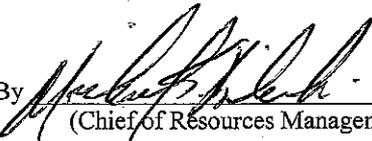


# 2012 MOSQUITO ACTION PLAN (MAP) Fire Island National Seashore

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Reviewed By  Date 8/6/12  
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## **INTRODUCTION: FIRE ISLAND NATIONAL SEASHORE MOSQUITO SURVEILLANCE**

Fire Island is a 32-mile long barrier island approximately 1-5 miles south of Long Island. Fire Island National Seashore (FIIS) is located on the eastern 26 miles of Fire Island. Additionally, FIIS includes the 613 acre William Floyd Estate in the community of Mastic Beach, New York on Long Island. The park's boundary around Fire Island extends 1,000 feet into the Atlantic Ocean and 4,000 feet into the Great South Bay and encompasses the islands adjacent to the bay shoreline. All of Fire Island is located in Suffolk County and there are four municipal governments that operate on Fire Island: towns of Islip and Brookhaven and the villages of Saltaire and Ocean Beach. There are approximately 4,200 homes dispersed among 17 communities, including the two villages, within the boundaries of the park. Of the 4,200 homes, approximately 350-500 are inhabited year-round. Visitation on a peak season weekend day can be as high as 100,000 within the park areas and the communities combined.

FIIS has the responsibility to protect and preserve the park's natural and cultural resources and to assist in the protection of visitor and employee health and safety. To that end, since the early 1980s, FIIS staff has monitored the park's mosquito populations. In 1985, based on research on mosquito dispersal, the park determined that the impact of mosquitoes in the federal wilderness area was minimal on nearby Long Island south shore communities.

In the late 1990s public concern relating to Eastern equine encephalitis (EEE) and West Nile virus (WNV), both diseases related to mosquito populations, prompted the park to initiate mosquito monitoring and surveillance. To further limit the possibility of a major incident and to ensure a quick and rational response should a mosquito-borne disease be found in, or near the park, FIIS has developed the following Mosquito Action Plan (MAP).

The use of pesticides within a National Park Service area are required to be in accordance with Servicewide policies as found in NPS-77 (Natural Resources Management Guidelines). An [Integrated Pest Management](#) (IPM) Plan for Fire Island National Seashore was prepared in late November 2006 to provide basic low-risk pest management guidelines to help protect park resources and to protect the health and safety of people.

All pesticides used within Fire Island National Seashore must be applied by or under the direct supervision of a State of New York certified pesticide applicator. All pesticides used in the park by residents, contractors, special use permittees, agricultural issues, or non-NPS personnel must conform to NPS policies and guidelines, and be approved before use. The goal is to use low-risk pesticides, if necessary, that will accomplish desired objectives.

Under a letter of authorization from the National Park Service (NPS), Suffolk County Department of Public Works, Division of Vector Control (SCVC) conducts spraying for adult and/or larval mosquitoes in several of the towns and villages within the boundaries of FIIS. Individual residents may request that their property be excluded from nonemergency treatments.

A long-term Mosquito Management Plan is being jointly developed by Suffolk County, New York and Fire Island National Seashore, and will be implemented when the joint plan is finalized. Until then, the park staff utilizes the mosquito surveillance and management protocols and MAP.

This document is intended to guide park staff and managers in the proper response to WNV and Eastern equine encephalitis virus (EEEV) occurrences within FIIS boundaries. These guidelines can also be used to address other emerging infectious diseases. The Mosquito Action Plan (MAP) works in conjunction with the Mosquito Surveillance and Management Protocols implemented by the park. Listed below are the actions that will be taken by the park and the different levels of response to human health threats from disease.

## **PRE-SEASON PREPARATIONS**

During this stage the park receives low to moderate visitation and mosquito activity is dormant to low. The primary goal of this stage is to prepare for the season ahead. Pre-season should be accomplished before the end of June 2012.

- 1. All Stage Three Incident (see below, p. 6-8) Caches will be checked to ensure that personal protective equipment (PPE) is maintained or replaced from the previous year.** Those employees that are incidental responders in the field will have access to Tyvek tick suits, head nets, gloves and insect repellent at each ranger station in the park (William Floyd Estate (WFE), Wilderness Visitor Center, Watch Hill, Sailors Haven, Fire Island Lighthouse). These items are stored in locked, weather-resistant caches at each station. Caches will be checked and restocked as necessary. See Appendix D for equipment cache information.
- 2. All dead bird transport coolers (see below, p.16-17 will be checked to ensure that the equipment and protocols are maintained and current.** Each ranger station in the park has a cooler with PPE and other items needed to collect and transport dead birds in accordance with state and federal guidelines.
- 3. Park employees will be informed of the preparations underway and educated about disease prevention including sanitation and personal protection.** The education program in the park should be started at the first staff meeting of the season to remind all staff of the issues pertaining to mosquitoes and safety precautions that should be taken. Employees should know how the disease is transmitted, how to prevent breeding areas from forming around the workplace or at home, and how to protect themselves. All employees should also be taught to recognize the signs and symptoms of WNV (see appendix A).
- 4. All park areas will be checked to identify any potential artificial freshwater mosquito breeding areas.** Work orders should be generated to clean up these areas. This should include evaluating park vehicle access roads (Burma Road, road to facilities, etc.). Those areas that have significant rutting that retain standing water longer than 2-3 days may need to be graded or filled. Sanitation actions should continue until October, when mosquito breeding activity ceases (see Appendix E).
- 5. Mosquito Surveillance Management Protocols, educational/outreach documents (mosquito brochure, interpretive programs), and other brochures and handouts will be prepared and management plans finalized.** Education should consist of brochures, interpretive programs, press releases or other means to inform the public.
- 6. Permit approvals for pesticide applications** or other management interventions will be obtained and should include all possible regulated chemicals for mosquito management use. This is done in partnership with Suffolk County Vector Control (SCVC). Permit applications are made to the National Park Service (NPS) Integrated Pest Management coordinator for FIIS.

