A. INTRODUCTION

As discussed in Chapter 1, “Description of the Proposed Action,” the New York City Department of Health (NYCDOH) is proposing to implement its Mosquito-Borne Disease Control Program, one of two Adult Mosquito Control Programs that are being proposed as part of the Proposed Action. This chapter will describe, analyze and compare the economic costs and benefits of the Mosquito-Borne Disease Control Program to those associated with NYCDOH’s ongoing Routine Surveillance and Control Program (Routine Program). The Routine Program, first implemented by NYCDOH in 2000, will be continued in the future, regardless of whether the Proposed Action is undertaken. Therefore, the Routine Program serves as both a baseline for existing conditions and for future conditions without the Proposed Action (the “No Action” scenario).

Both the No Action and the Proposed Action scenarios could result in economic costs and benefits to New York City. Without the Proposed Action, New York City residents, workers and visitors would face a greater risk of recurring outbreaks of West Nile virus, or other mosquito-borne diseases. The alternative, as described in Chapter 3.C, “Public Health,” is that the Proposed Action may increase the risk of illness (namely asthma) due to the proposed spraying of pesticides.

In either case, those who would get sick—either from the West Nile virus during a future outbreak, or from the proposed spraying of pesticides—would incur medical expenses, and possibly a loss of income due to their absence from school or work (if sick day benefits are not provided by their employer). Sick time is a factor in the City’s overall economic productivity, regardless of whether an employee gets paid for sick days. Even if employers provide sick benefits to their employees, the firm as a whole incurs a loss and productivity declines.

In severe cases, patients can undoubtedly die from the West Nile virus. Death, of course, has immeasurable costs related to the loss of a family member or friend. Death has associated costs such as the loss of potential earnings to a family or household (the amount someone would have earned throughout the rest of his/her life if he/she had continued living). In some instances, such costs may be offset by life insurance policies to make up for the loss in income that their family members (or “dependents”) would experience when they pass away.

The Proposed Action could also affect the City’s tourism industry. Without the Proposed Action, tourists may choose to travel elsewhere as a result of future outbreaks of West Nile virus, or the perceived threat of an outbreak. In that case, tourists would spend their money in another city and sales at New York City establishments such as hotels, restaurants, and entertainment venues could possibly be reduced. Alternatively, tourist activity could decline as a result of the Proposed Action, particularly when tourists are sensitive to the potential health effects (or perceived effects) of spraying pesticides.
In addition, recreational activities that take place outdoors could be affected by either the Proposed Action or the No Action scenario. During an outbreak of West Nile virus, which is more likely to occur under the No Action scenario, people may choose to modify their recreational activities to avoid the risk of being bitten by infected mosquitoes and contracting the virus. This could mean staying indoors, i.e., going to the gym instead of running in the park. Changes in activity patterns could also be spurred by the Proposed Action in the case where someone is sensitive to the health effects of pesticides. In either case, use of the City’s numerous outdoor recreational amenities may be modified or reduced, including golf courses, beaches, parks, etc. Many of these amenities generate revenue for the City, including: (1) recreational concessions such as the City’s 13 public golf courses; (2) food concessions such as hot dog stands along the Coney Island boardwalk and full-service restaurants within Central Park; and (3) special events. Should the No Action or Proposed Action reduce attendance/use of these amenities, revenue could potentially be reduced.

In addition, the horse industry could be affected by the Proposed Action. During the last 2 outbreaks of the West Nile virus, a number of horses in New York City and across the region became infected with the virus and several died. In response, the European Union adopted import restrictions that apply to horses residing in the northeastern United States. These restrictions impose costs related to precautionary measures that need to be taken in order to prevent traveling horses from becoming infected. Horse owners also face costs related to additional veterinary care, and possibly the loss of personal income in severe cases when a horse dies or is euthanized. Horses generate income for their owners via showing, racing, breeding, recreation, and other activities.

In addition to an individual horse owner’s costs, there is some evidence that the West Nile virus and, in particular, the import restrictions, can reduce attendance at equestrian events or even lead to their cancellation. In either case, direct revenues from the event are lost, as well as the taxes that are placed on them. In addition, secondary losses could be incurred by businesses that support the events (advertising, food concessions, lodging, etc.). In the racing sector, income from off-track betting activity could be reduced. Betting also generates revenue for the City and State through surcharges placed on wagers.

The Proposed Action is not expected to affect the commercial fishing industry. Although a commercial shellfishery once operated in Jamaica Bay, only recreational fishing occurs today on a very limited basis. Therefore, there would be no economic impacts on the commercial fishing industry as a result of the Proposed Action.

**Methodology**

Several factors were considered in determining the economic costs and benefits of the No Action and Proposed Action scenarios. Estimates of the direct cost—program implementation—were provided by NYCDOH. Hospitalization costs related to the potential public health effects of each program were obtained from the Statewide Planning and Research Cooperative System (SPARCS), a database that is maintained by the New York State Department of Health (NYSDOH), and NYCDOH’s 1997 report entitled “Asthma Facts.” Long-term costs associated with home health care were obtained from the 1996 Medical Expenditure Survey, which was conducted by the United States Department of Health and Human Services. The potential loss in personal income was estimated for those who would become infected by a mosquito-borne virus like the West Nile virus. The loss could range from the loss of a day’s work to long-term hospitalization or even death. Income data was provided by the U.S. Department of Commerce, Bureau of Economic Analysis. Life insurance data were provided by the U.S. Department of Labor, Bureau of Labor Statistics.
Potential effects on the City’s tourism industry were examined using reports and other data provided by NYC & Company (formerly the New York City Convention & Visitors Bureau). Lodging industry trends were identified using “Standard Historical Trend Reports” prepared by Smith Travel Research. The economic characteristics of certain types of outdoor recreation were provided by the New York City Department of Parks and Recreation (DPR), including trends in beach attendance, pool usage, and revenue from golf concessions and special events. The analysis of potential impacts on the horse industry entailed internet research and interviews with industry stakeholders.

PAST WEST NILE VIRUS OUTBREAKS
As discussed in Chapter 1, “Description of the Proposed Action,” the West Nile virus was first reported in New York City during the summer of 1999. A total of 45 cases of the illness (including one Canadian visitor) were found throughout New York City during August and September, several of whom resided in northern Queens, the epicenter of the outbreak. In response, the City instituted a substantial emergency program to control the outbreak through intense surveillance efforts and the spraying of pesticides (adulticides) in areas suspected to harbor infected mosquitoes. Spraying took place citywide from September 3 through October 3, 1999. Four New York City residents died from the virus in 1999.

