonstration Project, which employed every higher-numbered BMP except Class IV BMP 15 (Remove Dredge Spoils), seems to have been beneficial without any drawbacks.

The eight years of post-restoration monitoring results for the Wertheim Restoration Project continue to indicate that the newly created tidal network has improved marsh and vegetation health in the previously degraded portions of the marsh by increasing the cover of native plant species and decreasing the cover of Phragmites (Refer to Rochlin et al. 2012, Integrated Marsh Management (IMM): a new perspective on mosquito control and best management practices for salt marsh restoration). Recovery from areas impacted by construction has occurred. In addition significant reductions in mosquito production and consequent decrease of pesticide applications to the salt marshes have been also achieved at Wertheim. Refer to Rochlin et al. 2009, Geostatistical evaluation of integrated marsh management impact on mosquito vectors using before-after-control-impact (BACI) design), available through this link: http://www.ij-healthgeographics.com/content/8/1/35

The most recent publicly available Wertheim data report for this project can be found on-line, which includes an extensive photo array at: http://apps.suffolkcountyny.gov/health/suffolkvectorplan/index.html

The 2010 restoration work at Namkee Creek and Lyman marsh was relatively small projects that each employed only a few of the lower-numbered BMPs. The initial results for the restoration work at these two marshes, based on comparison of pre- and post-restoration field monitoring data, indicate that both marshes responded rapidly and positively to the restoration work. They now exhibit increased tidal flow, as evidenced by markedly higher surface-water salinities and noticeably less Phragmites. The final results have not been documented and therefore, the results are not yet available to the public. It is also noted that many salt marsh restoration projects, primarily utilizing Integrated Marsh Management techniques, have been successfully completed in other areas of the Northeast. References including several sample reports of these projects are provided in Appendix I.

These projects indicate that both large-scale and small-scale restoration projects can be effective at improving salt marsh health and function while reducing mosquito breeding in the County's South Shore salt marshes, which account for the majority of the 17,000 acres of salt marshes in the County. With a reduction in mosquito breeding areas that are routinely larvicided, the county can move closer to reaching its goal of a 75% reduction in larviciding over the twelve years of the Long Term Plan while improving the health of these marshes.

It is recommended in this WSS that the original approach of incremental usage of BMPs be expanded to allow use of higher BMPs due to the results of the Wertheim restoration project, but only after proper planning and review by involved agencies. In addition, an approach with an expanded usage of higher BMPs will likely result in sufficient acreage of salt marsh being maintained, enhanced and/or restored during the remaining years of the Long-Term Plan to achieve its main goal of reducing larviciding by 75 percent in terms of acres treated.

This WSS recommends that 1) BMPs 1-14 be considered as available to use on many acres of impacted salt marshes upon DEC review, to be chosen with the marshes that are in poorest apparent health of the approximately 4,000 acres that are routinely larvicided, 2) additional BMPs be identified to assist the County with restoration and/or meeting the Long Term Plan's larviciding-reduction goal, 3) the potential impacts of these additional BMPs, and Class IV BMP 15, be assessed through the implementation of projects, with express approval of the County Legislature, CEQ, and NYSDEC, 4) changes in salt marsh health related to these activities be tracked and assessed utilizing the County-specific model being developed under the WSP, and 5) recommendations for

wetland stewardship be developed beyond the March 2019 end date of the Long-Term Plan.

This WSS also recommends that the County 1) update the Long-Term Plan to reflect this new expedited BMP implementation schedule, and 2) obtain a general permit from the NYSDEC for as many BMPs as possible so that restoration projects and pilot projects can be implemented after review by the DEC.

With this WSS, this approach will allow the County to maintain, enhance and restore its salt marshes, as required, in a timely and cost-effective manner; and meet the primary Long-Term Plan goal of reducing larviciding by 75 percent in terms of acres treated. The specific procedural tasks included under each phase of this WSS, based on this overall approach, are described below.