**7. The MAP will be prepared in accordance with the Mosquito Surveillance and Management Protocols.** The MAP will include a protocol for handling dead birds and should be reviewed and approved by the MAP committee.

**The 2012 MAP committee includes:**

Jim Dunphy – Facility Manager; Lena Koschmann – Chief Ranger; Paula Valentine – Public Affairs Officer, Kathy Krause – Chief of Interpretation; Elizabeth Rogers – Science Communications Park Ranger; Roger Huguenin – Chief of Administration; Jordan Raphael – Park Biologist; Michael Bilecki – Chief of Natural Resource Management; and Kaetlyn Kerr – Biological Technician.

**8. Adult mosquito trapping sites and larval sampling sites have been chosen** in consultation with park experts and scientists at the United States Geologic Survey (USGS) – Biological Research Division and are detailed in the Mosquito Surveillance Management Protocols.

**9. Arrangements will have been made with SCVC and Suffolk County Department of Health Services** or other agencies for transport and testing of mosquitoes, dead birds, etc. Shipment schedule for samples sent from Suffolk to New York State testing facility will dictate when specimens should be sent to Suffolk County by FIIS staff. This is important for working out the weekly trapping schedule in order to minimize the turnover period from collection to receiving test results.

**10. All trapping equipment, parts and batteries, will be checked for functionality to be repaired or purchased.** All PPE, sorting/identification materials and all other supplies need to be inventoried before the start of the season and restocked if necessary.

## **STAGE ONE – ACTIVE SURVEILLANCE AND EDUCATION**

This stage begins in the summer when park visitation becomes moderate to high and mosquito activity is moderate to very high. The park will begin trapping mosquitoes and preparing pools of mosquitoes to be tested, in accordance with guidelines provided by the park's Mosquito Surveillance and Management Protocol. This will entail close work with SCVC and Suffolk County Department of Health Services.

**1. Education efforts by the park will be fully implemented.** Interpretive programs, webpages, social media, and press releases should be used to educate staff and the general public. Park brochures, handouts, and other sources of information should be distributed to all the visitor centers and, where appropriate and workable, in Fire Island communities. Web pages with links to additional information are updated.

- Mosquito Monitoring & Management: <http://www.nps.gov/fiis/parkmgmt/mosquito-management.htm>
- Avoid Mosquitoes: <http://www.nps.gov/fiis/planyourvisit/avoid-mosquitoes.htm>

Employees should be sufficiently knowledgeable to provide residents and visitors with accurate information (or know where they can get it). **However, it is critical that all employees realize that the park superintendent or his/her designee is the only one speaking to the media to represent the park.**

**2. The protocol for handling dead birds will be distributed and promoted.** FIIS employees, residents and visitors should understand what to do if they find a dead bird (Appendix B).

**3. Mosquitoes will be collected once a week from traps** set out at the WFE and from the Wilderness Visitor Center to the Fire Island Lighthouse. These mosquitoes will be kept chilled and transported back to the Patchogue Maintenance Facility (PMF), where they will be sorted into the main vector species and stored on dry ice until delivered to SCVC. The number of traps and exact placement will be determined after consulting with USGS biologists and SCVC. Deadlines for delivery of mosquitoes to SCVC will be coordinated with that agency.

See Mosquito Surveillance, Trapping Methods and Equipment, page 9, and Trapping Sites, page 11.

## **STAGE TWO – DETECTION AND PUBLIC NOTIFICATION**

This stage occurs when routine mosquito monitoring indicates a potential emergence of adult mosquitoes within the boundaries of the park, and/or if WNV is detected in the park or within two miles of or if Eastern equine encephalitis virus (EEEV) has been detected in FIIS or within five miles of FIIS. Visitation is probably high and mosquito activity high to very high. FIIS will notify Suffolk County of a potential emergence. If disease is detected in or near the park, visitors will be notified, informed of the realistic potential for contracting disease and advised to take proper precautions.

**1. Increased surveillance will take place** in and (if applicable) adjacent to the site(s) where disease was detected.

**2. Field responders will be reminded** of the resources available to them (equipment caches etc.).

**3. In the event that disease is detected, education efforts by FIIS staff will be intensified.** More frequent interpretive talks, community outreach and active distribution of brochures or handouts by rangers are a few ways to do this. Press releases will be generated (see Appendix C). Social media pages will be updated.

FIIS park press release website

- <http://www.nps.gov/fiis/parknews/newsreleases.htm>

FIIS social media sites (Twitter and Facebook):

- <http://twitter.com/FireIslandNPS>
- <http://www.facebook.com/pages/Fire-Island-National-Seashore/145302202157881>

**4. In the event that disease is detected, the FIIS staff will consult** with the Centers for Disease Control and Prevention (CDC), SCVC and Suffolk County Department of Health Services, New York State Health Department, New York State Department of Environmental Conservation (DEC) and other authorities. Together with these agencies, FIIS staff will decide on the best course of action to minimize the risk to human health, and determine the possible environmental impact of any action taken.

**5. In the event that disease is detected, arrangements for pesticide use will be finalized.** FIIS staff will work closely with SCVC and any other involved parties to assure that, should the need arise; application of pesticides is done within the guidelines approved by NPS, CDC, Environmental Protection Agency (EPA) and DEC.

## **STAGE THREE – MOSQUITO MANAGEMENT**

This stage will be triggered by the detection of disease in **more than one “pool” of mosquitoes** (a pool is defined as a sample of 10 to 60 mosquitoes, for one given trap) or by detection of disease in both mosquitoes and birds, or in increasing numbers of infected birds. Action at “Stage Three” could take several forms: application of adulticide to the identification site, application of larvicide to breeding areas, and/or closing areas of FIIS to the public. **The current events and concerns of disease transmission shall be interpreted to the public and staff regardless of what management action is taken.**

- 1. All of the actions listed above for Stage Two will be immediately implemented**, if not already done.
- 2. FIIS’s response will conform to the Suffolk County Unified Command (SCUC) structure and the NPS Incident Command System (ICS).** FIIS headquarters will be the Command Center, with supply, public relations and administration functions.
- 3. The Superintendent/Incident Commander will close areas of FIIS as needed or appropriate.** This may impact large areas of the park such as a marina or the WFE, or just specific trails.
- 4. There will be a daily radio brief to FIIS staff as part of the incident command process.** Public information efforts should be coordinated with the CDC and SCVC to prevent duplication of work and assure that information is consistent.