During the following year, another 2-month outbreak of West Nile virus occurred between mid-July and mid-August 2000. In that year, however, the epicenter of the outbreak occurred in Staten Island and the total number of cases (14) was considerably smaller. However, two New York City residents died as a result of the virus in 2000. Spraying was conducted citywide from mid-July through September of 2000.

B. PROGRAM COSTS
This section quantifies the actual program (or implementation) costs of: (1) the No Action scenario, including the City’s ongoing Routine Program; and (2) the Mosquito-Borne Disease Control Program.

EXISTING AND FUTURE NO ACTION CONDITIONS (ROUTINE PROGRAM)
The Routine Program includes comprehensive surveillance, education and research, and mosquito breeding prevention and larvae control activities. It is estimated that the Routine Program costs about $5.6 million annually. This estimate does not include additional costs such as NYCDOH’s supervision and coordination costs, and Police Department costs related to the public announcements made before spraying is conducted.

Surveillance
Three types of surveillance measures are being undertaken by the NYCDOH, including vector (mosquitoes), animal, and human surveillance. The cost of surveillance activities, $2.4 million, represents about 43 percent of the total Routine Program cost.

Education and Research
Education for the public and medical providers accounts for about 19 percent of the total Routine Program cost, or about $1.1 million.
Mosquito Prevention and Larvae Control Activities
As discussed in Chapter 2, “Pesticide Regulations and Usage,” several larvicide products were applied to known and potential mosquito breeding sites throughout the City during the 2000 mosquito season (April through October), including catch basins, storm drains, and the borders of stagnant fresh water ponds, as well as wetlands and salt marshes. The cost of these activities is approximately $2.1 million annually, or about 38 percent of the total Routine Program cost.

Probable Impacts of the Proposed Action (Mosquito-Borne Disease Control Program)
As discussed in Chapter 1, “Description of the Proposed Action,” the proposed Mosquito-Borne Disease Control Program would entail the application of adulticides to control adult mosquitoes that pose a threat to public health. By controlling adult mosquitoes, NYCDOH aims to prevent a recurrence of the West Nile virus (or other mosquito-borne disease outbreaks that might occur in the future). A number of application mechanisms may be used to apply adulticides under the Proposed Action, including backpack, all-terrain vehicles (ATVs), and truck or aerial spraying. In total, the Proposed Action could be expected to cost about $3.5 million annually.

C. Direct Medical Expenses
Existing Conditions
Forty-four residents in New York City were hospitalized with the West Nile virus in 1999 and 14 residents were hospitalized in 2000. According to the New York State Department of Health’s SPARCS database, the average cost of hospitalization for a case of arboviral encephalitis (i.e., mosquito-borne encephalitis) is $39,928, assuming an average stay of 17.7 days. Given the total number of hospitalization cases in 1999, this translates to a total cost of approximately $1.8 million. In 2000, the total cost was approximately $559,000.

People who become infected by the West Nile virus may also incur additional medical costs associated with emergency room visits, general doctors’ visits, medication, long-term care and rehabilitation, etc. According to an unpublished follow-up study conducted by NYCDOH, many patients who were hospitalized with the West Nile virus in 1999 required physical therapy and home health care services long after the onset of the illness. Long-term physical symptoms of the virus included difficulty walking, muscle weakness, fatigue, insomnia, muscle pain, headache, and joint pain. Many patients could not walk on their own and one person was completely bed-bound. In addition, there were a number of cognitive symptoms such as depression, irritability, memory loss, light-headedness, and confusion. Some of these physical and cognitive symptoms have persisted for 18 months. In general, there are many long-term effects of the virus. Of 36 hospitalized cases with known discharge status, 22 (61.1 percent) went to their own homes, 3 (8.3 percent) went to the home of a family friend, 4 (11.1 percent) went to a nursing home, and 7 (19.4 percent) went to a rehabilitation center.

An average of 17.1 percent of the surveyed hospitalized cases of West Nile virus in 1999 (6 out of 35 survey participants) required home health care services for almost a full year. According to the 1996 Medical Expenditure Panel Survey, which is conducted by the U.S. Department of Health and Human Services, the annual cost of home health care was $5,200 in 1996. 1 Inflated to today’s dollars, home

health care costs approximately $5,800 annually. This additional cost translates to a total of $46,400, assuming 8 of the 44 cases (17.1 percent) required such care.

As discussed in Chapter 3.C, “Public Health,” the Proposed Action may increase the number of asthma hospitalizations as result of the spraying of adulticides. Current conditions (as of 1997, the most recent year for which data are available) related to asthma in New York City, as reported in NYCDOH’s 1997 “Asthma Facts” report, are summarized below:

- There are approximately 33,350 hospital admissions for asthma annually.
- In total, asthma hospitalizations cost approximately $285 million in 2001 dollars.
- Children up to the age of 14 account for approximately 44 percent of all asthma-related hospital admissions.
- Children between the ages of 0 and 14 tend to have shorter length-of-stays (2.75 days) and lower average hospitalization charges ($6,044 per person in 2001 dollars).

Cases of asthma among older adults (age 65 years and older) involve the longest length-of-stay (7.02 days) and highest average charges for hospitalization ($15,509 in 2001 dollars). However, these figures are substantially lower than those related to mosquito-borne encephalitis (West Nile virus). As noted above, the average length-of-stay for a hospitalized case of mosquito-borne encephalitis is 17.7 days and the average cost is $39,928.

Regardless of the type of illness, there are intangible costs associated with becoming ill. These costs cannot be quantified.

**FUTURE WITHOUT THE PROPOSED ACTION**

Without the proposed Mosquito-Borne Disease Control Program, the City could experience additional—and possibly more severe—outbreaks of mosquito-borne diseases such as the West Nile virus. As discussed in Chapter 3.C, “Public Health,” the following projections were made concerning the number of illnesses and deaths related to potential future outbreaks of the West Nile virus:

- Based on the results of a serosurvey for prevalence of the virus during the 1999 outbreak, it is estimated that 2.6 percent of the population would become infected; about 18 percent of those infected would suffer from febrile illness (fever); and about 0.8 percent of those infected would require hospitalization. Judging by the rate of death among diagnosed, hospitalized cases in 1999 (7 of 59), it is estimated that 11.9 percent of those hospitalized might die a result of the potential mosquito-borne disease outbreak in the future without the Proposed Action.