5.1 WSS Phase 1 Tasks (Long-Term Plan Years 4 through 6)

The key objectives of Phase 1 of the WSS are to 1) build upon the work accomplished under the WSP during the first three years of the Long Term Plan; 2) provide the foundation for work to be performed during the last six years of the Long-Term Plan; 3) expedite the maintenance, enhancement and restoration of the County's most severely impacted salt marshes; 4) begin working toward the Long-Term Plan larviciding reduction goal; 5) evaluate the impacts of Long-Term Plan BMP 15 and any new BMPs on marsh health; and 6) comply with Long-Term Plan reporting requirements. Accordingly, Phase 1 consists of these eight tasks:

- Task 1-1: Develop Definition of Salt Marsh Health for the WSP
- Task 1-2: Complete Development of SCWAMM under the WSP
- Task 1-3: Develop Additional Field Monitoring Procedures for WSP Projects
- Task 1-4: Obtain General Permit for as Many Long-Term Plan BMPs as Possible
- Task 1-5: Implement BMPs 1-14 at High-Priority Impacted Salt Marshes
- Task 1-6: Identify Additional County-Specific BMPs for WSP Projects
- Task 1-7: Conduct Pilot Project(s) to Evaluate BMP 15 and Any New BMPs
- Task 1-8: Update WSS and Long-Term Plan in Conjunction with the Second Triennial Report

Details regarding each WSS Phase 1 task are provided below.

<u>Task 1-1: Develop Definition of Salt Marsh Health for the WSP</u>

During the development of the Long-Term Plan and the PSAs, it became clear that there are many similarities as well as differences between salt marshes. Therefore, each salt marsh attribute should be individually ground-truthed and treated as an individual salt marsh with its own characteristics, determined by the local conditions. With a similar approach, the Long-Term Plan (Book 9 Part I: Salt Marsh Health) proposed a list of first-order indices of salt marsh health on Long Island based on a review of available literature. A copy of the table listing the indices is provided in Appendix J.

The proposed indices were reviewed as part of the initial work performed under the WSP and were found to be reasonable and appropriate. Additionally, they can be readily assessed utilizing available County resources and were therefore selected for use as the basis for the marsh health model described under Task 1-2 below.

Additionally in 2010 (Long-Term Plan Year 4), at the request of the WW, the LKB Team developed a definition of salt marsh health for the WSP to address stakeholder concerns that management/restoration projects place due consideration on salt marsh health. The definition has been accepted by the WW and a copy is provided in Appendix K. It should be noted that this definition was developed specifically for work performed under the WSP, and is not intended to also serve as an academic definition of salt marsh health. Moreover, it should be noted that this definition can be updated based on new information that may become available during the remaining years of the Long-Term Plan.

Task 1-2: Complete Development of SCWAMM under the WSP

The SCWAMM (Suffolk County Wetland Assessment and Management Model) being developed under the WSP will provide the County with a cost-effective tool capable of quantifying the relative health of a salt marsh on a site-specific basis. The SCWAMM is based on the Hollands-Magee Method (A Rapid Procedure for Assessing Wetlands Functional Capacity) adapted for use in salt marshes. The model calculates marsh health based on the product of three key health-related parameters utilizing the equation below:

$$S = O \times P \times I$$

Where:

S = Salt marsh health
O = Open water (Observable remotely)
P = Plant health (Spartina)
I = Invasive plants (Phragmites)

Construction of the model entails developing County-specific methodologies for assessing each of these parameters, then developing reference curves for each of the three parameters based on aerial photographic and confirmatory field data, collected at five of the Long-Term Plan PSAs. These 5 marshes represent the range of salt marsh health conditions currently present in the County.

Detailed information on the SCWAMM, including sample reference curves for each parameter and the current procedure for selecting, assessing and quantifying aerial photographic information for each parameter, is provided in Appendix L of this WSS. Under the WSP, the following occurred:

- The key background documents relating to salt marsh health were reviewed.
- Three of the Long-Term Plan first-order indices of health were selected as parameters, specifically: plant health, percentage of invasive species, and percentage of open water.
- Field data on each of the parameters have been collected.
- The field data have been compiled, and are being assessed.
- The County's LIDAR data have been evaluated for possible use in the SCWAMM.
- A draft reference curve for the P (Plant Health) parameter was developed and correlated to field observations.
- A draft reference curve for the I (Invasive Species) parameter has been developed and is being correlated to field observations.
- A draft reference curve for the O (Open Water) parameter was reviewed and commented upon by the WW.
- The importance of soil salinity to areas of die-off or poor Spartina growth is being studied, and is being related to the flushing by the tidal cycle.
- A non-subjective means of establishing salt marsh boundaries was developed.
- A preliminary methodology for selecting and assessing SCWAMM-related information from aerial photo.s

Although the SCWAMM has not been tested as a model under this program, it will represent an open assessment tool to be used by the County to estimate the impacts of the salt marsh management, enhancement and restoration work performed under the WSP. The SCWAMM has been proposed as an open tool as new variables and modification to the existent parameters can be adapted to it as suggested by Suffolk County with input from the WW and WSC. For instance, the County will evaluate the incorporation of the Salt Marsh Integrity Monitoring Protocol that is being developed by the U. S. Fish and Wildlife Service.

