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European Cherry Fruit Fly Cooperative Control Program

Niagara Area, New York

Environmental Assessment
April 2018

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I. Need for the Proposal

The European cherry fruit fly (ECFF), *Rhagoletis cerasi* (Linnaeus, 1758) [Diptera: Tephritidae], is a destructive agricultural pest with a known distribution across the Northern Hemisphere, including 32 countries in Europe and 10 countries in Asia. In North America, ECFF is a regulated pest in Canada and the United States (USDA, 2001; Molet, 2011). In June 2016, Canadian authorities confirmed the presence of ECFF in an urban park of Mississauga, Ontario, about 80 miles overland from Niagara County, NY (IPPC, 2016). Delimitation surveillance confirmed five positive detection sites, including one near the bridge between the United States and Canada at Niagara Falls. The issuance of a Federal order on May 23, 2017, restricted the importation of ECFF host material from Ontario, Canada, into the United States (USDA, 2017a).

Official confirmation of ECFF incursion into the United States came on September 7, 2017 (USDA, 2018a), after eight live ECFF were collected from yellow sticky traps baited with ammonium acetate, at three locations in western Niagara County, New York (USDA, 2017b-2017h). Confirmation of these initial detections triggered increased surveillance and trapping to delimit the area of infestation (USDA, 2017i). By the end of October, 51 adult ECFF had been captured at 26 sites in Niagara County (USDA, 2018a). The official confirmation of an ECFF infestation, beyond U.S. ports of entry and near susceptible host-plant production areas in the United States, triggered Federal involvement in a proposed regulatory quarantine and control program for the Niagara Falls region of New York State (USDA, 2017i). Based on the life cycle of the fly, the status of the cherry harvest, and the location of ECFF detections in Canada, the Niagara Area ECFF Program planners focused on delimiting the infestation in Niagara and Erie Counties during 2017; ECFF population control and host management in the infested areas of Niagara County are proposed to begin in 2018 (USDA, 2018a).

ECFF is a serious pest of cherry fruit (*Prunus* spp.). Cherry trees were brought to North America by English colonists in 1629, and were later introduced into California by Spanish missionaries. ECFF hosts include black cherry (*P. serotina* Ehrh.), European bird cherry (*P. padus* L.), European dwarf cherry (*P. fruticosa* Pall.), mahaleb cherry (*P. mahaleb* L.), sour cherry (*P. cerasus* L.), and sweet cherry (*P. avium* (L.) L.) (USDA, 2011). The highest density of sweet and tart cherry cultivation in the United States occurs in California, Michigan, Oregon, and Washington; other States with commercial cherry production include Maryland, New York, Pennsylvania, Colorado, New Mexico and Utah (Molet, 2011). Cherry trees require specific periods of warm and cold weather to bloom and fruit properly (UCD, 2017).

Honeysuckle plants (*Lonicera* spp. L.) occurring as wild or ornamental shrubs, vines, and groundcover are important and pervasive ECFF hosts (Molet, 2011). Honeysuckle is native to temperate zones of both hemispheres; its importation to the United States occurred as landscape cultivars (Encyclopaedia Britannica, 2017; Cornell CE, 2017; Schierenbeck, 2004). Honeysuckle may be a desirable plant for home gardeners, but it is an ecosystem-destroying invasive for land managers; varieties are easily spread by seed-eating birds and small mammals (Medley and Morhman, 2014; Schierenbeck, 2004). *Lonicera* spp. are now found on every continent except Antarctica (Schierenbeck, 2004). Some varieties are woody shrubs while others twine high in the tree canopy, or form a tangled, dense groundcover. Recent ECFF detections in Canada were associated with *Lonicera* spp., indicating that it should be included as a sentinel plant in host surveys in U.S. detection efforts (Molet, 2011). Figure 1 shows some types of honeysuckle blossoms and fruit present in the United States.

Figure 1. Views of exotic honeysuckle: blooms (top) and fruit (bottom). (Sources: Cornell University online image and Michigan State University online image)

Other potential ECFF-host plants include bloodtwig dogwood (*Cornus sanguinea* L.), coralberry (*Symphoricarpos orbiculatus* Moench), snowberry (*Symphoricarpos* spp.), hollyleaved barberry (*Mahonia aquifolium* (Pursh) Nutt.), matrimony vine (*Lycium barbarum* L.), and whortleberry (*Vaccinium myrtillus* L.) (USDA, 2011).

The ECFF progresses through a four-stage life cycle: egg, larva, pupa, and adult. ECFF adults are active from late May to early July during sunny, hot, dry conditions. Adults go through a temperature-dependent maturation period of 6 to 13 days, during which they need to feed on carbohydrates, proteins and water to become sexually mature. Adults obtain these nutrients from bird feces, honeydew (sugary excretions from aphids), extrafloral nectaries, and bacterial colonies on leaf and fruit surfaces (Daniel and Grunder, 2012). Males establish territories for mating, and defend these areas while awaiting the arrival of females. Females begin laying eggs in mid-June and insert them individually beneath the skin of ripening fruit. After 1 to 2 weeks, the eggs hatch; larvae feed on developing fruit for approximately 4 weeks. Larvae then move to the soil where they pupate beneath the surface. Pupae can remain in this stage from 1 to 3 winters (USDA, 2011).

ECFF are univoltine[1] which limits the number of detection surveys and control efforts that can be completed in a seasonal or yearly timeframe. The average life span of the insect is 4 to 7 weeks; adult ECFF live 2 to 4 weeks. Females begin mating approximately 4 days after emerging and prefer to oviposit into fruit that are in full sun. One female can lay 30 to 200 eggs, usually one per fruit. Eggs hatch in 1 to 2 weeks; the larvae feed on fruit pulp for about 4 weeks. They then enter the soil under the host plant, to a depth of up to 2 inches, where they pupate. ECFF pupae overwinter in the soil below their host plant; their emergence from the soil occurs as the fruit on the plant begins to ripen the following year. Dormancy may extend for up to 3 winters if conditions are unsuitable; dormancy also varies by the fruiting periods of local hosts (Molet, 2011). Dormancy occurs in the soil in the immediate vicinity of hosts, generally avoiding the need for dispersal flights (Daniel and Grunder, 2012).

Adult ECFF tend to oviposit into the host from which they emerged, although they can shift hosts or disperse if there are no originating host species readily available. Laboratory studies demonstrated ECFF can fly almost 2 miles in 24 hours (Molet, 2011).

ECFF is similar to *R. berberidis* Jermy (a pest of barberry), another insect species that currently is not established in the United States. There are three other *Rhagoletis* species in North America known to infest cherries,

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[1] Univoltine: Having one brood of offspring per year. Many insect univoltine life cycles coincide with development of another species (such as a food plant) on which they rely. (Source: amentsoc.org)

including *R. cingulata* (Loew) (cherry fruit fly), *R. indifferens* (western cherry fruit fly), and *R. fausta* (Osten Sacken) (black cherry fruit fly) (Molet, 2011; UFL, 2012).

ECFF is not recognized as established in the conterminous United States. There have been 115 interceptions of this species at U.S. ports of entry since 1988; 58 of these interceptions occurred since 2000 (Molet, 2011). The larvae of this fly are commonly intercepted in fruit carried in passenger baggage (J. Stewart, personal communication, 09/08/17). Cherry producers in regions of the United States adjacent to Canada are especially concerned with the June 2016 confirmation of ECFF in Mississauga, as ECFF incursions may arise from infested fruit brought across international borders without inspection. It is nearly impossible to sort out infested cherries before they are marketed; the consumer may or may not notice the larvae after purchase. Consumers may dispose of infested fruit in compost piles, where ECFF may survive as overwintering pupae (USDA, 2017j). The presence of honeysuckle, not only in developed communities but also in wilderness areas along the U.S.-Canada border, is of concern to the U.S. cherry industry because this plant is an alternate ECFF host.