### **Debriefing Period:**

This period will conclude a Stage Three of the MAP, after the above actions (1-4 of Stage Two and 1-4 of Stage Three) have been taken. The purpose of this period is to evaluate the effectiveness and efficiency of the overall response to the incident.

- 1. If Stage Three was reached**, each response team leader, ranger or other supervisor will hold discussions with his/her staff and be prepared to make a presentation to the Incident Commander and overhead team no later than one pay period after the incident. The Incident Commander and overhead team should be prepared to hold a supervisor’s critique based on the above time line.
- 2. The superintendent will schedule a meeting with the MAP committee** no later than one pay period after the Incident Commander concludes his/her critique.
- 3. The park management team should quickly evaluate current conditions as stated by the IC Team** and a return to the appropriate stage should begin immediately.
- 4. If needed, appropriate changes or additions will be made to the actions taken in Stage Three** in order to mitigate any unnecessary future challenges experienced during the incident response.

### **POST- SEASON WRAP-UP**

At this point visitation is low and mosquito activity is low to dormant. The main purpose of this stage is to evaluate the past season, report results and clean and store all equipment.

- 1. A final report will be written**, detailing the results of the season's mosquito surveillance and management activities, along with any recommendations for the following year.
- 2. Monitoring equipment will be cleaned and put into safe storage**, ready the following year's use.

## **2012 MOSQUITO SURVEILLANCE**

### **Trapping Methods and Equipment**

Two types of traps are used for the collection of mosquitoes: Center for Disease Control and Prevention (CDC) Gravid traps (John W. Hock Company model #1712) and Carbon Dioxide CDC Miniature Light Traps (John W. Hock Company model #512). In most trap locations, light and gravid traps are paired together (within several meters of each other) in order to help facilitate possible future epidemiological research by United States Geologic Survey (USGS).

#### *Gravid Trap*

The gravid traps are designed to attract and collect gravid (egg-bearing) mosquitoes of species with larvae that thrive in freshwater, with high organic content, which in FIIS are predominately *Culex pipiens* and *Culex restuans*. However, these traps can occasionally collect non-gravid foraging females of other species, especially those which are typically low-flying such as *Ae. sollicitans*. Gravid *Culex* spp. mosquitoes are the preferred specimens for WNV testing. Gravid mosquitoes have already fed and are therefore more likely to be infected with the virus compared to those mosquitoes that have not yet fed. For that reason, along with the ecology and biology of *Culex* mosquitoes, it is argued that mosquito-for-mosquito gravid traps are likely to be more sensitive in detecting WNV and other mosquito-borne diseases than light traps.

The gravid trap consists of 3.5"-wide PVC tubing that has a basic motor fan secured inside and a net on the top. The fan is powered by a sealed 6-volt battery. Held up vertically by aluminum cross beams, the PVC tubing rests on top of a plastic bin with measurements of 7" x 10" x 14" (height, width, and length, respectively). The bin contains a fermented mixture of rabbit feed and water, which acts as a high-organic material bait. The fermented mixture amounts are adjusted so that the base of each tube sits approximately 1 inch above the surface of the mixture. The trap functions by pulling the mosquitoes up into the net via the PVC tubing, by the force of the fan, as gravid mosquitoes approach the fermented mixture to deposit their eggs (figure 1).

#### *Light Trap*

The CO<sub>2</sub>-baited light traps are designed to attract and collect host-seeking adult female mosquitoes. CO<sub>2</sub>-baited light traps are generally known to yield larger collections, with a greater diversity of mosquitoes compared to gravid traps (Lussier et al. 2006). Therefore, this trap may be a slightly stronger gauge for qualitatively measuring species abundance and, to a certain extent, diversity in each of the surveyed areas.

As with the gravid traps, the light trap consists of 3.5"-wide PVC tubing that has a basic motor fan secured inside and a collection container that hangs from the tubing. As bait, a quantity of dry ice approximately equivalent to a block 6" x 6" x 6" is wrapped in newspaper and hung adjacent to the trap using twine and gallon-sized zip-locking bags. CO<sub>2</sub> gas is given off during sublimation of the dry ice and attracts mosquitoes to the vicinity of the trap. It is claimed that once baited, an incandescent light located at the top of the tubing acts as a focal point and draws the mosquitoes to the suction of the fan, upon which they are pulled inside the bottom of the collection container via the tubing (figure 2).

**Fig. 1. Gravid trap with collection net and battery.**



**Fig. 2. Light trap with collection container.**



## Surveillance Sites

A total of seven areas are used as surveillance sites, which were selected in consultation with Dr. Howard S. Ginsberg of the USGS. The sites established are 1) the Lighthouse Tract, 2) the Village of Saltaire, 3) Sailors Haven, 4) Fire Island Pines, 5) Watch Hill, 6) the Wilderness Visitor's Center, and 7) the William Floyd Estate (respectively, from west to east). Exact locations of each trap were selected based on various factors such as vegetative indicators, proximity to residential communities, the degree of staff and visitor use, visibility of trap (to avoid vandalism), mosquito productivity, canopy cover (for light traps) and either the presence of standing water or indications of water table surfacing (for gravid traps).

Multiple traps are maintained at each of the surveillance sites. In most trap locations, light and gravid traps are paired together, within several meters of each other, in order to help facilitate possible future epidemiological research. There are only a few exceptions to this design.

The 2012 mosquito surveillance will begin with a total of eighteen traps (10 light traps and 8 gravid traps). Most traps will be placed in pairs, with one CO<sub>2</sub>-baited CDC light trap paired with one gravid trap at each trap site. Individual trap placement will depend on local habitat distribution (the gravid trap will generally not be directly adjacent to the paired CDC trap).