- This means that for every 100,000 people infected, about 18,000 would be projected to come down with a febrile illness, approximately 144 of those people would be sick enough to require hospitalization, and about 17 of those hospitalized could die.
When the projected rates are applied citywide, this would result in 208,215 infections, 37,479 febrile illnesses, 1,666 hospitalizations, and 198 deaths (based on a total City population of 8,008,278, as reported by the 2000 U.S. Census of Population).

Assuming that the average medical expenses described above under “Existing Conditions” remain the same, it is estimated that hospitalizations due to the West Nile virus in the future without the Proposed Action could reach a total annual cost of about $66.5 million. Of the people who would become hospitalized, about 47.4 percent or 790 cases would require home health care services for some period of time after being dismissed from the hospital, based on NYCDOH’s follow-up study of hospitalized cases in 1999. Approximately 17.1 percent (285 cases) would require such services for a full year. This translates to a total cost of about $1.65 million.

Additional medical costs related to prescription drugs, doctor’s visits, etc., would also be incurred by not only the hospitalized cases but also those who developed a febrile illness from the virus.

There are a number of efforts currently underway in New York City that may reduce the costs of asthma in the future. The City’s Childhood Asthma Initiative is educating patients and families, and raising standards of asthma care through a network of schools, hospitals, and community organizations. The Health and Hospitals Corporation is installing asthma centers in its primary care clinics and staffing them with pediatric pulmonologists. It has also begun to send vans into various neighborhoods to screen residents for asthma and teach them how to manage the disease. There has been some evidence that emergency room visits for asthma have declined as a result of these efforts. Hospitalizations and the related costs are expected to continue to decline in the future without the Proposed Action.

**PROBABLE IMPACTS OF THE PROPOSED ACTION**

Implementation of the Proposed Action would reduce the risk of a future outbreak of the West Nile virus or other mosquito-borne diseases by controlling adult mosquito populations. Accordingly, the Proposed Action would reap the benefit of improved public health and reduced medical expenditures since fewer people would contract the virus and become ill.

However, as discussed in Chapter 3.C, “Public Health,” the Proposed Action may increase the risk of illness as a result of the proposed spraying of pesticides. Based on the attributable risk calculations, on an annual basis, it is predicted that one child between the age of 0 and 14 could become hospitalized from asthma as a result of the Proposed Action in the Representative Areas. As discussed above, the average cost of asthma hospitalizations among children is $6,044 per person. Among adults, the Proposed Action is projected to result in one hospitalized case of asthma every three years for the Representative Areas. The average cost of an adult case of asthma is approximately $11,630. As compared to the current citywide number of asthma hospitalizations (33,350 cases in 1997), these projections represent a very small percentage.

**D. PERSONAL INCOME**

Infection with a mosquito-borne virus could affect an individual’s ability to earn income, ranging from the loss of a day’s wage due to short-term effects (such as fever) to the interruption and possible termination of a family’s income stream due to uninsured long-term hospitalization or death. Since the Proposed Action may reduce or constrain the number of infections with mosquito-borne diseases (compared to the No Action scenario), the economic benefits to individuals and families in the form

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of financial stability could be extensive under the Proposed Action. The following analysis expresses the potential economic benefits in terms of per capita income that could be potentially lost as a result of infection with West Nile virus, ranging from one day’s wage to the remaining lifetime earnings.

**EXISTING CONDITIONS**

Per capita income represents the total personal income in a geographic area, divided equally among all residents of that area, regardless of age. In 1998, the per capita income in New York City was about $35,000, as shown in Table 3.I-1. Per capita income varied widely by borough within the City, with Manhattan residents having the highest at about $72,000, and Bronx residents having the lowest at less than $20,000. Assuming the average person is paid for 260 workdays per year, including vacations and holidays, the average daily wage for residents of New York City was about $135 in 1998, and ranged from a high of about $277 per day for Manhattan residents to a low of about $76 for Bronx residents.

<table>
<thead>
<tr>
<th>Borough</th>
<th>Per Capita Personal Income</th>
<th>Average Daily Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronx</td>
<td>$19,841</td>
<td>$76.31</td>
</tr>
<tr>
<td>Kings</td>
<td>$24,076</td>
<td>$92.60</td>
</tr>
<tr>
<td>New York</td>
<td>$72,194</td>
<td>$277.67</td>
</tr>
<tr>
<td>Queens</td>
<td>$28,423</td>
<td>$109.32</td>
</tr>
<tr>
<td>Richmond</td>
<td>$31,187</td>
<td>$119.95</td>
</tr>
<tr>
<td>New York City</td>
<td>$35,006</td>
<td>$134.64</td>
</tr>
</tbody>
</table>

*Source: US Department of Commerce, Bureau of Economic Analysis, Regional Accounts Data.*

Based on the 1998 per capita income, a 20-year old person would have total lifetime earnings, i.e., up to age 65, of about $2.8 million, assuming real income growth (non-inflationary) of about 2.5 percent annually. As a person’s age increases, earnings potential decreases, since there are fewer earning years remaining. As shown in Table 3.I-2, a 50-year old person with 15 years of potential income remaining would earn about $627,700 until retirement at age 65, and a 60-year old person would earn less than $200,000 in the remaining 5 years of work before retirement. (Again, this analysis is based on per capita income, and does not reflect the potential to earn higher salaries later in life.) Thus, the loss of a day’s wage would cost the average worker about $135. Long-term illness or death could cost a family hundreds of thousands of dollars in future earnings, perhaps even millions of dollars, depending on the age of the worker, and the duration and severity of the illness.

Obviously, these per capita income measures do not take into consideration various types of insurance, including paid sick leave (which is available to about 56 percent of full-time employees in medium and large private establishments, and about 50 percent of full-time employees in small firms), or long-term disability insurance (which is available to 42 percent of full-time workers nationwide in medium and large private firms, and 22 percent of full-time employees in small firms),
or life insurance which can help replace the earning power of a deceased person.\textsuperscript{3} Nationally, life insurance is available to 87 percent of full-time employees in medium and large firms, and to 62 percent of full-time employees in small establishments. About two-thirds of the participants in life insurance plans had their protection defined as a multiple of annual earnings, typically about 1.5 times annual earnings. About one-third of the participants were protected with a fixed dollar amount usually ranging from $5,000 to $25,000, with an average of about $17,000 per employee.

However, depending on the age of the deceased, life insurance benefits may not fully offset the loss of future earnings by the family breadwinner. Assuming a per capita personal income of $35,000, the average death benefit from an insurance multiplier of 1.5 would be about $52,500. If the insurance were based on a fixed payment, the average that survivors would receive would be about $17,000. Both of these scenarios would compensate for only a fraction of the potential lifetime earnings of those who may die from infections with the West Nile virus. (In many instances, similar conditions would exist with other types of post-death benefits, such as pensions.)