The U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA) and the New York State Department of Agriculture and Markets (NYSDAM) propose a cooperative program to control the ECFF infestation in Niagara County and prevent the spread of ECFF to noninfested areas of the United States. (A map of the proposed program area[2] is provided in appendix A of this document.) USDA's authority for cooperation in the program is the Plant Protection Act (Title 4 of the Agricultural Risk Protection Act of 2000); this authorizes the Secretary of Agriculture to carry out operations to control insect pests, and to use emergency measures to prevent the dissemination of plant pests new to, or not widely distributed throughout, the United States.

Surveys for ECFF intensify in the neighborhood surrounding each confirmed ECFF detection. The Cooperative Agricultural Pest Survey (CAPS) is directed by USDA's New York State Plant Health Director and NYSDAM's State Plant Regulatory Officer; NYSDAM's Division of Plant Industry carries out the survey. CAPS inspections are an important part of monitoring the movement of biologically and economically damaging plant pests and pathogens (NYSDAM, 2018). Monitoring for ECFF continues where there are susceptible host plants and an environment conducive for fruit fly establishment.

[2] For the purpose of this document, "program area" refers to everywhere inside the quarantine boundary, and includes both treatment and movement control zones.

ECFF-host plant species grow and are propagated in Niagara County and adjacent regions, which increases the potential environmental impact of the confirmed ECFF incursions. The proposed program area includes commercial cultivation of ECFF-host species; there are multiple growers with cherry orchards inside the program area (J. Stewart, personal communication, 01/06/18).

Potential ECFF hosts grow on public and private properties in the program area. As of January 18, 2018, the proposed regulated area included public parks, registered nurseries and plant stock dealers (see appendix B in this document for data sources). There are also organic farms and farmer's markets within the proposed program area. All of these entities may store infested fruit or susceptible host plants.

USDA and its cooperating partners discussed and comprehensively analyzed alternatives for exotic fruit fly programs since 1984. USDA first evaluated the environmental impacts of fruit fly control technologies in the "Fruit Fly Cooperative Control Program, Final Environmental Impact Statement—2001" (EIS1) (USDA, 2001). USDA reexamined its findings and introduced an additional tool for programs in the "Use of Genetically Engineered Fruit Fly and Pink Bollworm in APHIS Plant Pest Control Programs, Final Environmental Impact Statement—2008" (EIS2) (USDA, 2008). Both EIS2 and EIS1 consider fruit fly risks and mitigations at the programmatic level. This situation-specific environmental assessment (EA) incorporates the analyses in EIS2 and EIS1 by reference.

This EA analyzes the environmental issues arising from the proposed program's control of ECFF at specific sites in New York State. The control measures being considered for this program were comprehensively analyzed in USDA's fruit fly chemical risk assessments (USDA, 2018b, 2015, 2014, 2003, 1999, 1998a, 1998b; appendix C in this document). These documents are incorporated by reference. Environmental documentation for USDA's fruit fly control programs may be viewed online via the following links: USDA fruit fly control program environmental documentation and USDA GE control applications for plant health.

II. Alternatives

Alternatives considered for this proposed program include (A) no Federal action, (B) quarantine and commodity certification, and (C) the preferred alternative, control using an integrated pest management (IPM) approach. Under all of these alternatives, trapping and surveys for ECFF will be conducted in the Niagara Area Cooperative Control Program as a diagnostic measure. Component methods of alternative C include the use of regulatory controls, high-density trapping, host plant survey, and

chemical pesticides to facilitate the timely elimination of the current ECFF incursion. These alternatives and their component methods are the same as the alternatives considered in EIS2 and EIS1 (USDA, 2008, 2001).

All pesticides used in USDA programs are required to comply with the Federal Insecticide, Fungicide, and Rodenticide Act. To fulfill obligations under this statute, USDA will ensure that a full pesticide registration (i.e., Section 3 registration), a special local needs registration (i.e., Section 24(c) registration) and/or an emergency quarantine exemption (i.e., Section 18 exemption) have been approved by the U.S. Environmental Protection Agency (EPA) for each pesticide use pattern in fruit fly program applications.

A. No Action

Under the no action alternative, there would be no Federal efforts to control ECFF or restrict expansion of the ECFF population from the infested area. In the absence of a Federal effort, quarantine and control efforts would remain under the control of State and local government, grower groups, and individuals. Specifically, this means ECFF control efforts would be managed by, and be wholly under the control of, NYSDAM. Expansion of ECFF populations would be influenced by the proximity of host plants, local weather conditions, and any control measures used in the area.

"No treatment" might be the only reasonable alternative for some sensitive sites. In such cases, lack of treatment could lead to an ongoing infestation and establishment of the pest. An expansion of the infestation could result in substantial economic losses to growers in the United States, as well as negative impacts to the U.S. export agricultural markets.

Under the no action alternative, USDA would continue cooperative practices to support NYSDAM's detection program and research. For information on New York State's ECFF and other invasive plant pest programs, please use this link: NYSDAM Division of Plant Industry.)

B. Quarantine and Commodity Certification

This alternative combines a Federal quarantine with commodity treatment and certification, as stipulated under Title 7 of the Code of Federal Regulations (CFR) § 301.32. Any ECFF control efforts would be managed by, and be wholly under the control of, NYSDAM, as in the no action alternative. Regulated commodities harvested within the quarantine area would not be allowed to move outside the area unless they are treated and certified for movement. For a large infestation, intensive quarantine enforcement activities could be necessary, including safeguarding of local

fruit stands, mandatory baggage inspection at airports, and judicious use of road patrols and regulatory checks. The quarantine actions of this alternative would reduce human-mediated transport of ECFF in host commodities and host plant materials to areas outside the quarantined area; however, ECFF populations are likely to establish within the quarantine boundaries.

A quarantine boundary will be established around each ECFF detection site to ensure any host material that leaves the area is free of ECFF. If the ECFF quarantine expands to federally or State protected historical sites, wilderness, or Tribal lands, then the program will restrict treatments to those approved for each type of site.

Interstate movement of regulated commodities would require the issuance of a limited permit (contingent upon commodity treatment), or the grower or shipper complying with specific conditions designed to minimize pest risk and prevent the spread of ECFF. Treatment methods available to commercial producers under this alternative include regulatory chemicals and cold treatment. Regulatory chemical treatments may include (1) treatment with lambda cyhalothrin soil drenches, and (2) bait sprays containing a mixture of yeast protein hydrolysate (a food bait) with either spinosad or malathion (as insecticides). Growers with ECFF-host plants may apply ground-based or aerial applications of spinosad or malathion bait spray so long as they adhere to EPA-approved application requirements. Protein hydrolysate is a commonly used attractant bait that increases the efficacy of chemical applications while reducing the area of pesticide treatments needed to achieve control (Prokopy et al., 1992). The protein hydrolysate (which can be derived from plants or yeast) attracts the fruit flies; they consume a lethal dose of the pesticide while consuming the bait.

Certain host material in the ECFF program area, as a requirement for certification and shipping, may be treated in enclosed areas or containers by cold treatment (USDA, 2001, 2004). (See EIS1 and the associated spinosad and lambda cyhalothrin risk assessments (USDA, 2001, 2015, 2014) for information about these treatments)).

More than 66,748 acres of commercial agricultural production occur within the program area. In 2016, major crops in this location included alfalfa, apples, barley, cabbage, cereal grains, corn, grapes, grass/hay, legumes, and soybean. ECFF-host commodities currently under commercial cultivation within the proposed ECFF quarantine include multiple acres of cherries. Some of those acres are located within the proposed treatment area. (See appendix B in this document for data sources.)

Under a limited permit, growers apply USDA/State-approved preharvest treatments in the field and move fruit out of the quarantined area to enclosed facilities for processing into juice or for packing. Under a compliance agreement, growers treat production areas using approved field and/or premise treatments; these crops must be certified by program officials for movement to packing sheds for marketing.