On Fire Island a total of fourteen traps will be placed from west to east. The traps are located as follows:

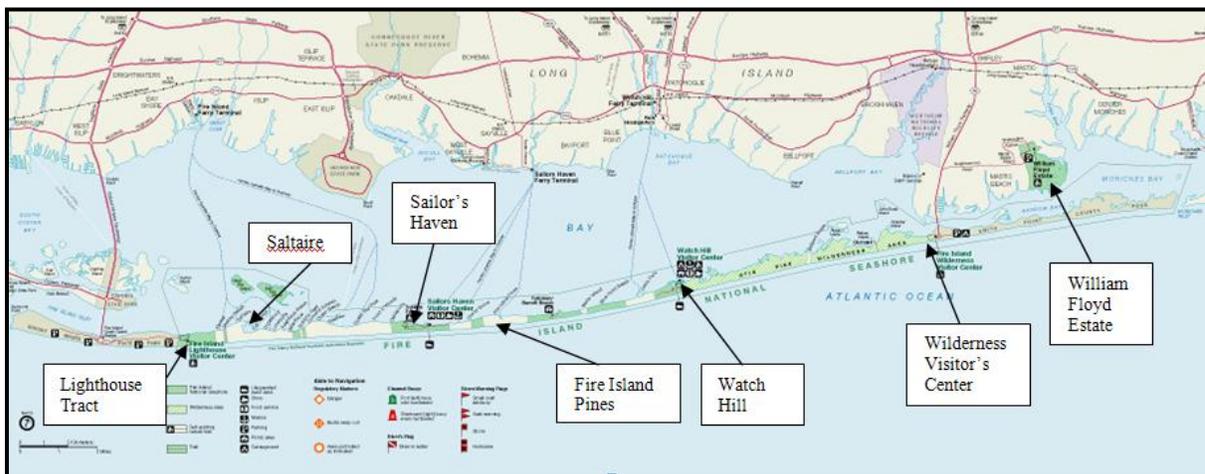
- one gravid/CDC trap pair will be placed near wetlands at the eastern end of the Lighthouse tract;
- one gravid/CDC trap pair located in the Village of Saltaire;

- one gravid/CDC trap pair will be placed in the Sunken Forest along the board walk and one single CDC light trap will be placed behind the concession stand at Sailors Haven Marina;
- one gravid/CDC trap pair will be placed in the Carrington Tract just west of Fire Island Pines;
- one gravid trap and one CDC light trap will be placed near the Watch Hill/Davis Park border along with a single CDC light trap located near the park employee housing at Watch Hill; and
- one gravid/CDC trap pair will be placed behind the primary dune just west of the Wilderness Visitor's Center at Smith Point.

At the WFE, a total of four traps will be set: one gravid/CDC trap pair will be placed in moist woodland habitat near the salt marsh/woods border; and one CDC light trap and one gravid trap will be placed near the freshwater wetland and drainage area near the main entrance.

This initial distribution of traps may be modified based on surveillance results. For example, if there are positive results in birds or mosquitoes in an area, additional traps can be added to that area to get more complete information about the local epizootiology of the virus.

Traps will be set once each week, June – September (traps at different sites may be placed on different nights, to facilitate timely setting and collecting of traps). Trap catches will be sorted to species, and the number of *Culex* spp., *Aedes sollicitans*, *Ae. taeniorhynchus*, *Ae. vexans*, *Ae. albopictus* -- and other mosquito species as time permits -- will be counted. During large emergencies, trap counts and species composition will be estimated using appropriate techniques.



## APPENDIX A

# QUESTIONS AND ANSWERS ON WNV/ENCEPHALITIS FOR EMPLOYEES AND VISITORS OF FIRE ISLAND NATIONAL SEASHORE

### **What is West Nile Encephalitis?**

"Encephalitis" means an inflammation of the brain and can be caused by bacteria and viruses, including viruses transmitted by mosquitoes. West Nile encephalitis is an infection of the brain caused by West Nile virus (WNV), a virus native to Africa, West Asia, and the Middle East. WNV is also less commonly found in southern Europe. It was found in the Western Hemisphere for the first time in 1999. It is closely related to St. Louis encephalitis virus, also found in the United States.

### **How big a threat is WNV to the health and safety of National Park Service (NPS) employees and visitors?**

Since its introduction into the Western Hemisphere, WNV has proven to be most serious in the elderly and people who are already weakened by other ailments. From 2001 to 2011, there have been a total of 68 human cases of WNV in Suffolk County, NY. In 2011, there were 44 human cases of WNV and subsequently, 2 deaths in New York State (not in Suffolk County). Of these human cases, 4 were located in Suffolk County. The peak in occurrence in human cases for New York State was in the latter half of August 2011, commonly when WNV is most prevalent (CDC, 2012). In the United States, WNV is transmitted by infected mosquitoes, primarily members of the *Culex* and *Aedes* genus of which, several species occur on Fire Island (CDC, June 2010). From FIIS mosquito and surveillance monitoring since 1998, there have been 15 positive WNV occurrences in mosquitoes or dead birds on Fire Island and two positive occurrences at the William Floyd Estate. People most likely to develop serious symptoms are the elderly and those who have a compromised immune system, such as people diagnosed with AIDS. By using insect repellents when engaged in outside activities, the risk of contracting WNV can be greatly lowered. For maximum protection, a repellent containing 33% DEET is recommended. Follow the label directions carefully, especially when using DEET on children, for whom a lower % of DEET is recommended.

### **What is the basic transmission cycle for the WNV?**

Mosquitoes become infected when they feed on birds infected with the virus. After an incubation period (roughly 10 days), infected mosquitoes can transmit WNV to humans and/or other animals. Disease symptoms do not develop in everyone who is bitten by an infected mosquito. Elderly and other people who are fighting an illness are more likely to develop symptoms and possibly encephalitis.

### **How long has WNV been in the United States?**

It is not known how long the virus has been in the U.S., but the CDC scientists first detected it in the eastern U.S. during the summer of 1999 in Queens, NY.