**Future without the Proposed Action**

As noted above, programmatic costs in the No Action scenario would be approximately $5.6 million. It is also projected under the No Action scenario that as many as 198 people may die from the West Nile virus during a potential future outbreak, nearly 1,700 would be hospitalized, and nearly 38,000 would suffer from fevers with the infection. In terms of potential economic costs, the No Action condition would result in the loss of about $18 million in earnings to individuals and families, if half of the projected 198 deaths were uninsured persons of 60 years of age. Even if those persons were insured and their survivors received a fixed death benefit in the high range of payments nationally, the potential cost in lost earnings would be about $14.5 million. Hospitalizations would result in approximately $1.5 million in lost (uninsured) income, excluding the costs of the hospitalization. Assuming that all those with febrile infections would take just one sick day, the lost personal income (or income covered by corporate sick leave) would equal about $5 million.

**Probable Impacts of the Proposed Action**

The cost of the Proposed Action would be approximately $3.5 million annually for mosquito-borne disease control, excluding the one-time cost of about $1.7 million for preparation of the Environmental Impact Statement (EIS). The program would generate substantially more economic

\begin{tabular}{|c|c|}
\hline
\textbf{Age} & \textbf{Lifetime Earnings Potential} \\
\hline
20 & $2,853,550 \\
30 & $1,922,800 \\
40 & $1,195,700 \\
50 & $627,700 \\
60 & $184,000 \\
\hline
\end{tabular}

\textit{Note:} Earnings based on assumptions outlined in this chapter.

benefits than its cost. For example, if the Proposed Action saves the lives of 19 60-year old wage earners (or 1.2 20-year old wage earners), the economic benefits to individuals and families would equal the program cost. If the Proposed Action reduces sick leave (paid or unpaid) to about 25,600 days, the economic benefits of retained earnings and productivity would equal the cost of the Mosquito-Borne Disease Control Program. Although there may be unforeseen long-term affects on personal income potential from the spraying itself, the immediate economic benefits of the Proposed Action suggests that the benefits will outweigh the costs.

E. TOURISM

EXISTING CONDITIONS

The tourist industry is a major generator of economic activity in New York City. As noted in Table 3.I-3, over 38 million people visited New York City in the year 2000, and spent more than $16 billion on hotels, restaurants, shopping, entertainment, recreation, and transportation. The purpose of this analysis is to determine how the No Action condition and the Proposed Action would impact the tourist industry in the City. There are essentially two issues or questions underlying the analysis: would tourists cancel or significantly alter their plans to visit New York City, based on real or perceived threats to public health from mosquito-borne disease (the No Action assumption), or from the Mosquito-Borne Disease Control Program (the Proposed Action). In either case, visitors might cancel family trips, conventions or conferences, or small business meetings. A very recent example of tourists’ response to real or perceived health threats is the impact of foot and mouth disease on tourism in England.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Visitors</th>
<th>Domestic Visitors</th>
<th>International Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>22,790,000</td>
<td>17,300,000</td>
<td>5,490,000</td>
</tr>
<tr>
<td>1992</td>
<td>27,872,000</td>
<td>22,300,000</td>
<td>5,572,000</td>
</tr>
<tr>
<td>1993</td>
<td>26,701,000</td>
<td>21,400,000</td>
<td>5,301,000</td>
</tr>
<tr>
<td>1994</td>
<td>25,783,000</td>
<td>20,500,000</td>
<td>5,283,000</td>
</tr>
<tr>
<td>1995</td>
<td>28,542,000</td>
<td>23,100,000</td>
<td>5,442,000</td>
</tr>
<tr>
<td>1996</td>
<td>29,123,000</td>
<td>23,400,000</td>
<td>5,723,000</td>
</tr>
<tr>
<td>1997</td>
<td>33,022,000</td>
<td>26,900,000</td>
<td>6,122,000</td>
</tr>
<tr>
<td>1998</td>
<td>33,009,000</td>
<td>27,000,000</td>
<td>6,009,000</td>
</tr>
<tr>
<td>1999</td>
<td>36,654,000</td>
<td>30,100,000</td>
<td>6,554,000</td>
</tr>
<tr>
<td>2000*</td>
<td>38,389,000</td>
<td>31,500,000</td>
<td>6,889,000</td>
</tr>
</tbody>
</table>

Note: *Forecasted estimate
Source: NYC & Company, 2/15/01

To help determine potential impacts, visitor trends in New York City were examined for a 10-year period from 1991 to 2000. Trends in hotel occupancy and average room rates were examined for a 7-year period from 1994 to 2000.

A review of newspapers covering the larger cities in the U.S. (e.g., Chicago Tribune, Atlanta Constitution, Dallas Morning News, San Francisco Chronicle), the nation as a whole (USA Today),
and cities abroad (The London Times) was conducted to determine whether domestic and foreign visitors were aware of the presence of the West Nile virus and/or the emergency spraying programs in New York City during 1999 and 2000. The newspaper review was intended to present a general or representative picture of media trends; the review was not comprehensive, i.e., not every article was counted. As each year’s outbreak developed, the news media reported on the spread of the virus (to humans, birds, and animals), and the City’s spraying activity. News of the West Nile virus outbreaks in New York City reached the national level as well as the international level. Figures 3.I-1 and 3.I-2 illustrate the level of news coverage, by month, during 1999 and 2000, respectively. Following the discovery of the virus at the end of the summer in 1999, there was considerable news coverage during the months of September and October, as shown in Figure 3.I-1. In particular, USA Today provided a substantial amount of national coverage with 9 articles during those 2 months. This coverage was followed by newspapers in Chicago and Atlanta. In 2000, news articles on the virus appeared throughout the year, with heavier coverage during New York City’s second outbreak (between mid-July and mid-August) and continuing through September. As it had in 1999, the national newspaper (USA Today) printed a substantial number of articles, followed by newspapers covering Chicago and Atlanta. Overall, news coverage (number of articles) outside of New York City was about 70 percent higher in 2000, as compared to the number of articles that appeared in 1999.

A similar newspaper review was conducted for the New York area, including the New York Times and Newsday. As can be expected, New York media coverage of the West Nile virus was substantially higher than coverage elsewhere, since the outbreaks occurred locally. In each year, the number of news articles increased as each outbreak developed. However, in 2000, there were almost three times as many articles printed than in 1999 (275 articles versus 97).