C. Control Using an IPM Approach (Preferred Alternative)

USDA's preferred alternative for the Niagara Area ECFF Program is control using an IPM approach. This alternative combines quarantine and commodity certification with control efforts This alternative could prevent ECFF populations from establishing in the country and minimize impacts to the environment, the public, and program operating costs.

For many species of exotic fruit flies, there are no effective nonchemical control methods (USDA, 2001). Control programs rely on species-specific combinations of surveillance, targeted bait sprays, trapping, and biological control methods such as sterile insect technique. The proposed ECFF program may include any or all of the following methods:

- no Federal action
- regulatory quarantine treatment, and movement control of host materials and regulated articles
- host survey and sampling for evidence of breeding ECFF
- host removal and ground litter removal
- applications of insecticides for control of ECFF at different life stages
- mass trapping to delimit the infestation and monitor posttreatment ECFF populations

Treatment and quarantine areas center on ECFF detection sites (see map in appendix A of this document). Program surveillance, quarantine, and treatment boundaries may expand when there are findings of additional adult flies or other ECFF life stages.

The proposed Niagara Area ECFF Program does not plan to use aerial methods of chemical treatment (J. Stewart, personal communication, 01/16/18). The proposed chemical applications may employ targeted, ground-based spinosad bait or malathion bait sprays, and lambda

cyhalothrin soil drenches (J. Stewart, personal communication, 06/06/17). Like other USDA programs for exotic fruit fly infestations in the United States, the proposed ECFF program would employ established procedures and treatments to attack the various life stages of the fly.

1. Delimitation

ECFF surveillance would involve the use of a baited sticky trap. The range of dispersal of *R. cerasi* is determined by the availability of host fruit; thus, the delimited area can be determined by ECFF-host distribution. The current NYSDAM CAPS-approved method for delimitation trapping is a protein-baited yellow sticky card with a lure of ammonium acetate in a polycon dispenser (USDA, 2017j).

For ECFF surveys in 2017 and beyond, the ammonium acetate lure could consist of a membrane-based liquid polymer housed in a plastic dispenser. Figure 2 shows this type of trap as placed in a cherry tree. Several food-based synthetic attractants use ammonia or its derivatives. Ammonium carbonate and ammonium acetate baits are used for several *Rhagoletis* species (IAEA, 2003; Pelz-Stelinski et al., 2006).). Although ammonium carbonate is effective as an ECFF bait (Yee and Goughnour, 2016), it will not be used by the proposed cooperative program, in order to ensure standardized data and survey supply procurement (Molet, 2011). Ammonium acetate is a salt of acetic acid. It occurs naturally in plants and animals, and does not persist in the environment (EPA, 2015). (For further information see the risk analysis of ammonium acetate in appendix C of this document.)

Trap placement would begin during May and into June, and trapping would continue for approximately three to four months. Trap maintenance includes keeping traps free of dust, weekly or biweekly inspection, and replacement of active ingredients as required by the label for each chemical. Ordinarily the traps are placed around the perimeter of cherry orchards, and in the middle section of the tree canopy on the outside edge of trees (USDA, 2017j). The traps may also be placed in or adjacent to honeysuckle. Trap placement in honeysuckle occurs on the main stem if the plant is large enough. If the plant is unable to support the trap, it may be hung from a metal or wooden stake placed in close proximity to the plant (Molet, 2011).

The Niagara Area ECFF Program would conduct surveys for immature ECFF stages (via fruit sampling) around all trap sites where ECFF was detected and on adjacent properties (USDA, 2017i). Sweep netting is another sampling technique for insect surveys in cherry and

Figure 2. Yellow sticky trap with added lure dispenser on cherry tree. (Source: USU, 2010)

honeysuckle. Sweep netting around *Lonicera* spp. was found to be an effective method for detection of adult flies in Canada (Molet, 2011). Fruit sampling and larval surveys, not sweep netting, would be employed for this purpose by the cooperative Niagara Area ECFF Program (2017i).

2. Control Actions

Confirmation of a breeding ECFF population leads to targeted, ground-based control of host trees and plants within a 200-meter radius of each ECFF detection (USDA, 2017j; J. Stewart, personal communication, 03/16/2018). Ground control is comprised of multiple elements: foliar bait spray treatments of ECFF-host and/or non-host plants with hand or mechanical ground spray equipment; soil drenching of hosts within a 200-meter radius of larval/pupal/mated female ECFF detections, as well as any capture associated with the ECFF outbreak; mass trapping; leaf and litter raking in lieu of soil treatments where the public may be walking; and removal of host fruit from the property. Foliar bait spray treatments target the adult life stage of the fruit fly. Soil drenching inside the drip-line of a host plant targets the larval or pupae stage in the soil. Fruit removal breaks the life cycle by eliminating potential hosts for egg oviposition and larval development (USDA, 2017j; J. Stewart, personal communication, 02/26/18).

Foliar treatments are highly localized sprays consisting of a formulation of spinosad or malathion (insecticide) and protein hydrolysate (a food bait). Overall coverage of a tree canopy is unnecessary when using a

bait that relies on attracting the fruit flies; a spot spray is adequate to protect developing fruit (SPC, 2002).

GF-120 NF Naturalyte® is an organic chemical formulation approved for program use against ECFF. Its active ingredient, spinosad, is an organic insecticide derived from the fermentation juices of a soil Actinobacteria called *Saccharopolyspora spinosa* (Merchant, 2004). The formulation also includes sugars, plant proteins, and extracts (EPA, 2011). Spinosad bait spray applications to ECFF hosts in the program area would be made every 7 to 14 days, according to label directions (USDA, 2017j). Spinosad is relatively nontoxic to mammals and beneficial arthropods; it has approved uses for the control of certain pests of agriculture, livestock, pets, and humans (DeAngelis, 2004). The ECFF program spray applications are not attractive to pollinators; the sprays target host plant foliage (not flowering plants) so adverse exposures are not expected.

Depending on the manufacturer's use label, growers may have the option to treat an ECFF population with a different bait/insecticide: malathion, in combination with Nu-Lure® Insect Bait. Like the prescribed spinosad treatment, the approved malathion bait spray must be applied at a low volume application, either as a hand-wand type spot-spray or with ultra-low volume application equipment (USDA, 2017j). Nu-Lure® Insect Bait is a proteinaceous liquid derived from corn (MCF, n.d.). A special local needs label may need to be obtained before using malathion in the proposed program (USDA, 2017j).

Evidence of a breeding population (immature life stages, mated female ECFF, or multiple adult captures within a certain distance and time frame) leads to risk assessment, and may include stripping and removal of all potential host fruit within a 200-meter radius of each detection site (USDA, 2017j).

A lambda cyhalothrin drench may be applied to soil within the drip line of ECFF hosts in larval detection sites, or to containerized soil in ECFF-host production nurseries under quarantine. USDA and NYSDAM will need to obtain a special local needs label before using either of these soil treatments in the proposed program. Lambda cyhalothrin is a synthetic pyrethroid insecticide and acaricide. Applications of lambda cyhalothrin could occur in the following locations: (a) within the drip line of fruit-bearing fruit fly host plants that are located within a 200-meter radius from a mated female ECFF, multiple adult captures or ECFF larvae, egg or pupae detection, (b) as a regulatory treatment on containerized host nursery stock, and (c) to soil around nursery stock prior to movement of nursery stock out of the quarantine area (USDA, 2017j, 2015).

Before taking action, program officials would inform the general public and potentially impacted plant producers via press releases, meetings, and other forms of communication appropriate to reach the recipients. Residents whose property would be treated, or whose fruit would be removed, would be notified at least 48 hours in advance of these actions. Notification letters would be sent to trading partners as they are identified. Given the potential for impacts to commercial production, orchard owners, packing sheds, nurseries, agricultural vendors, and other produce operations handling ECFF host material, these entities would also be notified of the ECFF quarantine location and treatment schedules (USDA, 2017j).