**How do people get WNV?**

Transmission comes through the bite of a mosquito (primarily the *Culex spp.*, or possibly *Aedes sollicitans*) that is infected with the WNV. The virus is located in the mosquito's salivary glands. It is not commonly transmitted by casual contact between people, but in a small number of cases it has been transmitted by blood transfusions, organ transplants, breastfeeding and even during pregnancy from mother to baby.

**What are the symptoms of WNV?**

Most people who are infected with WNV have no symptoms. Some experience flu-like symptoms, including fever, headaches, and body aches, and skin rash and swollen lymph glands are also common symptoms. In fewer cases, the infection may be more severe and an infected person may also experience neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and/or paralysis. Severe infection may lead to permanent neurological damage or death in the most extreme cases.

**What is the treatment for WNV?**

There is no specific treatment for WNV. Mild cases usually clear up with no treatment. In more severe cases, intensive supportive therapy is indicated including hospitalization, IV fluids and nutrition, and good nursing care. If you develop symptoms of severe WNV illness, such as unusually severe headaches or confusion, seek medical attention immediately.

**Is there a vaccine against WNV?**

Though there are vaccines for the WNV for horses and other pets, there is no vaccine for human use at this time.

**Can a person get WNV directly from birds that might have the virus?**

There is evidence that a person with a cut can get West Nile encephalitis from handling live or dead birds that test positive for the virus. To be safe, always use gloves or double plastic bags to handle or remove dead birds.

**Is a woman's pregnancy at risk if she gets West Nile encephalitis?**

There is evidence that an infection caused by the WNV can be transmitted to the non-born child of a pregnant woman. The CDC recommends that pregnant women avoid being bitten (stay away from mosquitoes and ask your doctor about the use of repellent).

**Why doesn't Fire Island National Seashore (FIIS) spray for mosquitoes?**

FIIS is by law required to protect the native wildlife, plants and other natural resources within its boundaries from environmental contamination. Modern insecticides, while safer for humans than their older counterparts, are often very toxic to fish and other forms of marine life.

Since 1999, FIIS, in cooperation with Suffolk County, and in consultation with New York State and the CDC, has conducted a mosquito surveillance program each summer to monitor mosquitoes on park lands for the presence of diseases that present a threat to humans, such as Eastern equine encephalitis virus (EEEV) and WNV. The program was designed by a leading entomologist from the University of Rhode Island.

Each week, mosquitoes are sent to Albany to be tested for disease. If mosquito-borne disease is found in the park, or within a few miles of park boundaries, the NPS will consult with Suffolk County, the CDC, and New York State and with academic experts to decide whether or not to spray park lands to reduce the number of adult mosquitoes. Other control methods such as larviciding may also be implemented.

### **What role does the CDC play in NPS mosquito management efforts?**

The CDC and other federal, state and local agencies will assist the NPS to determine the severity of the public health threat from mosquito-borne disease in FIIS, and to choose the appropriate course of action to protect the health of staff, residents and visitors. CDC does not announce a “public health threat”; they simply provide technical assistance to the park in the decision-making process.

### **What can park visitors or park employees do to prevent becoming infected with the WNV?**

No control method will eliminate *all* mosquitoes. For the individual, the very best form of protection is personal protection. Avoid areas with mosquitoes, but if you must be outside, wear protective clothing and use repellent.

- Long-sleeved shirts, long pants, a hat, and gloves can provide increased protection from mosquitoes. For extra protection, clothing can also be treated with an insecticide such as permethrin.
- The use of an insect repellent on exposed skin will reduce your chances of being bitten by mosquitoes. A repellent with 20% to 30% DEET (N,N-diethyl-meta-toluamide) as the active ingredient works the best.
- The combination of permethrin-treated clothing and a DEET-based repellent on exposed skin will provide for maximum personal protection.
- The use of a head net and mesh jacket can also provide added protection and needed ventilation on warm days.

### **Where can I get more information on WNV and other mosquito borne diseases?**

Check the following web pages for additional information.

NPS Public Health Program [http://www.nps.gov/public\\_health](http://www.nps.gov/public_health),  
NPS WNV: <http://inside.nps.gov/publichealth/zed/wnv/wnv.htm>

U.S. Centers for Disease Control and Prevention:  
Division of Vector-Borne Diseases [www.cdc.gov/ncezid/dvbd/](http://www.cdc.gov/ncezid/dvbd/).

Environmental Protection Agency:  
Using Pesticides Wisely - <http://www.epa.gov/pesticides/health/safely.htm>

U. S. Geological Survey:  
WNV tracking maps - [disease maps.usgs.gov](http://disease maps.usgs.gov).

New York State Department of Health:  
Mosquitoes and Disease [http://www.health.ny.gov/diseases/west\\_nile\\_virus/](http://www.health.ny.gov/diseases/west_nile_virus/)

Suffolk County Department of Health Services:  
<http://www.suffolkcountyny.gov/Departments/HealthServices.aspx>

Suffolk County Department of Public Works, Division of Vector Control  
<http://www.suffolkcountyny.gov/Departments/PublicWorks/VectorControl.aspx>  
[Suffolk County Mosquito Spraying Schedule](http://www.suffolkcountyny.gov/Departments/HealthServices/PublicHealth/PreventiveServices/PesticideApplicationNotification.aspx)  
[http://www.suffolkcountyny.gov/Departments/HealthServices/PublicHealth/PreventiveServices/PesticideAp  
plicationNotification.aspx](http://www.suffolkcountyny.gov/Departments/HealthServices/PublicHealth/PreventiveServices/PesticideApplicationNotification.aspx)

## APPENDIX B

### 2012 PROTOCOL FOR COLLECTING DEAD BIRDS ON FIRE ISLAND NATIONAL SEASHORE FOR WEST NILE VIRUS SURVEILLANCE

**The Start Date for Dead Bird collection and the  
Dead Bird hotline in 2012 will be June 11<sup>th</sup>**

The National Park Service (NPS), Fire Island National Seashore (FIIS) will work with the New York State Department of Environmental Conservation (DEC), Suffolk County Health Department and Suffolk County Vector Control (SCVC) to collect and transport bird carcasses. This will be done in accordance with guidelines developed by the U.S. Fish and Wildlife Service, the Center for Disease Control (CDC), New York State and the Suffolk County Health Department.