Task 1-3: Develop Additional Field Monitoring Procedures for WSP Projects

In addition to the SCWAMM, which will be the primary tool utilized by the County to evaluate the effectiveness of the salt marsh maintenance, enhancement and restoration projects performed under the WSP, the WW has recommended that basic field monitoring be performed in conjunction with each project in the event that such information can be utilized in the future. Therefore under this task, procedures for such monitoring will be

developed and presented to the WW, with the understanding that actual performance of such work shall be subject to availability of funding and personnel. At a prior WW meeting, the United States Environmental Protection Agency indicated that it may be able to fund some monitoring under its Wetland Program Development program. Also, the United States Geological Survey indicated that it can provide matching funds, and Dowling College indicated that it will solicit volunteers to perform this monitoring work.

Task 1-4: Obtain General Permits

Because any general permit requires site specific planning and review and based on input provided by the WW, the general permit will initially be limited to County and NYSDEC owned lands, but could later be amended to include Town owned lands. Under the county properties, most likely the County's Parks Department will be listed as the property owner. Moreover, the County's prior general permit, issued to SCVC, can likely be used as the template for the general permit although different conditions may be required for public health (vector control) projects versus restoration only projects. Federal permit requirements could likely be met under the Nationwide Permit program. Also, the NYSDEC's prior policy of having a Unit Management Plan in place for restoration projects likely does not apply to the WSP and is not currently implemented here.

Task 1-5: Implement BMPs 1-14 at High-Priority Restoration Projects

Once a priority list of restoration projects is generated, Suffolk County will develop individual plans to use BMPs 1-14 as allowed. The first step will be to develop a prioritized list of candidate salt marshes and proposed actions based on historical marsh health, larviciding frequency data, cost-benefit analysis and available resources.

It is anticipated that this list will be comprised of the County owned marshes that are in poorest apparent health chosen in part from the approximately 4,000 acres that are routinely larvicided. This serves the dual purpose of restoring the health of some of the most impaired marshes while also working toward the Long-Term Plan larviciding-reduction goal. This list will be developed by Suffolk County and presented to the WSC for feedback and recommendations. Once the list is approved, the work will be scheduled and implemented by SCVC, which is the County agency experienced in and owner of the specialized equipment for this type of work on the marsh.

Task 1-6: Identify Additional County Specific BMPs for WSP Projects

Since the WSS is based on the BMPs from the Long-Term Plan, reviewing the Long-Term Plan BMPs and augmenting them with possible additional BMPs is a Phase 1 task. As examples, several potential additional BMPs specific to restoration mentioned at a previous WW meeting are: Phragmites removal, replanting (e.g., control erosion), bulkhead removal, and dam removal.

For this task, the WW shall meet to propose and discuss any new BMPs based on review of the latest findings from the Wertheim Demonstration Project, the results of the restoration projects performed by the NYSDEC and SCVC at Namkee Creek and Lyman Marsh, and publicly available literature. Any additional BMPs that may also be of use to the County for the WSP can be incorporated into subsequent phases of the WSS. Should additions to the Revised BMP Manual are determined to be required, for instance the inclusion of new BMPs, such changes are subject to review by the Suffolk County Legislature and CEQ.

Task 1-7: Conduct Pilot Project(s) to Evaluate BMP 15 and Any New BMPs

BMP 15 (Remove Dredge Spoils) is the only Long-Term Plan BMP that has not been included in any of the restoration projects performed by the County or other local agencies subsequent to development of the Revised BMP Manual. Therefore, a pilot project is presently underway at Indian Island to assess the impacts of BMP 15 on local salt marsh health. In early 2010, the County received a grant from NYSDEC to restore a 7-acre filled salt marsh (Indian Island/Terry Creek Park). It is recommended that this project be utilized as the pilot project to assess the impacts associated with BMP 15. If additional BMPs are approved by the WW, one or more additional

pilot projects may be required to evaluate their impacts prior to implementing them under the WSP.

Task 1-8: Update WSS and Long-Term Plan in Conjunction with the Second Triennial Report

The Resolution requires that each Triennial Report include the recommendations of the WSS and that the Long-Term Plan be updated as appropriate. Therefore, the WSS and Long-Term Plan will be updated in conjunction with preparation of the Second Triennial Report during Phase 1 of the WSS.