Detailed descriptions of the alternatives considered for fruit fly control and their component methods are in the previously mentioned fruit fly risk assessments (USDA, 2018b, 2015, 2014, 2003, 1999, 1998a, 1998b; appendix C in this document).

III. Affected Environment

This chapter briefly discusses pertinent physical and demographic features in the proposed cooperative control program area. The information serves as background to understanding the current local program area in the context of the entire county. Potential ECFF program areas within the county would be identified on an as-needed basis as infestations and incursions occur.

A. Land Characteristics and Demographics

The ECFF infestation is currently within the boundary of Niagara County, New York. Niagara County is located in the northwest corner of New York State. It is bordered on three sides by water: Lake Ontario to the North, Tonawanda Creek to the South, and the Niagara River to the West (Niagara County, 2017). In 2010, the county reported a land area of 522.36 square miles, and a resident population of 216,469 (USCB, 2017a). Niagara Falls is a historic and globally recognized landmark, consisting of two cities of the same name on the U.S. and Canadian banks of the Niagara River, and the following waterfalls: in Canada, the Horsehoe Falls; in the United States, the American Falls and Bridal Veils Falls. Goat Island in Niagara Falls, New York, separates the Horseshoe Falls from the U.S. falls.

Niagara County's key industries include tourism as well as agriculture and wine. The fertile flatland produces grapes, apples, peaches and other fruits and vegetables. Several wineries are part of the Niagara Wine Trail. Figure 3 shows the location of major Niagara County communities. These include two Federal Indian reservations, Tuscarora and Tonawanda, with

landholdings inside the county boundaries. Additionally, there are many State parks, including De Veaux Woods State Park, Devil's Hole State Park, Fort Niagara State Park, Earl W. Brydges Artpark State Park, Four Mile Creek State Park, Golden Hill State Park, Joseph Davis State Park, Niagara Reservation State Park, Reservoir State Park, and Wilson-Tuscarora State Park (NY.gov, 2017).

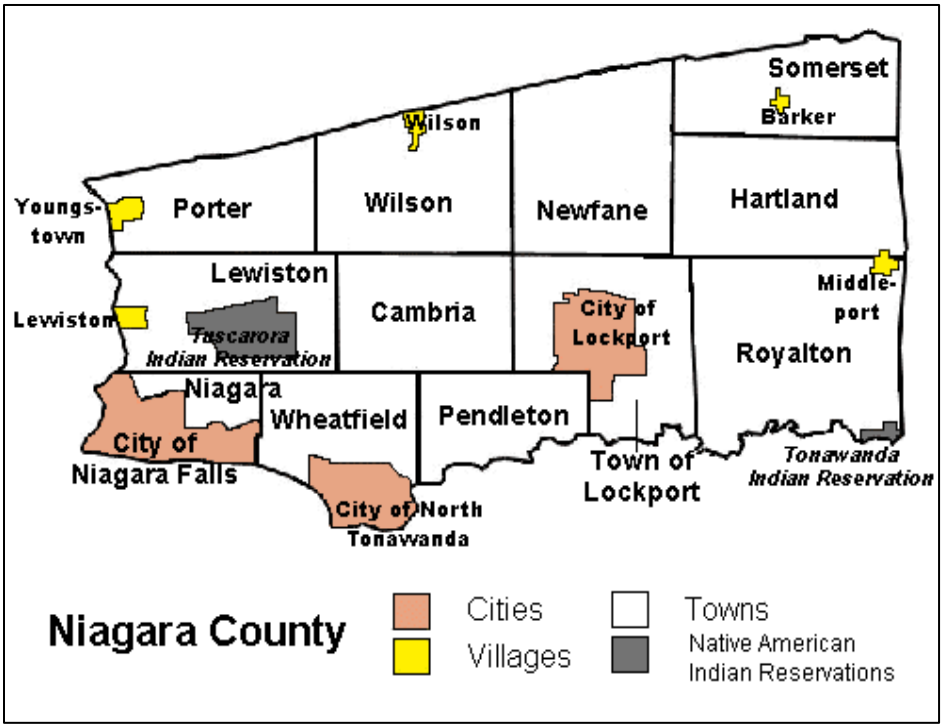

Figure 3. Municipalities in Niagara County, NY.
(Source: Smithancestry.com Niagara County)

The northern and western edges of the proposed program area are located at the international boundary between the United States of America and Canada. The city of Niagara Falls, for example, is built along the Falls and the Niagara Gorge, which is located next to the Niagara River. Summers in the region are warm and partly cloudy, while the winters are freezing, dry, and windy. The predominant average hourly wind direction in Niagara Falls is from the west throughout the year. Local temperatures typically range from 18 °F to 80 °F, rarely falling below 4 °F or rising above 87 °F. The warm season typically lasts 3.6 months, from May 30 to September 19; the cold season typically lasts 3.4 months, from December 3 to March 15. The wetter season typically lasts 8.6 months, from March 23 to December 12; the drier season typically lasts 3.4 months, from December 12 to March 23. The snowy period of the year typically lasts 5.0 months, from mid-November to mid-April (Weatherspark, 2017).

According to the 2010 U.S. Census, the city of Niagara Falls occupies slightly over 14 square miles of land in Niagara County with a resident population of 50,193 (USCB, 2017a). The city's economic base is shifting from manufacturing to tourism. More than 12 million people each year visit the falls; it is one of the most visited tourist attractions in the world (Niagara Falls Live, 2017; Touropia, 2017). The city offers other attractions, such as the Niagara Falls State Park and the the Seneca Niagara Casino & Hotel.

The town of Niagara neighbors the city of Niagara Falls and is located in the southwest corner of the county. As of the 2010 census, the town of Niagara had a total population of 8,378 (USCB, 2017a). It is bordered by the town of Lewiston to the north, the town of Wheatfield to the east, and the city of Niagara Falls to the west and south. Niagara Falls International Airport lies within the township and serves the Niagara County area. Major employers in the town of Niagara include retail stores, small industry, the airport, and service occupations (USCB, 2017b).

The town of Lewiston occupies 64 square miles along the Canadian border. It has a population of approximately 16,250 people and views of Toronto, the Niagara River, and Lake Ontario. The town was a gateway to western settlement and is known for its historic character, scenic vistas, and working farms, vineyards and orchards. Lewiston is the gateway to the Niagara wine trail (Town of Lewiston, 2017).

The town of Porter occupies the northwest corner of Niagara County; it is bounded by Lake Ontario on the north and by the Niagara River on the west. In 2010, the town of Porter reported a population of 6,771. The historic village of Youngstown is considered a part of Porter; in 2010 the village's population was 1,935. Youngstown lies at the mouth of the Niagara River, about 11 miles north of the Falls. This village is home to Fort Niagara, which receives more than 100,000 visitors each year. The soil quality of the area attracted many fruit farmers in the 1800s; boating, fishing, water sports, and tourism are important industries today (Town of Porter, 2017; USCB, 2017c; Village of Youngstown, 2017).

Major roadways in the proposed ECFF program area include the Niagara Scenic Parkway, Interstate 190, and New York State Routes 18, 31, 61, 62, 93, 104, 182, 265 and 384. The current ECFF infestation is concentrated in a rural residential neighborhood which contains schools, municipal parks, biking and hiking trails, and golf courses. Public and private recreational facilities occur within or near the program area. In the proposed program area, ECFF-hosts grow on both private and public property. Table 1 shows distances from central points in the ECCF program area to land sites of potential concern.