**FIIS managers and their staff should familiarize themselves with this protocol in order to stay protected when collecting dead birds. Additional training by park biologists and a JHA is available for staff.**

For viral testing, the DEC definition of an acceptable bird carcass for collection and transportation is:

- The bird is a **corvid species** (crow, raven, or blue jay), **American robin** or **raptor** (osprey, eagle, hawk, vulture, or falcon).
- The collector believes it **died within the past 18-24 hours** (the carcass is fresh, not bloated, infested or decayed).
- The collector believes **it did not die of routine natural causes or due to an accident.**

**EVERY EFFORT SHOULD BE MADE TO COLLECT AND TRANSPORT CARCASSES TO THE PATCHOGUE MAINTENANCE FACILITY (PMF) WITHIN A FEW HOURS SO THAT THE 24-HOUR PERIOD IS NOT PASSED.**

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List of dead-bird drop off locations on Fire Island National Seashore:

Lighthouse Annex (checkpoint)  
Sailors Haven  
Watch Hill  
Wilderness Visitor Center (Smith Point)

Rules for reporting, handling and transporting dead birds:

1. When a dead bird is found by a visitor, resident, or park staff, a trained NPS employee should be contacted to safely collect the specimen. Park biologists should be contacted when other trained individuals are unavailable. Park biologists should also be made aware of all dead bird collections in order to coordinate with SCVC.
2. Safety first and foremost – **DO NOT TOUCH THE CARCASS WITH YOUR BARE HANDS!**

3. Collecting equipment will be found in the dead bird collection-and-transport coolers located at all ranger stations or visitor centers (Lighthouse Annex, Sailors Haven, Watch Hill, Smith Point –Wilderness Visitor Center, William Floyd Estate). In the coolers will be large plastic bags, rubber gloves and specimen tags. **THE TAGS ARE TO BE COMPLETED BY THE CARCASS COLLECTOR.**
4. Collectors shall wear rubber gloves (found in cooler).
5. The carcass is collected by inverting a plastic bag (found in cooler), grasping the bird, and then pulling the bird into the bag.
6. The bag with the bird is sealed, and then placed inside another plastic bag with a tag containing the following information:
  - Where the bird was found
  - Date and time the bird was found
  - Collector’s name
  - Name and number of person who found the bird
  - Best estimate of what species it is (e.g. *Cyanocitta cristata*) and the common name (e.g. Blue Jay).
7. Place the bagged carcass in the dead bird transportation cooler with two or three blue ice packs (found in ranger/visitor station freezer). **DO NOT FREEZE THE BIRD.**
8. Remove the rubber gloves by turning one inside out, holding it with the other glove then turning that one inside out also. **PLACE THE GLOVES IN THE COOLER.** If possible, immediately wash hands with soap and water or use alcohol-based hand sanitizer.
9. Close the cooler securely and transport to the PMF as quickly as possible. At PMF B there will be a large light gray dry ice cooler in the mosquito lab. The cooler will be marked “DEAD BIRDS IN HERE- DO NOT STORE FOOD OR DRINK” and is situated on the refrigerator in the back of the lab. Place two or three blue ice packs, found in the freezer compartment of this refrigerator, into this cooler until dry ice can be obtained. Place the bird in the cooler and close securely. The bird will be transported to SCVC with the next shipment of mosquitoes. The park has arranged with SCVC to keep dead birds on dry ice until delivered (dry ice will preserve the integrity of the virus, if any is present, but regular freezing will not).
10. Return the dead bird cooler to the ranger station/visitor center it came from and replace plastic bags and gloves with new ones. Make sure the blue ice packs go back into the freezer at the ranger station/visitor center.
11. Once a specimen is collected, park staff **must call the Suffolk County dead bird hotline immediately to report it: (631) 853-8405, 9:00 AM to 4:30PM.** Information on the person who found the bird, the bird collector, the bird species, location, date and time of collection needs to be given to SCVC.

## APPENDIX C

### DRAFT PRESS RELEASE

#### Date

#### West Nile Virus Found on Fire Island

Fire Island National Seashore Superintendent K. Christopher Soller announced today that West Nile Virus (WNV)-infected mosquitoes/birds have been found on Fire Island. The bird was found by \_\_\_\_\_ at \_\_\_\_\_. The mosquitoes were from a trap set by \_\_\_\_\_ (Suffolk County/the park as part of its weekly monitoring program). Testing was done by \_\_\_\_\_ (currently NY State Department of Health, Arthropod-Borne Disease Program, Albany).

The National Park Service will be working closely with the Centers for Disease Control and Prevention (CDC), the New York State Department of Environmental Conservation (DEC), Suffolk County Vector Control, and local Fire Island and Long Island municipalities to determine the best course of action to protect residents, visitors and employees of the Seashore. Actions to protect the public may include control methods such as larviciding or spraying. The public will be notified 24 hours in advance of any spray event.

The park is also conducting continued surveillance to monitor the severity and extent of WNV in the Seashore.

Residents, visitors and staff are advised to avoid mosquito-infested areas. If contact with mosquitoes is unavoidable, it is advisable to wear protective clothing and use an effective insect repellent, such as one containing at least 30% DEET. People most at risk of becoming ill from WNV are those over 50 years of age or whose health is impaired. Such people are advised to stay away from areas with mosquitoes.

For general information on WNV, please contact your local health department. Information can also be obtained from the CDC, New York State or Suffolk County WNV web sites, or one of the park visitor centers. If you have information or questions for the park, please contact our headquarters at (631) 687-4750.