Tourism

Despite the apparent widespread knowledge of public health conditions in New York City during the summer and fall of 1999 and 2000, the analysis described below indicates that the tourism industry was largely unaffected by the spread of the virus and the emergency spraying program. New York City played host to approximately 75 million visitors during the 2-year period. As indicated in Table 3.I-3, above, total visitation to the City has been steadily increasing since 1991, except during the national economic downturn in 1993 and 1994.

By 2000, the number of visitors in New York City reached a peak of approximately 38.4 million, which represented an increase of about 1.7 million or approximately 4.7 percent over the 1999 visitation. The rate of growth was even higher between 1998 and 1999, about 11 percent, after having remained essentially unchanged between 1997 and 1998.

The growth in the total number of visitors is reflected in the increasing numbers of both domestic and international visitors to the City. The number of domestic tourists increased to 31.5 million in 2000 from 17.3 million in 1991, while the number of international tourists grew to about 7.2 million from about 5.5 million between 1991 and 2000. The distribution of domestic and international visitors has remained fairly stable throughout the entire study period, with approximately 80 percent of the visitors arriving from locations within the United States and about 20 percent from foreign countries. The number of domestic tourists grew by about 4.7 percent between 1999 and 2000, while the number of international visitors grew by about 5.1 percent.

Increased tourism was accompanied by consistent annual increases in visitor spending since 1991, even during the economic downturn of the early 1990’s. As indicated in Table 3.I-4, these tourist dollars are a major contributor to the City’s economy. In 2000, the tourist industry generated
approximately $16.4 billion in direct spending in New York City for the hotel industry, the food and beverage industry, the entertainment industry, as well as for recreation, retail goods, public and private transportation. The rate of growth in visitor spending is very strong—a 5 percent increase between 1999 and 2000, and an 11.5 percent increase between 1998 and 2000. On a per capita basis, each man, woman, and child visiting New York City spent and average of $427 in 2000.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Visitor Spending (in billions of dollars)</th>
<th>Per Capita Spending (in dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>9.6</td>
<td>421</td>
</tr>
<tr>
<td>1992</td>
<td>10.0</td>
<td>359</td>
</tr>
<tr>
<td>1993</td>
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<td>1994</td>
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<td>1996</td>
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<td>436</td>
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<td>1997</td>
<td>13.8</td>
<td>418</td>
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<tr>
<td>1998</td>
<td>14.7</td>
<td>445</td>
</tr>
<tr>
<td>1999</td>
<td>15.6</td>
<td>426</td>
</tr>
<tr>
<td>2000*</td>
<td>16.4</td>
<td>427</td>
</tr>
</tbody>
</table>

Note: *Forecasted estimate
Source: NYC & Company, 2/15/01

The importance of visitor spending to New York City’s economy is evidenced by the distribution of visitor expenditures in 1999 (see Table 3.I-5, below). Tourists spent over $5.8 billion on hotels and other lodging, $3.2 billion on food, $2.1 billion on retail goods, and over $2 billion on public transportation. Broadway theaters, movie theaters, and nightclubs were supported by $1.9 billion in tourist spending.

<table>
<thead>
<tr>
<th>Category</th>
<th>Total Spending (in millions of dollars)</th>
<th>Spending Per Visitor Per Trip (in dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Domestic</td>
<td>International</td>
</tr>
<tr>
<td>Public Transportation</td>
<td>1297.9</td>
<td>792.0</td>
</tr>
<tr>
<td>Auto Transportation</td>
<td>474.4</td>
<td>34.9</td>
</tr>
<tr>
<td>Lodging</td>
<td>3250.1</td>
<td>2581.2</td>
</tr>
<tr>
<td>Food</td>
<td>2079.9</td>
<td>1131.5</td>
</tr>
<tr>
<td>Entertainment/Recreation</td>
<td>1292.7</td>
<td>577.1</td>
</tr>
<tr>
<td>Shopping</td>
<td>647.5</td>
<td>1468.5</td>
</tr>
<tr>
<td>Total</td>
<td>9042.5</td>
<td>6585.2</td>
</tr>
</tbody>
</table>

Source: NYC & Company, 2/15/01
All of this spending generates tax revenue for the City, as well as for New York State and the Federal government—approximately $2.8 billion in 1999, which represented a 4 percent increase over the 1998 figure of $2.8 billion. The City alone received about $863 million in tax revenues from visitor spending in 1999, a 5.7 percent increase over the $817 million in 1998. Visitor spending also supports employment, providing nearly 140,000 jobs in the City in 1999. Tourist-supported jobs grew at a more rapid rate than total employment in the City between 1998 and 1999, expanding by about 3.4 percent compared to 2.5 percent in the City job market as a whole.

The data decidedly demonstrate that neither the West Nile virus nor the emergency spraying program had a discernable impact on the tourist industry in New York City in 1999 and 2000. While the numbers are so large that a negative impact might be hard to detect, the annual trends during the years when there were outbreaks of the virus and spraying to control the mosquitoes, i.e., 1999 and 2000, indicate that if there were tourists who chose not to visit New York City because of the outbreak of the virus or the spraying program, they were evidently replaced by others who were not concerned (or perhaps uniformed). In any case, the tourist economy apparently did not suffer because of the presence of the West Nile virus or the emergency spraying program. Visitation increased in both 1999 and 2000 at substantial rates over the previous year, i.e., about 11 percent and 4.7 percent respectively. Both the number of domestic and international visitors increased in 1999 and 2000, also at substantial rates over the previous year. While the rate of increase between 1999 and 2000 was somewhat slower than between 1998 and 1999, there could be several underlying reasons, including a serious slowing of national and regional economic growth during the fourth quarter of 2000.

**Lodging**

The New York City hotel market, like the national hotel market, continues to experience a dramatic recovery from a period of economic downturn during the early 1990’s. As one of the country’s leading business and leisure destinations, Manhattan draws visitors from across the U.S. and the world. In 2000, the City’s hotel market was the strongest it has ever been with an occupancy rate of 84.1 percent and average room rate of $220 (Manhattan), according to Smith Travel Research. Table 3.I-6, below, summarizes the performance of the Manhattan and Queens hotel markets over the 7-year period from 1994 and 2000. (Performance data for the Bronx, Brooklyn, and Staten Island are not available because the sample of hotel properties is too small to conceal individual hotel performance for confidentiality.)