Table 1. Distance from ECFF Detections to Certain Land Sites.*

Designated Land Use	Distance Rounded to Nearest Tenth of a Mile
Historic Sites	• 17 within treatment zone • 9 more within quarantine
Local, State and Federal Lands	Within treatment zone • Devils Hole State Park • Fort Niagara State Park • Fourmile Creek State Park • Joseph David State Park • Niagara Falls State Park • Niagara Frontier Country Club • Riverdale Cemetery • Whirlpool State Park Within quarantine • Air Force Plant No. 38 • Bonds Lake Park • Earl W. Brydges State Park • Hyde Park • Hyde Park Golf Course • Niagara Falls Air Reserve Station • Seneca Hickory State Golf
Nearest Airports	• Niagara Falls International Airport, 2.0 • Saint Catherine's Airport, 12.0 • North Buffalo Suburban Airport, 19.0 • Buffalo Niagara Inertational Airport, 24.0 • John C. Munro Hamilton International Airport, 56.0
Nearest International Seaports	• Thorold Port (Canada), approx.. 7.0 • Youngstown Harbor and Marina, approx.. 10.0 • Niagara-on-the-Lake Marina, approx.. 11.0 • Port Weller Port (Canada), approx.. 12.0 • Saint Catherine's Marina (Canada), approx.. 12.0 • Welland Port (Canada), approx.. 12.0 • Port Colborn-Lake Erie (Canada), apporx. 18.0 • Buffalo Port, approx.. 21.0 • Gasport Boat Dock-Erie Canal, approx.. 26.0
Nearest Native American Lands	• Tuscarora Indian Reservation, within quarantine • Tonawanda Indian Reservation, 22.0 miles outside quarantine
Organic Production and Farmers Markets	• 2 federally-certified organic operation, within quarantine (outside treatment zone) • 2 farmers markets within treatment core • 2 more farmers markest within quaratine
Schools and Academic Institutions	• 24 within treatment zone • 14 more within quarantine
Canada border	• Less than 0.1

* See appendix B in this document for data sources.

B. Water Resources

Niagara County obtains most of its raw water supply from the Niagara River (Niagara Falls Water Board, 2016; Town of Lewiston, 2016; Town of Niagara, 2018; Town of Porter, 2016). The Niagara River connects two large bodies of water—Lake Erie and Lake Ontario. These two Great Lakes form part of the largest freshwater system in the world. Less than 1 percent of the water from the Great Lakes is renewable (via precipitation and ground water). The remainder of the water is considered paleowater from the last ice age (Hornblower Canada, 2018).

Water located beneath the ground in proposed ECFF treatment areas, or surface water that runs off it, may enter the Niagara Falls-Niagara River and Niagara River Watersheds. Freshwater emergent, pond, riverine, lake, forested/shrub, and other types of wetland occupy about 9,153 acres of the proposed ECFF treatment zone, and about 12,788 acres within the proposed ECFF quarantine (data sources in appendix B of this document). Table 2 shows the distance between the current ECFF program area and other water resources.

Periods of soaking rainfall in the first quarter of 2018 ended the dryness lingering in parts of New York State. As of April 3, 2018, Niagara County is not reported to be experiencing abnormally dry conditions (Miskus, 2018).

Table 2. Distance from ECFF Detections to Certain Water Resources*

Type of Resource	Distance Rounded to Nearest Tenth of a Mile
Impaired Waterbodies, according to Federal standards	• 5 within treatment zone • 10 more within quarantine
Bodies of Water	Within treatment zone • Fish Creek • Forebay Open Channel • Lake Ontario • Niagara River • Tuscarora Reservoir Within quarantine • Gill Creek, 0.2 • Unnamed lake, 0.5 • Silxmile Creek, 0.9 • Twelvemile Creek, 1.8

* See appendix B in this document for data sources.

IV. Potential Environmental Consequences

This EA analyzes the potential environmental consequences of alternatives considered for ECFF control in Niagara County, New York. This EA focuses on site-specific characteristics of the proposed program with respect to the preferred alternative's potential to affect human health, nontarget species (including threatened and endangered species), and environmental quality. USDA identified, considered, and accommodated potentially sensitive sites through the selection of control methods and use of specific mitigation measures. USDA will conduct additional emergency environmental analyses if ECFF detections present new environmental issues associated with any expansions of the program boundaries.

The land and water features identified in Chapter III, "Affected Environment," are not expected to experience adverse impacts under any of the alternatives as a result of program activities. In implementing the preferred alternative, program operations are highly unlikely to impact soil and water quality in the affected environment.

A. No Action

Lack of Federal action would place the burden of ECFF control on private agricultural producers and the State of New York. It is reasonable to expect ECFF populations would continue to expand in number and into new areas. Wild honeysuckle populations could be reduced by ECFF feeding, but this feeding is not expected to substantially impact wildlife that use honeysuckle plants for food or habitat (Belovsky, 1981; Harlow et al., 1975; Schierenbeck, 2004). Increased ECFF populations would lead to increased quarantine efforts. Unsuccessful control of ECFF could lead to the establishment of this pest within the conterminous United States, causing substantial economic loss to U.S. growers and impacts to trade. Crop loss could lead to commodity scarcity and higher costs for U.S. consumers. ECFF establishment would lead to a change in the regulatory status of potential ECFF hosts, and could cause temporary or permanent loss of valuable local and U.S. export markets.

B. Quarantine and Commodity Certification

The quarantine actions of this alternative reduce the human-mediated movement of ECFF by preventing the transportation of ECFF-host plant materials beyond the quarantine boundary. As in the no action alternative, USDA expects a resident ECFF population would persist within the quarantine boundary. Increased ECFF populations would lead to increased quarantine efforts because any failure in quarantine actions could lead to

ECFF establishment outside the program area, and the need for expanded quarantine boundaries. The commodity certification requirement would create a necessary but new layer of ongoing governmental presence in the marketplace. This situation could create inspection jobs; however, it would also restrict trade until the produce was inspected and certified for sale. Crop loss is likely to lead to commodity scarcity and higher costs for U.S. consumers.

C. Preferred Alternative

This section considers the potential for impacts from implementation of the preferred alternative (control using an IPM approach). The preferred alternative may employ any one or a combination of the following methods:

- no Federal action
- regulatory quarantine treatment and movement control of host materials and regulated articles
- host survey and sampling for evidence of breeding ECFF
- host removal and ground litter removal
- applications of insecticides for control of ECFF at different life stages
- mass trapping to delimit the infestation and monitor posttreatment ECFF populations

The proposed program calls for highly localized chemical applications in designated properties and no-spray buffers around all sensitive areas, including all bodies of water. This method of application minimizes the potential for introduction of program chemicals into local water resources. This alternative allows for departure from the standard operating procedures and modification of mitigation measures, giving the program flexibility to adjust for site-specific characteristics. In Niagara County, it is highly likely that modifications will be necessary for the ECFF program to adequately treat in or near watersheds while minimizing the potential for environmental impact. (See EIS1, USDA, 2001) for a description of the the approaches used to mitigate for adverse impacts to bodies of water.)

As discussed in chapter II, spinosad or malathion could be used as ground-based treatments; lambda cyhalothrin could be applied to soil. At present, there are no plans for aerial applications of program chemicals. The baits

approved for ECFF program use are protein hydrolysate and ammonium acetate.

The two program baits are expected to present little or no risk to human health or to the general environment, when used according to label requirements. Protein hydrolysate is a mixture of organic compounds (mostly amino acids) obtained by the hydrolysis of proteins; it is used as a source of amino acids, as a seasoning agent, and in nutrition (MWMD, 2017). The ratios of the amino acids in the mixture vary with the source protein used for hydrolysis. Ammonium acetate is derived from the combination of ammonia and acetic acid. Ammonium acetate is a water-soluble, white crystalline solid that is registered for use in a variety of situations including chemical analysis, pharmaceuticals, preserving foods, and as an agrochemical (NCBI, 2017). Review of the treatment protocols by USDA indicates the chemical formulations used as baits in Federal fruit fly eradication and control programs are unlikely to result in adverse environmental or human health risks (USDA, 2018b, 2014, 2003, 1999, 1998a, 1998b; appendix C in this document).