## APPENDIX D

### CHECK LIST FOR MOSQUITO ACTION PLAN (MAP) EQUIPMENT CACHES

Each ranger station at Fire Island National Seashore has Stage Three Personal Protective Equipment (PPE) stored in a clearly labeled black box. Each station also has a cooler for transporting dead birds. Boxes and coolers should be kept in an area with other protective equipment. **They should be inspected periodically by Rangers and Mosquito Biological Technician when possible** and the black PPE boxes should be kept locked. The key should be clearly marked and in an obvious, easily accessible location (such as a key box). Caches will be available to all staff involved in implementing MAP protocols. Caches are available at:

- Lighthouse (Full cache)- RM shed (small white shed off to the west of boardwalk leading to the bay)
- Sailors Haven Ranger Station/Shop (Full cache)-storage closet in the visitor center
- Watch Hill Ranger Station/Shop- (Full cache)-RM storage room/office
- Wilderness Visitor Center (Half cache)-crawl space underneath the visitor center
- William Floyd Estate (Half cache)- Fire shed
- Patchogue Maintenance Facility (PMF)- (Full cache)- RM storage room

The following is the list of items in a full cache:

#### **Stage Three PPE Black Box:**

- hoop style head nets
- net style bug jackets
- leather gloves
- Tyvek paper suits
- Repellant:
  - DEET 15%
  - DEET free
  - Permethrin
- “After Bite” pens
- one copy of the Mosquito Action Plan

#### **Dead Bird Coolers:**

- large plastic bags
- rubber gloves
- bird carcass identification tags
- blue plastic ice packs (to be placed in site area freezer from June 1 through September 15)

Additional PPE equipment is stored at PMF B in the Resource Management storage room, second floor.

## APPENDIX E

### REDUCTION OF ARTIFICIAL FRESHWATER MOSQUITO BREEDING HABITAT ON PARK LANDS

As stated in the Mosquito Surveillance and Management Protocol, Fire Island National Seashore will conduct a sanitation program to remove or reduce artificial larval habitat for the West Nile Virus (WNV) vector, *Culex spp.* Such habitat is characterized by the presence of stagnant fresh water with high organic content. Fresh water that is present and undisturbed for 4 days or more and that contains a moderate to large quantity of organic matter (decaying vegetation; animal droppings; garbage of any kind; pollution or runoff from gardens, livestock holding pens, or other sources) is prime habitat for *Culex* species. Following are suggestions from state and federal agencies in NY, NJ and elsewhere for where to look for *Culex* larval habitat and mechanical remedies to reduce the attractiveness of these areas to mosquitoes.

#### **Underground Septic Tanks**

Mosquitoes can enter through covers that do not fit properly, through cracks in the ground, or through vent pipes, and produce offspring in large numbers. Covers should be altered so that they fit adequately, cracks should be filled, and all vents should be covered with screening, preferably aluminum, to prevent the entry of females ready to lay eggs.

#### **Crawl Spaces under Buildings**

Garbage bags, tin cans or other open containers may collect water. Refuse may attract vermin whose droppings will make the area even more enticing to *Culex*. Trash or garbage of any kind should be removed.

#### **Containment Areas for Livestock**

Pens should be examined for permanent or semi-permanent puddles, or low, outlying areas of standing water that receive runoff. Steps should be taken to reduce the amount of runoff and fill in the puddles. Disposal of animal wastes should be done in an area with drainage sufficient to prevent the accumulation of rainwater.

#### **Garbage Dumps**

Areas should be examined for the presence of standing fresh water (in cans or can covers, trash bags, old buckets, under or beside storage sheds). Containers should be overturned or adequately covered and puddles filled in.

#### **Gas Tanks**

Area should be examined for the presence of refuse, standing fresh water or containers able to collect standing water. Refuse should be removed, puddles filled, and containers covered or overturned.

### **Clogged Ditches or Drains**

Remove source of clog and check routinely.

### **Garbage Cans, Recycle Bins and Other Containers**

Holes should be punched in the bottoms (not the sides) of plastic garbage or recycling bins to prevent them from holding water. All areas with significant human impact should be examined for forgotten or discarded containers (flower pots, tin cans, buckets, etc.) that may fill with fresh water and provide breeding habitat. Containers should be discarded, covered or overturned.

### **Tire ruts on roads**

Tire ruts can prove to be significant breeding ground for freshwater mosquitoes. The ruts should be filled and the road graded to improve drainage.

**Note: If potential breeding sites are found that are not easy to remedy by the means outlined above, the location and a brief description of the area should be given to the park biologist in charge of mosquito management.**

## APPENDIX F

### AVIAN FLU WILDLIFE RESPONSE PLAN

#### BACKGROUND

##### **Historical and Scientific Information**

The Asian H5N1 strain of highly pathogenic avian influenza (HPAI), or bird flu, is primarily a disease of domestic poultry that is not native to North America. At the time of this writing, H5N1 is not known to be present in North America; however, outbreaks of HPAI in Asia, the Middle East, Europe, and Africa, and the likelihood of continued spread to other parts of the world, have heightened concern in the United States. The Federal government response to HPAI is tiered from the Homeland Security Council's National Strategy for Pandemic Influenza (<http://www.pandemicflu.gov/plan/>). The National Park Service response is further tiered from the Department of the Interior Pandemic Influenza Preparedness and Response Plan.