<table>
<thead>
<tr>
<th>Table 3.I-6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hotel Market Performance, Manhattan and Queens</strong></td>
</tr>
<tr>
<td><strong>Year</strong></td>
</tr>
<tr>
<td>Average Occupancy Rate (%)</td>
</tr>
<tr>
<td>Average Room Rate</td>
</tr>
<tr>
<td>Source: Smith Travel Research</td>
</tr>
</tbody>
</table>

The Manhattan market contains approximately 62,500 rooms, whereas the Queens market contains 5,100. Together, the three other boroughs of New York City contain approximately 1,500 rooms, bringing the total citywide room supply to 69,100. Compared to other large hotel markets in the U.S. (e.g., Las Vegas, Los Angeles), New York City ranks 7th in size and can be considered "undersupplied."\(^5\)

Figures 3.I-3 and 3.I-4 illustrate the monthly trends in occupancy rates for both boroughs during the same 7-year period. As can be seen, both markets generally peak during the spring and fall. The Manhattan market exhibits more consistent year-to-year trends, with a gradual increase from 1994 to 2000. In both markets, occupancy throughout the year 2000 remained above all other years' occupancy levels, with the exception of the fall tourist season.

During the two years in which there was an outbreak of the West Nile virus (1999 and 2000), occupancy rates appear to have remained stable, as shown in Figures 3.I-5 and 3.I-6. When Queens was the epicenter of the outbreak in 1999, hotel occupancy in that borough declined slightly between July and August but continued to rise thereafter. This decline is not attributable to the West Nile virus because public awareness and the City’s emergency spraying activity did not begin until September. As shown in Figure 3.I-1, above, news of the virus was not reported until then. Furthermore, as shown in Figure 3.I-4, Queens experienced a similar decline in occupancy in 1996, which lasted even longer (2 months) through September.

Manhattan is more representative of the citywide hotel market because it contains over 90 percent of the total number of hotel rooms. Therefore, if the West Nile virus had a negative effect on the City’s hotel market (when either Queens or Staten Island was the epicenter of the outbreak), a decline in occupancy would have been observed in Manhattan. As shown in Figure 3.I-3, Manhattan’s hotel occupancy levels throughout both years rose during the summer, corresponding closely to trends in prior years (1994 to 1998). Therefore, outbreaks of the West Nile virus did not have an effect on the hotel market, or any effect was too small to detect using borough-wide, monthly hotel occupancy data.

**FUTURE WITHOUT THE PROPOSED ACTION**

**Tourism**

NYC & Company, the City’s convention and visitors bureau, projects that tourism will continue its upward increase in 2001, growing to approximately 39.4 million visitors who are expected to pour more than $17 billion into the City’s economy. If the number and rate of infections with the West Nile virus remains at or close to that experienced in 2000, there is no evidence to indicate that the tourist industry in New York City would suffer any losses in the future without the Proposed Action. Information about outbreaks of the virus was publicized in major newspapers in major cities throughout the United States and overseas, and continued reporting of public health conditions would not likely result in a significant decrease in tourism and all of the benefits derived from the tourist industry.

However, as indicated by the current awareness and sensitivity among the general public to events in Europe surrounding the recent outbreak of foot and mouth disease and mad cow disease, the general public could alter its traveling patterns if infections and deaths from West Nile virus were to increase significantly. Without the Proposed Action, the virus could potentially infect about 2.6 percent of the

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population and could result in as many as 198 deaths in a given year. While the existing tourist trends and data do not permit a comparison to a worst case condition in the future without the Proposed Action, the potential impact on the tourist industry in New York City could best be described in terms of changes in spending per capita, i.e., for every man, woman and child who chooses not to visit the City (and is not replaced by another visitor), the City would lose approximately $427 in expenditures in today’s dollars; for every 100 visitors, $42,700; for every 1,000 visitors, $427,000; for every million visitors, $427 million. In the context of total tourist expenditures in 2000, a decline of 1 million visitors would result in a decline of approximately 2.6 percent in current tourist expenditures.

Lodging

In light of the recent slowdown in economic activity nationwide, it is likely that the City’s hotel market will either ?level off? or experience a slight decline in the future without the Proposed Action. As indicated by a comparison of January occupancy data, Manhattan hotels were operating at an average occupancy rate of 65.4 percent in 2001, down from 68.4 percent one year before. Queens hotels experienced a similar decline, with hotel occupancy declining to 68.7 percent in January 2001, from 71.1 percent a year before. This wintertime rate is still considerably higher than occupancy rates achieved during the mid-1990’s (1994 to 1997).

However, if the number of visitors declines significantly in the future without the Proposed Action, the impact on the lodging industry would likely be minimal. As noted above, there are currently about 69,100 hotel rooms in New York City. Over the course of a year, the lodging industry in the City has a capacity of about 25.2 million room nights. A decline of 1 million room nights—equivalent to 300,000 visitors spending 3.33 fewer nights in a hotel—would result in a decline of about 4 percent in the City’s overall hotel occupancy rate. Based on the current hotel occupancy (all other factors being equal), the hotel occupancy rate in the future without the Proposed Action would be about 80 percent, similar to what it was in 1996, and higher than it was in 1994 and 1995.

PROBABLE IMPACTS OF THE PROPOSED ACTION

Tourism

The Proposed Action is unlikely to significantly affect tourist trends in the City of New York, unless there is a significant and well-publicized increase in the number of deaths or infections resulting from the West Nile virus, prior to implementation of the Proposed Action. If, as a result of the Proposed Action, the number or rate of deaths and infections does not rise over levels observed in 2000, the recent trends of moderate increases in the number of visitors to the City would likely continue. Trends in tourism are affected by a wide range of factors, including the state of the global, national, and regional economies, as well as weather, crime, travel and transportation costs, such as airline tickets and hotel rates, alternative destinations, and major special events, such as national political conventions, national sporting events (international tennis tournaments, professional baseball and basketball playoffs, etc.), and major public festivals, such as Operation Sail. Comparison of visitation trends and data for 1999 and 2000 with the prior 8 years indicates that public reaction to and concern about the unknown effects of the spraying program are likely to have little or no impact on tourism in the City.

In terms of costs, the Proposed Action would have to retain relatively few visitors for the economic benefits to equal the programmatic costs. For example, visitors spent an average of $427 during their trips to New York City in 2000 for lodging, food, entertainment, shopping, and transportation. Thus, the cost of the Proposed Project is equal to the expenditures of just 8,100 visitors to New York City (or about 0.02 percent of the total number of visitors in 2000). In other words, if the Proposed Action
kept 8,100 visitors from canceling plans to visit the New York, the adult mosquito control program would pay for itself in terms of economic benefits to the City as a whole. Given the recent strong reaction by American tourists to the European foot and mouth outbreak, retention of foreign tourist expenditures may be a more important benefit of the Proposed Action. For example, international visitors spent an average of $1,005 when visiting New York in 1999. If control of a future outbreak of West Nile virus convinced fewer than 3,500 foreign tourists to follow through with plans to visit New York, their expenditures would equal the cost of the Proposed Action. This represents just 0.05 percent of all foreign visitors to New York in 1999. It appears that the Proposed Action would cost very little in comparison to the economic benefits retained in terms of the tourist industry.