1. Human Health

The principal human health concerns arise from program use of chemical insecticides. The proposed program may apply targeted foliar applications of spinosad or malathion bait spray using ground-based equipment or sticky traps, and lambda cyhalothrin soil drenches (only on containerized nursery stock). The risks to human health are associated with chemical toxicity and the potential for exposure. These factors are influenced by the environmental fate and use patterns for each particular insecticide. This section will first discuss the pesticide toxicities, and then potential exposure and risk from the program uses of these pesticides. Pesticides were grouped based on foliar applications or soil drench treatments. Finally, the section briefly discusses the use of fumigation.

Toxicity Evaluations for the Foliar Application Pesticides (Spinosad, Malathion, and Baits)

Spinosad

Spinosad is toxic to specific invertebrate species; humans and other mammals experience low toxicity (USDA, 2014; EPA, 2016a). Spinosad was first registered with EPA in 1997 (EPA, 2012) and is currently registered for use on a variety of field and vegetable crops, fruit trees, berries, herbs, grasses, ornamentals, residential turf, and other non-food uses (EPA, 2016a). Spinosad bait spray is a formulation of naturally produced bacterial compounds (spinosyns).

Malathion

Mammals acutely exposed to malathion orally, dermally, or through inhalation exhibit low to very low acute toxicity. Malathion is a slight dermal irritant and a slight eye irritant (EPA, 2016b). Malathion primarily affects the nervous system in humans with symptoms including tremors, salivation, urogenital staining, and decreased motor activity (EPA, 2016b). Human exposure to high levels of malathion may cause difficulty in breathing, chest tightness, vomiting, cramps, diarrhea, watery eyes, blurred vision, salivation, sweating, headaches, dizziness, loss of consciousness, and death (ATSDR, 2003). EPA classifies malathion as "suggestive evidence of carcinogenicity but not sufficient to assess human carcinogenic potential" (EPA, 2016b).

ECFF Baits

The protein hydrolysate (in the program's spinosad or malathion bait spray) is a source of amino acids (food) attractive to the fruit flies. Other commercial uses of this product are as a seasoning agent and in human nutrition (MWMD, 2017). Protein hydrolysate derived from extracts of yeasts or grains acts as a broad-spectrum food bait for male and female fruit flies (Dekker and Messing, n.d.). The limited available data suggests low acute toxicity to human health.

Yeast extract hydrolysate from *Saccharomyces cerevisiae* was registered with EPA (EPA, 2004) as a biopesticide for use on all food crops, as well as on turf and ornamental plants. There were no toxic effects observed when testing the end product in laboratory mammals. The U.S. Food and Drug Administration considers the active ingredient yeast extract hydrolysate as a Generally Recognized as Safe product for food use. Yeast extract hydrolysate has a long history of safe use in food and agriculture (EPA, 2004).

Toxicity Evaluation for the Sticky Trap Lure (Ammonium Acetate)

Ammonium acetate (proposed for use in traps as an ECFF bait) is an ammonium salt of acetic acid. Ammonium acetate and acetic acid are similar in chemical structure, physical-chemical properties, environmental fate behavior, and aquatic and mammalian toxicity (EPA, 2015). For these reasons, toxicity data on acetic acid approximates toxicity information for ammonium acetate. Acetic acid has low to moderate acute toxicity from oral, inhalation, and dermal exposure, and there are no toxicological endpoints of concern (EPA, 2015). Acetic acid caused dermal irritation, skin corrosiveness, and acute eye irritation in testing animals. It may be toxic to the upper respiratory tract (ScienceLab.com, 2013). Ammonium acetate is

approved by the EPA as an inert ingredient for non-food use. (A more detailed discussion on the toxicity of ammonium acetate is included in the ammonium acetate risk analysis summary in appendix C of this document.)

Toxicity Evaluation for the Soil Drench Pesticide (Lambda Cyhalothrin)

Animals exposed to lambda cyhalothrin show low to moderate acute toxicities from oral, dermal, and inhalation exposures with the primary acute toxic effect of neurotoxicity. In toxicity studies with subchronic and chronic exposures, lambda cyhalothrin was not mutagenic, carcinogenic, and did not cause developmental or reproductive effects at relevent doses (USDA, 2015).

Potential Exposure and Risks

The potential for human exposure to ECFF program chemical compounds would likely be limited to workers conducting the applications, or who are located on the commercial premises during or shortly after aerial or ground application. Dermal exposure is the primary route, while off-site drift could potentially expose people located close to the treatment area, there is limited information available on inhalation exposures.

Program workers who mix, load, and apply pesticides are the most likely segment of the human population to be exposed to program insecticides; exposure varies with the formulation and the use pattern. Proper use of personal protective equipment, general safety hygiene practices, and adherence to label required restrictions limit the exposure of program workers. Based on the low potential for exposure to program pesticides during applications made according to label directions, adverse health risks to workers are expected to be minimal.

People who live in or visit an ECFF control zone also have the potential to be exposed to program pesticides. The low amounts of chemical use, rapid degradation of chemicals, and limited application sites associated with the program minimize exposure to members of the public. The use of targeted foliar sprays, baited traps, soil drenches, fumigation regimes, and site-specific mitigation measures all reduce the potential for exposure to the public. If chemical applications to commercial holdings become necessary, they would occur on private property where chemical exposure to the general public is unlikely. Further, public notification and program information sharing are standard mitigation measures that minimize the potential for human exposure by allowing people to choose to stay away from treated areas. Following invasive pest control treatments, USDA provides residents information detailing

precautions to take, including safe intervals of time that should elapse before harvesting fruit on their property. Application methods that adhere to label requirements minimize the potential for pesticide drift and runoff. The proposed program would restrict posttreatment entry according to each pesticide's label requirements. The program also monitors the removal and destruction of fruit in treated areas.

Spinosad or malathion application to target surfaces, when made in accordance with EPA label instructions, produces incrementally negligible effects to human health and the environment. Spinosad is not persistent in the environment (a half-life of 2.0 to 16 days in sunlight on foliage, and less than 1 day in water) (NPIC, 2014). In soil, the reported half-lives for malathion range from 1 to 17 days (Gervais et al., 2009). (An additional summary of the environmental fate of program pesticides is discussed in the Environmental Quality section of this document (IV.C.4)).

ECFF program baits present little or no risk to human health based on their lack of toxicity at relevant doses, the small amounts placed in the environment, and the low probability of exposure to humans when label restrictions are followed (USDA, 2014; appendix C in this document).

Lambda cyhalothrin is not expected to have significant impacts on human health from the proposed use pattern. ECFF program pesticide applicators have the highest potential for exposure to lambda cyhalothrin. However, exposure risk to applicators is expected to be negligible with the proper use of personal protective equipment and adherence to EPA-approved label instructions. The general population is not likely to be exposed to program applications of lambda cyhalothrin when label restrictions are followed by applicators (USDA, 2015). Proper notification of residents prior to any soil drench treatment on their property will reduce their potential risk of exposure to ECFF program soil drenches.

Applications of lambda cyhalothrin will be targeted and ground-based, delivering large coarse droplets directly to the soil within the drip line of host plants, or to containerized host plants, to minimize the potential for offsite transport. Dietary consumption of fruit from the treated fruit-bearing trees is not a concern because of the destruction of fruit from the treated areas. Risk to residential children from potential exposure to lambda cyhalothrin in the treatment area is minimal because application procedures prevent the pesticide mixture from leaving the treated area, as required by the label, and because program personnel will remain onsite until the application is absorbed into the soil. The risk evaluation of a conservative scenario on the pica behaviors for children also indicated minimal risk from potential exposure to lambda cyhalothrin

remaining in soil (USDA, 2015). Lambda cyhalothrin exhibits chemical fate properties that suggest it would not be mobile and subject to transport to surface or ground water that would serve as a source for drinking water. Label restrictions regarding application buffers and vegetative filter strips adjacent to aquatic habitats will further reduce the potential for contamination to any surface drinking water (USDA, 2015).