The updates to the WSS will include those requested by WW and recommended by the WSC, based on the results of the work conducted during Phase 1 of the WSS. The updates to the Long-Term Plan may include modifying the BMP implementation approach to reflect the new expedited approach for implementing Long-Term Plan BMPS 1-14, as discussed above. The WSS and Long-Term Plan will be updated by Suffolk County, with input from the WW and WSC.

5.2 WSS Phase 2 Tasks (Long-Term Plan Years 7 through 9)

The key objectives of Phase 2 of the WSS are to1) continue to expedite the maintenance, enhancement and restoration of the County's salt marshes, 2) continue working toward the Long-Term Plan larviciding reduction goal; 3) initiate implementation of Long-Term Plan BMP 15 and any new BMPS at high-priority salt marshes; 4) track and assess the results of Phase 1 WSS activities; and 3) comply with Long-Term Plan reporting requirements. Accordingly, Phase 2 consists of these six tasks:

- Task 2-1: Add Additional BMPs to General Permit, if possible
- Task 2-2: Continue to Implement BMPs 1-14 at Selected Salt Marshes
- Task 2-3: Implement BMP 15 and Any New BMPs at High-Priority Salt Marshes
- Task 2-4: Track and Assess Results of Phase 1 WSS Activities
- Task 2-5: Update SCWAMM (If Needed)
- Task 2-6: Update WSS and Long-Term Plan in Conjunction with Third Triennial Report

Details regarding each WSS Phase 2 task are provided below.

Task 2-1: Add Additional BMPs to General Permit, if Possible

At a WW meeting, the NYSDEC indicated a low probability to issue a general permit for all 15 of the Long-Term Plan BMPs, preferring instead to focus at first on the BMPs associated with restoring tidal flow and possibly adding other BMPs over time. Therefore, under this task, the County will request that BMPs, as well as BMP 15 and any new BMPs, not be included in the initial general permit, until full review by the DEC occurs. The County will also request that the general permit be amended to include work on Town owned lands.

Once the permit has been modified, projects utilizing these BMPs can be performed with notifications and site specific review to the NYSDEC, the United States Army Corps of Engineers, CEQ and the Suffolk County Legislature. This task is to be performed by Suffolk County, with input from the WW and review by NYSDEC.

Task 2-2: Continue to Implement BMPs 1-14 at Selected County Salt Marshes

As stated above in Section 2.0 (Related County Laws, Regulations and Requirements), a major goal of the Long-Term Plan is to reduce larviciding by 75 percent, as measured in acres treated, over 12 years. The meet this goal, the County must continue to implement the Long-Term Plan BMPs, as warranted, at as many of the salt marshes that are routinely larvicided as possible. Use of these BMPS for marsh restoration purposes only should also continue to be implemented at selected salt marshes, as warranted. Therefore, continuing to implement BMPs 1-14 at selected County salt marshes is a key task under Phase 2 of the WSS.

A list of potential candidate marshes will also be developed by the WW, and approved by the WSC. The field work will be performed by SCDPW VC and/or other government agencies, with input from the WW and WSC.

Task 2-3: Implement BMP 15 and Any New BMPs at High-Priority Salt Marshes

Under this task, the County will begin implementing Long-Term Plan BMP 15 and any new BMPs, as warranted, at high-priority impacted salt marshes. The first step will be to develop a prioritized list of candidate salt marshes and proposed actions specific to these BMPs. The list may include marshes where BMPs 1-14 are also being employed. It is anticipated that this list will also be comprised of the County owned marshes that are in poorest apparent health of the approximately 4,000 acres that are routinely larvicided, thereby restoring the health of the most impaired marshes while also working toward the Long-Term Plan larviciding reduction goal. Cooperation will be sought with other stakeholders to maximize the efforts of reaching this goal.

This list will be developed by Suffolk County and recommended by the WW and by the WSC. Once the list is approved, the work will be scheduled and implemented by SCVC, which is the County agency experienced in, and with the specialized equipment for, this type of work.

Task 2-4: Track and Assess Results of Phase 1 WSS Activities

Under this task, the County, the WW and/or other interested parties will utilize the SCWAMM completed under Task 1-2 and/or the additional field monitoring protocols developed under Task 1-3 to track and assess the results of the Phase 1 WSS activities. It is anticipated that this task will primarily be performed by County personnel utilizing the SCWAMM, as it is being developed specifically for this purpose.

The results of all field projects performed during Phase 1 will be assessed to determine their effectiveness in maintaining, enhancing and/or restoring salt marsh health, as appropriate. This will be accomplished by the County by comparing each salt marsh's "before" and "after" scores from the SCWAMM.