**Lodging**

The lodging industry attracts the largest portion of visitor expenditures, approximately $5.8 billion in 1999, or about 37 percent of all visitor expenditures in New York City. In 1999, the average visitor spent about $159 on lodging alone. In terms of potential impacts on hotel room revenue, the Proposed Action would need only to retain about 21,760 room nights to equal the cost of the adult mosquito control program, or about 0.09 percent of the total room nights available annually in the City. As noted above, the effects of the Proposed Action on international tourism would result in significant benefits to the tourist industry. Because the duration of their visits are longer, the foreign tourist spent an average of $394 on lodging in the City in 1999. The Proposed Action would need to retain only 8,800 international visits to New York to equal the cost of the adult mosquito control program, or about 0.13 percent of all foreign visitors. Avoiding a significant reduction in the number of visitors to the City would be a major economic benefit of the Proposed Action.

**F. OUTDOOR RECREATION**

**EXISTING CONDITIONS**

New York City offers a wide range of outdoor recreational activities with some 1,700 public parks and playgrounds, 14 miles of beaches, 33 outdoor pools, 35 recreation and senior centers, and thousands of acres of wetlands and woodlands. In addition to these recreational amenities, the City sponsors many special events throughout the year, including, but not limited to athletic tournaments and races such as the New York City Marathon, ethnic and cultural festivals, large musical events featuring the New York Philharmonic and the Metropolitan Opera, holiday activities such as the Easter Eggstravaganza, and historic house tours.

The City, through the Department of Parks and Recreation (DPR), collects a substantial amount of revenue from such events. In the period between July 1996 and June 2000, the total revenue generated by all special events averaged $1 million annually. Even more revenue is generated by the City’s numerous food service and recreational concessions, which currently generate over $50 million each year. The City’s public golf courses (13 in total) generate a substantial portion of this revenue stream. Between 1996 and 2000, the golf courses generated an average annual revenue stream of $21.09 million. Food service concessions, including everything from hot dog/pretzel vendors to full-service restaurants such as Tavern on the Green, also generate a substantial amount of revenue for the City. In general, revenue from special events and concessions has been rising steadily in recent years, even in 1999 and 2000 when outbreaks of the West Nile virus occurred.

Beaches, including their related promenades and boardwalks, are one of the major outdoor recreational attractions in New York City. As noted above, the City maintains 14 miles of public
beachfront. Trends in beach attendance over the past three summers, 1998 through 2000, are presented in Table 3.I-7. Between 1998 and 1999, citywide beach attendance increased by over 2.1 million or approximately 27 percent. However, during the following year, attendance decreased by over 3.8 million or approximately 38 percent. Beaches such as Orchard Beach in the Bronx and Coney Island in Brooklyn experienced a drop of over 50 percent between 1999 and 2000.

<table>
<thead>
<tr>
<th>Beach</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orchard, Bronx</td>
<td>1,145,905</td>
<td>1,045,055</td>
<td>479,389</td>
</tr>
<tr>
<td>Coney Island, Brooklyn</td>
<td>1,887,275</td>
<td>3,868,800</td>
<td>1,721,643</td>
</tr>
<tr>
<td>Manhattan, Brooklyn</td>
<td>418,877</td>
<td>574,300</td>
<td>453,304</td>
</tr>
<tr>
<td>Rockaways, Queens</td>
<td>4,434,450</td>
<td>4,508,649</td>
<td>3,530,236</td>
</tr>
<tr>
<td>Midland, Staten Island</td>
<td>28,760</td>
<td>24,520</td>
<td>14,561</td>
</tr>
<tr>
<td>South, Staten Island</td>
<td>24,150</td>
<td>29,505</td>
<td>25,522</td>
</tr>
<tr>
<td>Wolfe's Pond, Staten Island</td>
<td>26,245</td>
<td>45,235</td>
<td>30,959</td>
</tr>
<tr>
<td>Total</td>
<td>7,965,662</td>
<td>10,096,064</td>
<td>6,255,614</td>
</tr>
</tbody>
</table>

Source: New York City Department of Parks and Recreation

Beach attendance is influenced by a variety of factors. Weather is the principal factor, particularly concerning the last few years. In 1999, beach attendance reached a record high with many dry, hot days. In the summer of 2000, New York City experienced relatively cool weather and numerous rainy days. Accordingly, there was a substantial drop in beach attendance. The average maximum temperature for the months of June, July, and August 2000 was about 77 degrees Fahrenheit for each month. As reported by numerous websites designed for travelers to New York City, these months should typically reach a high of 80, 85, and 83 degrees, respectively. Rainfall was also a factor in 2000 with an extra four days of rain during each summer month. In particular, many of the rainy days occurred on weekends, including long holiday weekends such as Independence Day and Labor Day.

Economic conditions can also play a role in beach attendance. In a robust economy, many residents will choose to travel outside the City to attend beaches or resorts during their leisure time. This pattern relates to the general theory that consumers spend more as their net worth becomes higher (the wealth effect). Residents also have more leisure time during a strong economy, which further encourages travel.

**FUTURE WITHOUT THE PROPOSED ACTION**

In the future without the Proposed Action, future outbreaks of the West Nile virus (or other mosquito-borne diseases) may occur. If the outbreaks were similar to those experienced in 1999 and 2000, they would be limited to a small geographic area (e.g., northern Queens, as in 1999) and would exhibit a similar rate of human infection (2.6 percent of the local population). In that case, it is unlikely that outdoor recreation would be affected because no noticeable effects were observed during the last 2 years. (Citywide data were examined for the purposes of outdoor recreation. It is possible that local effects could have occurred, but the data were not available at that level.) As discussed above, the DPR reports that revenue from its special events and concessions has continued to rise in recent years—despite the outbreaks of West Nile virus in 1999 and 2000 in which several people died.
Citywide beach attendance declined in 2000, but that was attributable to the substantially cooler temperatures and greater rainfall. Furthermore, attendance at beaches located within the 2000 epicenter (Staten Island) remained above attendance levels of 1998, when there was no virus outbreak. When northern Queens was the epicenter in 1999, beach attendance in that borough rose to its highest ever.