The analyses and data of EIS2 and EIS1 and the associated human health risk assessments indicate exposures to pesticides from normal program operations are not likely to result in substantial adverse human health effects. (Refer to EIS2 and EIS1 (USDA, 2008, 2001) and the human health risk assessments (USDA, 2018b, 2015, 2014, 1999, 1998a; appendix C in this document) for more information on the potential for human health risks.)

USDA recognizes a small portion of the population may have greater than usual sensitivity to certain chemicals, and program treatments may pose higher risk for these individuals. Special communication strategies to mitigate this risk are discussed in detail in appendix C of EIS1 (USDA, 2001).

Trap placement and chemical applications may be rescheduled if rainfall or strong winds are forecast for the program area. Site inspections will continue to ensure existing program treatments are not likely to affect humans. The destruction or relocation of traps and treatments due to weather events is unlikely to result in adverse impacts to the human environment because the potential pesticide toxicity is reduced by dilution during the storm's water and air movement.

Of the three alternatives considered, a well-coordinated control program using IPM technologies results in the least use of chemical pesticides over time, and minimizes their potential to adversely affect human health. Neither alternative A (no Federal action) nor alternative B (quarantine and commodity certification) is expected to eliminate ECFF as readily or as effectively as the preferred alternative. Implementation of alternatives A or B over a protracted period would likely result in broader and more widespread use of pesticides by homeowners and commercial growers, with correspondingly greater potential for adverse impacts to human health.

2. Other Aspects of the Human Environment

The National Historic Preservation Act of 1966, as amended (16 United States Code (U.S.C.) §§ 470 et seq.), requires Federal agencies to consider the impact of their proposed actions on properties included in, or eligible for inclusion in, the National Register of Historic Places (36 C.F.R. §§ 63 and 800). USDA finds ECFF program actions will not disturb facilities

because there will be no application of pesticides to the buildings, and the application methodologies minimize the potential for drift. For these reasons, the program activities considered in this assessment are not likely to affect historic properties. Program workers may handpick fruit from surrounding landscape plants, and place bait stations outside of the historic site's property whenever possible.

USDA completed the Full Environmental Assessment Form for the proposed action as directed by the New York State Office of Parks, Recreation and Historic Preservation (OPRHP). A draft of this EA will be provided to OPHRP. Suitable documentation of the proposed action must be prepared prior to issuance of a permit by OPHRP. In addition, USDA submitted a project description to the New York State Historic Preservation Office (also known as New York State Parks, Recreation and Historic Preservation's Division for Historic Preservation) on March 26, 2018. Only after these consultations conclude would USDA consider conducting action at sites under their authorities.

It could become necessary to treat any area within Niagara County when an ECFF outbreak occurs. Currently, there are five federally listed Historic Places in Niagara County listed as open. These historic places use landscaping as part of the area's viewshed (Allan Herchell Carousel Factory, High-Locust Streets Historic District, Oakwood Cemetery, New York State Barge Canal, and the Niagara Falls Schools Administration Building) (Anonymous, 2017). There are an additional 77 historic places in Niagara County that are listed as closed, which means ECFF program workers are highly unlikely to identify any suitable individuals to contact in advance of entering the site, if control activities become necessary. Many of these locations consist of buildings with landscaping, and some are associated with publically managed lands (Anon., 2017).

If control activities become necessary on any of these properties, ECFF program workers will take all reasonable measures to contact responsible individuals at those sites prior to taking action. These measures are likely to include, but are not limited to, notification using a door-hanger tag at least 48 hours in advance of chemical treatments to surrounding vegetation. Buildings themselves are not treated. All the types of chemical treatments discussed in this EA that can be made to landscape plants do not alter, change (restore or rehabilitate), modify, relocate, abandon, or destroy any historic buildings, edifices, or nearby infrastructure.

In general, USDA's fruit fly control programs are compatible with the preservation of historic sites because USDA discreetly integrates control activities into the site, soil treatments do not disrupt the viewshed or create fugitive dust, and the treatments do not affect human-made structures.

USDA restricts program treatments and activities to an as-needed basis, and also can modify normal program activities at historically significant locations to reduce pesticide release, if necessary. Program workers will conduct chemical applications using ground-based equipment that is directly targeted to foliage or soil. This may include spraying by hand using a backpack sprayer. Bait treatments and fruit stripping by hand may occur. Program workers will inspect produce at farmer's markets, and infested fruit may be confiscated and destroyed. For all these reasons, USDA finds the proposed action will not adversely affect historic properties. If USDA discovers any archaeological resources, it will notify the appropriate individuals.

Federal agencies identify and address the disproportionately high and adverse human health or environmental effects of proposed activities, as described in Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." USDA engages locally impacted people in collaborative decisions on fruit fly trap placement whenever possible, and considers the potential environmental impacts of implementing the action alternatives on minority and/or low-income communities, Tribal interactions, and historical and culturally sensitive sites in the program area.

Using 2010 U.S. Census Bureau data (USCB, 2017a), the population in Niagara County reporting their race as Hispanic, Black, or Asian is roughly less than half the percentages of these minorities throughout the State of New York. At 1.1 percent, the individuals reporting themselves as "American Indian" or "Alaska Native" is slightly higher than the average in New York State or the United States. Only 4.1 percent of the recorded population of Niagara County reported they spoke a language other than English at home.

Approximately 90 percent of the population graduated high school and the median household income estimate for 2011-2015 (in 2015 dollars) was $49,449, which is about $10,000 less than the median for the State of New York. Approximately 15 percent of the people live in poverty (USCB, 2017d). There are three cities within the County: Niagara Falls, North Tonawanda, and Lockport. Other municipalities are towns and villages. Niagara Falls differs from the other cities with a higher population of Black individuals (at 21.6 percent), and more people living in poverty (26.7 percent) (USCB, 2017d).

These data suggest the overall county cannot be considered a community with environmental justice concerns (even though there may be clusters of minority and low-income communities within the cities), based on the high percentage of white individuals who often own the house they live in. Residents of cities within Niagara County are likely to pass through areas

where fruit fly treatments occur without even noticing the traps; confiscation of infested fruit at farmer's markets may be the only program contact with these individuals. USDA does not anticipate needing to provide advance notice of ECFF program activities and potential exposure hazards in other languages to meet the needs of the population in Niagara County.

Federal agencies consider the needs of children to comply with Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks." The proposed ECFF program does not pose any highly disproportionate adverse effects to children because they are unlikely to be present when program workers apply treatments or maintain bait traps, and there is negligible exposure to pesticides once they are applied. The design of the traps allows placement beyond the reach of children, even though children are intermittently present at shelters, playgrounds, parks and picnic areas, religious centers, public/private campgrounds and trailer parks, athletic fields, bus depots, and outdoor community facilities where the program may place bait traps.

There are 59 public schools and 22 private schools in Niagara County reported to serve approximately 36,725 students. Some of the 95 charter schools in New York State (serving more than 30,000 students) may be located in Niagara County (New York Schools, 2017). The number of schools within the quarantine areas and treatment zones will vary over time but, where possible, USDA will not apply ECFF control treatments on school property. USDA will maintain traps and apply any pesticide applications only when children are not present in the immediate area. When pesticide applications are essential, USDA uses either a bait trap or backpack sprayer. Any exposure of children to applied products is negligible based on the program's application methods and the product formulations.

Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments," calls for agency communication and collaboration with Tribal officials when proposed Federal actions have the potential for Tribal implications. The Archaeological Resources Protection Act of 1979 (16 U.S.C. §§ 470aa-mm), secures the protection of archaeological resources and sites on public and Tribal lands. Using the Native American Graves Protection and Repatriation Act Online Databases (25 U.S.C. §§ 3001 et seq.), USDA finds there are three Tribal entities with land interests in Niagara County (NACD, 2017). The proposed action will not involve treatments that excavate soil or create fugitive dust, so program activities are unlikely to affect Native American artifacts. To the extent that treatments may occur on land where there are Tribal interests, USDA will contact representatives from the three identified Tribes (Seneca Nation of Indians [previously listed as Seneca Nation of New York], Tonawanda

Band of Seneca, and Tuscarora Nation [previously listed as Tuscarora Nation of New York]) to ensure adequate notification and consultation in a timely manner.