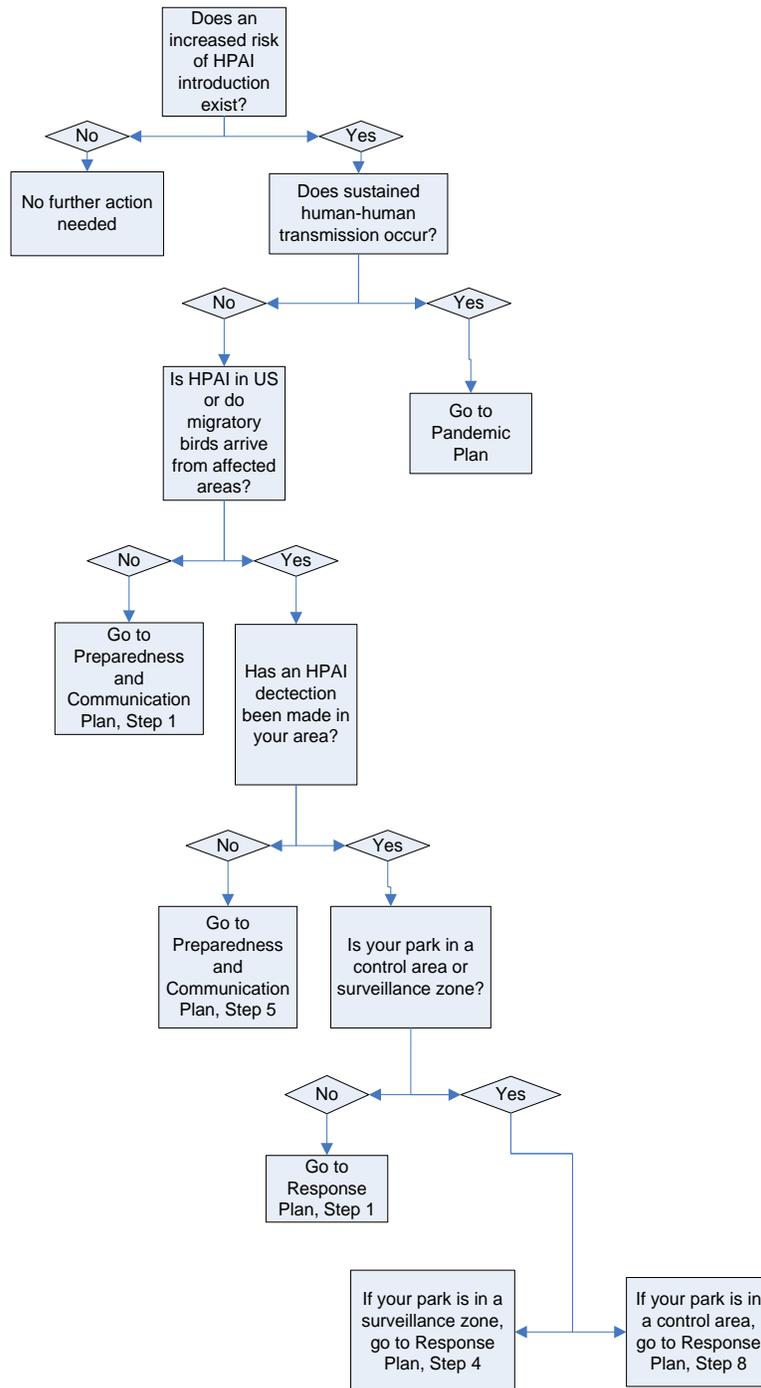
Outbreaks of highly pathogenic avian influenza subtype H5N1 have been occurring in poultry in Southeast Asia since 2003. Wild birds, particularly waterfowl and shorebirds, commonly carry low pathogenicity avian influenza viruses without harm. However, the Asian H5N1 HPAI virus has mutated and adapted to cause illness and death in domestic and wild birds, and has also affected a limited number of mammals, including humans. Worldwide, mortality from the virus has been detected in more than forty species of free-ranging birds including swans, ducks, geese, gulls, birds of prey, and some peridomestic species such as sparrows and corvids (view full list at [http://www.nwhc.usgs.gov/disease\\_information/avian\\_influenza/affected\\_species\\_chart.jsp](http://www.nwhc.usgs.gov/disease_information/avian_influenza/affected_species_chart.jsp)). Over 200 million domestic birds in the affected countries have died or been culled in attempts to control the disease. In humans, the death rate from reported HPAI cases to date has been about 50%; however, case mortality in a pandemic has been projected in the U.S. National Strategy for Pandemic Influenza (2005) to be <2%.

The virus is spread among birds in fecal droppings, saliva, and nasal discharges. The virus is quite easily inactivated by disinfectants but can survive for long periods (a month or more) in cold water. HPAI has been detected in some apparently healthy wild birds. The role of migratory birds in spread of the disease is likely, although human assisted movement of poultry or poultry products are also important transmission pathways. The impact of HPAI on wild bird populations is unknown. More clear is that HPAI poses a significant economic threat to domestic poultry and fowl operations and to human health.

Therefore, should HPAI be introduced to the U.S., potential exists to impact Fire Island National Seashore (FIIS) in three primary ways. The first and most likely impact will be to wildlife, particularly migratory birds. Management of domestic fowl maintained for cultural scenes would also be impacted although there is no domestic fowl associated with any cultural areas of FIIS. Further, humans can be exposed to and contract this illness by contact with birds, placing some FIIS employees and possibly visitors at risk. Additionally, if the virus adapts to achieve sustained human to human transmission, it is

possible that FIIS staff would be faced with participation, along with local, state and federal health officials, in controlling the spread of this agent among people.

**Highly Pathogenic Avian Influenza Virus Decision Tree.** This decision tree indicates the Plan and Step at which each situation is addressed. Note that steps are progressive in the Wildlife Plan Preparedness and Communication section and, regardless of current situation, if risk exists action should begin at Step 1 of the Preparedness and Communication section of the Wildlife Plan.\*



## **ACTION FLOWCHART** for Moving Through the Preparedness and Communication Plan and Response Plan

- This action flowchart has been developed to assist or provide guidance to managers in determining when or whether to move from the HPAI preparedness and communication planning stage to the HPAI response stage. This decision is based on the current situation in the area of the park. The process starts with the preparedness and communication plan which is a limited measured response designed to provide park managers with the necessary information to identify and implement appropriate management actions and concerns.
- FIIS park management should be advised that should a suspect or confirmed case of HPAI be identified in or adjacent to the park, that the United States Department of Agriculture, Animal and Plant Health Inspection Service may establish Control Areas and Surveillance Zones which may include units of the NPS. Should such Control Areas or Surveillance Zones be established by APHIS, FIIS may be required to go directly to implementing all or portions of the FIIS Response Plan. In order to establish and maintain a measured response, communications between FIIS and cooperators is essential.

**\* More information on proper responses to Avian Flu can be found in *Fire Island National Seashore Highly Pathogenic Avian Influenza in Wildlife Response Plan*. (P:\Natural\_Resource\_Management\Program SOP's\Avian Influenza)**