Projects performed in routinely larvicided salt marshes for public health purposes will also be assessed with respect to achieving the Long-Term Plan larviciding reduction goal by comparing data on larviciding requirements before and after the project. This work will also be performed by the County, with input from the WW as well as local towns and villages in meeting this goal while establishing appropriate protocol to assess as many of the 4,000 acre routinely larvicided sites

Task 2-5: Update SCWAMM (If Needed)

It is anticipated that the model reference curves for the three parameters that currently form the basis of the SCWAMM may need to be updated in the future as baseline conditions change and/or as new data become available. Additionally, it is possible that the County may want to refine the SCWAMM by adding parameters. Therefore, updating the SCWAMM, if needed, is a Phase 2 task of the WSS.

If required, it is anticipated that this task will be performed under the WSP, with input from the WW and WSC.

Task 2-6: Update WSS and Long-Term Plan in Conjunction with Third Triennial Report

As noted above in Section 5.1, under Task 1-8, the Resolution requires that each Triennial Report include the findings of the WSS, and that the Long-Term Plan be updated as appropriate. Therefore, updating the WSS again in conjunction with the Third Triennial Report is a Phase 2 task. It is anticipated that this work will be performed under the WSP with input from the WW and WSC.

5.3 WSS Phase 3 Tasks (Long-Term Plan Years 10 through 12)

The key objectives of Phase 3 of the WSS are to1) continue to maintain, enhance and restore the County's salt marshes; 2) assess the effectiveness of Phases 1 and 2 of the WSS in improving salt marsh health; 3) verify that the Long-Term Plan larviciding reduction goal is being met; 4) develop long-term recommendations for wetland stewardship beyond the period of the Long-Term Plan; and 5) comply with Long-Term Plan report requirements. Accordingly, Phase 3 consists of these six tasks:

- Task 3-1: Renew/Augment General Permit, as Required
- Task 3-2: Continue to Implement BMPs at Selected County Salt Marshes
- Task 3-3: Track and Assess Effectiveness of Phases 1 and 2 WSS Activities
- Task 3-4: Evaluate Findings Relative to Achieving Long-Term Plan Goals
- Task 3-5: Update SCWAMM (If Needed)
- Task 3-6: Update WSS and Long-Term Plan in Conjunction with Fourth Triennial Report

Details regarding each WSS Phase 3 task are provided below.

Task 3-1: Renew/Augment General Permit, as Required

In Task 1-4 Obtain General Permits, the end date of the initial general permit is anticipated to coincide with the end of the Long-Term Plan, while Task 2-1 (Add Additional BMPs to General Permit, if possible), anticipates addition(s) of new BMPs to the permit over time. Since the County's WSP activities will continue beyond the March 2019 end date of the Long-Term Plan, renewing/augmenting the general permit is a Phase 3 WSS task. This task will be performed by the County, with input from interested agencies.

Task 3-2: Continue to Implement BMPs at Selected Salt Marshes

Under this task, the County will continue to implement the BMPs, as warranted, at selected salt marshes to maintain, enhance and restore salt marsh health, and further reduce larviciding. The basic procedure for this task will be similar to Task 2-2 (Continue to Implement BMPs 1-14 at Selected Salt Marshes). Specifically, a list of potential candidate marshes will be developed by the WW, recommended by the WSC and subject to review by the County Legislator and CEQ. Field work will be performed by SCVC with input from project partners and/or other government agencies.

Task 3-3: Track and Assess Effectiveness of Phases 1 and 2 WSS Activities

This scope of this task is basically a continuation of Task 2-4, with the addition of the Phase 2 activities. Under this task, the County, the WW and/or other interested parties will continue to utilize the SCWAMM completed under Task 1-2 and/or the additional field monitoring protocols developed under Task 1-3 to track and assess the results of both Phase 1 and Phase 2 WSS activities. It is anticipated that this task will also be performed primarily by County personnel utilizing the SCWAMM being developed specifically for this purpose, and will be accomplished by comparing each marsh's "before" and "after" scores from the SCWAMM. Projects performed in routinely larvicided salt marshes for public health purposes will continue to be assessed with respect to achieving the Long-Term Plan larviciding reduction goal.

Task 3-4: Evaluate Findings Relative to Achieving Long-Term Plan Goals

The purpose of this Phase 3 task is to verify that the main Long-Term Plan goal of reducing larviciding by 75 percent in terms of acres treated is being met. In general, this will be accomplished by compiling and then comparing the previous versus current larvicide-application data for the 4,000 acres of County salt marsh that have been routinely larvicided. The specific procedure for performing this evaluation will be developed by the WW, with input from SCVC.