Alternatively, it is possible that future outbreaks of the West Nile virus will be more severe without the Proposed Action in place. The outbreak could spread beyond the local epicenter to the entire City and/or the infection rates among residents could increase. As discussed above, under “Direct Medical Expenses,” if an outbreak similar to that of 1999 were to occur throughout the City on a uniform basis (i.e., human infection rate of 2.6 applied to the entire City population), almost 200 residents may die. Under this scenario, residents would probably alter their recreational activities to some degree, spending more time indoors in order to avoid the risk of being bitten by a virus-infected mosquito. It is possible that a sufficient number of people would change their patterns of activity, thereby making the City’s recreational concessions and special events less profitable. In turn, demand for indoor recreational activity (e.g., movies) may rise. However, overall economic conditions would not necessarily be affected because there would be a shift in the types of spending as opposed to a decline in spending. As long as the average personal budget for leisure/recreation remains the same, overall spending and economic activity would continue at current levels.

**Probable Impacts of the Proposed Action**

If the Proposed Action is implemented, future outbreaks of West Nile virus would be controlled, as they were in 1999 and 2000, or the potential for future outbreaks would be eliminated altogether. Since there were no effects on outdoor recreation during the previous West Nile outbreaks, it is unlikely that there would be any effects under the Proposed Action. The spraying of adulticides may alter recreational activity on a temporary basis, however. For example, when the police make public announcements before the spraying is actually conducted, warning residents to stay indoors, people may choose to postpone their outdoor activities to another time. This temporary effect would not be expected to result in a reduction in park revenues or other sources of recreational income. Concession and special event revenues for the DPR can be expected to rise if the economy remains strong and if weather conditions in the summer are good.

**G. Horse Industry**

**Existing Conditions**

During the outbreaks of West Nile virus in 1999 and 2000, a considerable number of horses in the northeastern United States became infected by the virus and many of them became clinically ill. In 1999, a total of 25 horses were reported to have the virus, all of which resided on Long Island (22 in Suffolk County and 3 in Nassau County). Nine of those horses died or were euthanized. In 2000, the outbreak among horses was more severe and widespread, with 59 cases in 7 different states from Delaware to Massachusetts. Twenty-three of those horses died or were euthanized.  

In New York City, several horses were infected by the West Nile virus during the 2000 outbreak: 9 in Staten Island and 2 in the Bronx. Two of the infected horses in Staten Island were euthanized. The

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City is home to approximately 3,200 horses, or about 2 percent of the statewide horse population of 155,000.\(^8\) The horse industry contributes to the State economy by producing goods and services valued at $1.7 billion annually, and generating about 12,800 full-time job equivalents.\(^9\) Applying the percentage of horses located in New York City (2 percent), it can be assumed that $34 million in annual revenues and 256 jobs are generated in the City by equestrian activity.

In response to the outbreaks of West Nile virus among horses in the United States, countries in the European Union have imposed import restrictions on horses that are shipped from any of the following 6 states: New York, Pennsylvania, New Jersey, Connecticut, Massachusetts, and Rhode Island. The restrictions require a supplementary certificate of health, which is granted under certain conditions. If a horse is stabled within 30 kilometers of an equine case of West Nile virus that occurred during the last 30 days, it must be isolated and monitored for 21 days in an area that is protected from mosquitoes.\(^10\) This requires precautionary measures such as applying insect repellant on horses before going outdoors, applying pesticides to stables and transport vehicles, and/or possibly providing a climate-controlled environment (e.g., air conditioning). These import restrictions do no apply to horses that are shipped through the 6 states without stopping (e.g., continuous travel to the airport).

The equestrian community faces many costs associated with the West Nile virus. The import restrictions clearly require horse owners to incur additional costs. Furthermore, the restrictions contribute to the perception that the northeastern United States is unsafe for horses and other animals. In addition, when horses contract the West Nile virus, there are direct medical costs associated with veterinary care and, in severe cases, death. Indirect costs are those associated with the loss of income from owning a horse. Horses generate income for their owners via showing, racing, breeding, and recreation, among other uses. Lastly, betting activity and the related tax revenue could be reduced as a result of the West Nile virus. Although the horse racing industry in New York has declined in recent years, it is still a considerable source of economic activity.

As a result of the import restrictions, which were first adopted by the European Union in September 2000, a major equestrian event (FEI World Singles Championship) was cancelled in Gladstone, New Jersey, home of the U.S. Equestrian Team Training Center. The sponsor of the event, Gladstone Equestrian Association (GEA), was particularly concerned about the championship entries from European countries, which would have faced difficulty in returning to the European Union after the event. The welfare of all horses, both domestic and international, was also a major concern.\(^11\) Given the 2-year planning effort and the revenue that would have been generated if the event had been held, it is estimated that nearly $6 million was lost as a result of the cancellation.\(^12\)

Major equestrian events are also held in New York City. Each year, the National Horse Show is held in Madison Square Garden in Manhattan. With over 50,000 attendees, this 3-day event generates a considerable amount of revenue. However, in recent years with the outbreaks of West Nile virus, (References)

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\(^12\) Dr. Nancy Halpern. New Jersey Department of Agriculture. Email correspondence. April 12, 2001.
there is some evidence that attendance has declined and the revenues have also. Events such as these contribute to the City’s tourism industry, which is discussed above.

The City is also home to many horse races, which are held at Aqueduct Racetrack in Ozone Park, Queens. In addition, there are numerous riding academies, stables, and other recreational facilities for equestrians.

**FUTURE WITHOUT THE PROPOSED ACTION**

In the future without the Proposed Action, it is possible that additional costs would be incurred by equestrians in New York City as a result of future outbreaks of the West Nile virus. If there are repeated outbreaks and sustained import restrictions, equestrians may choose to move their operations outside of the City and possibly outside of the region. Accordingly, major events currently held in the City may be transferred to other destinations in the United States or to cities abroad. This would represent a loss in revenue for the City as a result of lower visitor attendance and spending, and reduced demand for businesses that support the equestrian events.

**PROBABLE IMPACTS OF THE PROPOSED ACTION**

If the Proposed Action is implemented, West Nile virus infections among horses in New York City are likely to remain at levels similar to that of past West Nile outbreaks (1999 and 2000). Alternatively, equine infections could decline as a result of either controlling future outbreaks of the virus, or reducing the potential for outbreaks altogether. In either scenario, potential impacts on the horse industry would be smaller than those projected for the No Action scenario.
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