It is anticipated that this task will be performed by the County, and that it will be completed early on during Phase 3 of the WSS so that there is sufficient time to complete additional projects if it is determined that they are necessary to meet the Long-Term Plan larviciding reduction goal.

Task 3-5: Update SCWAMM (If Needed)

As noted above in Section 5.2 under Task 2-5, the model reference curves for the three parameters that currently form the basis of the SCWAMM may need to be updated again as baseline conditions change and/or as new data become available. Additionally, it is possible that the County may want to refine the SCWAMM by adding parameters. Therefore, updating the SCWAMM, if needed, is included as a Phase 3 task.

If required, it is anticipated that this task will be performed under the WSP with input from the WW and WSC. It should be noted that revisions to SCWAMM are expected to reflect both changes in field conditions and priorities set by the WSC and WW, who shall direct the selection of priorities and rankings built into the SCWAMM.

Task 3-6: Update WSS and Long-Term Plan in Conjunction with Fourth Triennial Report

As noted previously, the Resolution requires that each Triennial Report include the findings of the WSS, and that the Long-Term Plan be updated as appropriate. Therefore, updating the WSS again in conjunction with preparation of the Fourth Triennial Report is a Phase 3 task.

Since the Fourth Triennial Report marks the end of the Long-Term Plan 12-year implementation period, this update will include long-term recommendations for wetland stewardship. The recommendations will be based on the work completed under the WSP pursuant to this WSS. It is anticipated that the recommendations will be developed by the WW, with input from the County and the WSC.

6.0 Implementation Schedule

An Implementation Schedule for each of the three WSS phases and associated tasks described in Section 5.0 above is provided as Figure 1 on the following page. The implementation of the Wetlands Stewardship Strategy as indicated by Figure 1 will be composed of three phases and each phase will be implemented for a period of three years. Because the majority of the tasks will take an extended period of time to complete, the schedule is on a calendar quarter basis beginning with the second calendar quarter of year 1. This schedule will be updated and/or modified based on considerations of Suffolk County and in conjunction with each Triennial Report.

Figure 1 - Implementation Schedule
Suffolk County Wetland Stewardship Strategy

	WSS Phase 1											
	Year 1				Year 2				Year 3			
Phase 1 Tasks	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter Year 2	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter Year 3	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter Year 1 Phase 2
Task 1-1: Develop Definition of Salt Marsh Health for the WSP												
Task 1-2: Complete Development of SCWAMM Under the WSP												
Task 1-3: Develop Additional Field Monitoring Procedures for WSP Projects												
Task 1-4: Obtain General Permit for as Many Long-Term Plan BMPs as Possible												
Task 1-5: Implement BMPs 1-14 at High-Priority Impacted Salt Marshes												
Task 1-6: Identify Additional County-Specific BMPs for WSP Projects												
Task 1-7: Conduct Pilot Project(s) to Evaluate BMP15 and Any New BMPs												
Task 1-8: Update WSS and Long-Term Plan in Conjunction with Second Triennial Report												

	WSS Phase 2											
	Year 1				Year 2				Year 3			
Phase 2 Tasks	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter Year 2	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter Year 3	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter Year 1 Phase 3
Task 2-1: Add Additional BMPs to General Permit, if Possible												
Task 2-2: Continue to Implement BMPs 1-14 at Selected County Salt Marshes												
Task 2-3: Implement BMP15 and Any New BMPs at High-Priority Salt Marshes												
Task 2-4: Track and Assess Results of Phase 1 WSS Activities												
Task 2-5: Update SCWAMM (If Needed)												
Task 2-6: Update WSS and Long-Term Plan in Conjunction with Third Triennial Report												

	WSS Phase 3											
	Year 1				Year 2				Year 3			
Phase 3 Tasks	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter Year 2	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter Year 3	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter Following Year
Task 3-1: Renew/Augment General Permit, as Required												
Task 3-2: Continue to Implement BMPs at Selected County Salt Marshes												
Task 3-3: Track and Assess Effectiveness of Phases 1 and 2 WSS Activities												
Task 3-4: Evaluate Findings Relative to Achieving Long-Term Plan Goals												
Task 3-5: Update SCWAMM (If Needed)												
Task 3-6: Update WSS and Long-Term Plan in Conjunction with Fourth Triennial Report												