USDA considered the potential environmental impacts of implementing the alternatives listed in chapter II on minority and/or low-income communities, Tribal interactions, and historical and culturally sensitive sites in the program area. A lack of Federal action could result in adverse economic and health impacts on affected producers and consumers, such as decreased harvests, higher consumer prices, loss of local employment, reduced nutritional options, loss of market share, compromised mental and physical health, loss of property, and so on. These indirect impacts may occur to a lesser extent under the quarantine and commodity certification alternative. USDA does not anticipate these types of adverse effects as a result of carrying out the preferred alternative's surveillance activities, trapping, and program chemical applications. On a case-by-case basis, USDA accommodates special needs through the selection of specific control methods, or by modifying program operations. This minimizes the potential for impacts to those communities, locations, sensitive areas, or individuals.

3. Nontarget Species

The principal concerns for nontarget species, including threatened and endangered species, relate to the potential for harm from the use of program pesticides to control ECFF populations. Paralleling human health risk, the risk to nontarget species is related to the fate of the pesticides in the environment, their toxicity, and exposure to nontarget species. USDA's fruit fly programs are designed to prevent the introduction of program chemicals into nontarget areas.

All of the pesticides considered in this EA are highly toxic to invertebrates, even though the likelihood of exposure (and any ensuing impacts) varies among the pesticides and with the specified use pattern (USDA, 2018b, 2015, 2014, 2003). In general, a well-coordinated ECFF control program using IPM technologies would result in the least overall use of chemical pesticides, with minimal adverse impacts to nontarget species. The no action alternative is less likely to be effective at eliminating ECFF, and would be expected to result in broader and more widespread use of pesticides by homeowners and commercial growers, with a correspondingly greater potential for adverse impacts.

Trap placement and chemical applications may be rescheduled if strong winds and rain storms are forecast for the program area. Site inspections will continue to ensure existing program treatments are not likely to affect nontarget organisms. The destruction or relocation of traps and treatments, due to weather events, is unlikely to result in adverse impacts to animal species and their habitats, as the potential toxicity should be greatly reduced by dilution of the program materials in water and air.

The control program will apply a targeted foliar bait treatment using ground-based equipment where there are ECFF detections. Treatment of host and/or non-host plants within a 200-meter radius of ECFF find site occurs with a highly localized spray consisting of an organic formulation of the pesticide spinosad combined with a bait. The protein hydrolysate bait alone minimally impacts environmental quality and nontarget species because of its low toxicity and rapid degradation in the environment (EPA, 2004). The small amount of bait used in traps is not expected to displace or supplement natural food sources for nontarget species. Ammonium acetate is not expected to be toxic to aquatic organisms, terrestrial mammals, or birds (EPA, 2015).

The pesticide spinosad has low to moderate toxicity to wild mammals and birds. Spinosad toxicity to fish is moderate while aquatic invertebrates are more sensitive in acute and chronic exposures. Toxicity to terrestrial invertebrates is variable; spinosad is considered highly toxic to honey bees. However, bait spray applications are not attractive to pollinators and are only applied to host plants (not flowering plants); adverse exposures to honey bees and other pollinators are not expected from ECFF program spinosad applications. Risks to nontarget fish and wildlife, including beneficial insect species, are anticipated to be negligible based on the proposed use pattern that would result in a low potential for exposure to most taxa. A favorable environmental fate profile and low toxicity to most nontarget organisms further reduces the risk to terrestrial and aquatic animals (USDA, 2014).

Malathion bait spray is to be used only in commercial orchards. Malathion is highly toxic to some fish and other aquatic life. Malathion is moderately toxic to other fish and birds, and is considered low in toxicity to mammals. It is moderately to severely toxic to terrestrial invertebrates. Risk to sensitive nontarget vertebrates and invertebrates within the spray block will be reduced by the use of a large droplet size and a fruit fly attractant that allows for low use rates that are more attractive to ECFF (USDA, 2018b). Risks to terrestrial nontarget vertebrates and invertebrates will be greatest within the treatment block, but the offsite risk is considered low based on conservative risk estimates (USDA, 2018b).

Lambda cyhalothrin has low to moderate toxicity to terrestrial wildlife such as birds and mammals (USDA, 2015). Lambda cyhalothrin is highly toxic to most terrestrial invertebrates, including pollinators. Soil drench applications could only affect pollinator species attracted to flowers underneath the canopy of ECFF host plants (most likely, very few flowering plants would be found there). Also, the method of application to soils at the drip line of select host trees within a 200-meter radius of an ECFF detection minimizes the impacts to sensitive terrestrial invertebrates

that may consume treated plant material, or occur in soil at the application site (USDA, 2015). The low frequency and method of these applications suggest that any impacts to sensitive terrestrial invertebrates would be localized to the treatment area, and would be transient (USDA, 2015).

a. Migratory Birds

The Migratory Bird Treaty Act of 1918 (16 U.S.C. §§ 703–712) established a Federal prohibition, unless permitted by regulations, to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird or any part, nest, or egg of any such bird.

Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," directs Federal agencies taking actions with a measurable negative effect on migratory bird populations to develop and implement a memorandum of understanding (MOU) with the U.S. Fish and Wildlife Service (FWS) that promotes the conservation of migratory bird populations. On August 2, 2012, USDA and FWS signed an MOU to facilitate the implementation of this Executive order.

Niagara County, New York, is part of the Atlantic Flyway, an important migration corridor providing suitable habitat for many bird species. Table 3 lists migratory birds of conservation concern within the proposed program area. Birds of conservation concern are bird species, subspecies, and populations of migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act.

USDA evaluated the proposed ECFF program in terms of potential impact on migratory avian species. Implementation of the preferred alternative is not expected to have any adverse effect on migratory birds or their flight corridors associated with treatment areas. The proposed program would not remove or disturb trees, shrubs, or other vegetation typically used by birds for food, habitat, or forage. The targeted nature of the program treatment applications precludes direct bird exposure to most program chemicals. Birds may be exposed to malathion bait treatments applied to cherry orchards, particularly if applied aerially. However, direct avian acute and chronic risk from exotic fruit fly treatments is expected to be minimal (USDA, 2018b). In addition, the acreage that could receive malathion bait sprays is small (only 9 acres of cherry orchards in the

Table 3. Migratory birds of conservation concern in Niagara County, NY*

Common Name	Scientific Name	Season Present in Area
American bittern	*Botaurus lentiginosus* (Rackett)	Breeding
Black tern	*Chlidonias niger* (L.)	Breeding
Black-crowned night heron	*Nycticorax nycticorax* (L.)	Breeding
Blue-winged warbler	*Setophaga (Vermivora) pinus* L.	Breeding
Canada warbler	*Cardellina* (*Wilsonia*) *canadensis* (L.)	Breeding
Cerulean warbler	*Setophaga* (*Dendroica*)*cerulea* (A. Wilson)	Breeding
Common tern	*Sterna hirundo* L.	Breeding
Golden-winged warbler	*Vermivora chrysoptera* (L.)	Breeding
Least bittern	*Ixobrychus exilis* (Gmelin)	Breeding
Olive-sided flycatcher	*Contopus cooperi* (Nuttall)	Breeding
Peregrine falcon	*Falco peregrinus* Tunstall	Breeding
Pied-billed grebe	*Podilymbus podiceps* (L.)	Breeding
Red-headed woodpecker	*Melanerpes erythrocephalus* (L.)	Breeding
Short-eared owl	*Asio flammeus* (Pontoppidan)	Wintering
Upland sandpiper	*Bartramia longicauda* (Bechstein)	Breeding
Willow flycatcher	*Empidonax traillii* (Audubon)	Breeding
Wood thrush	*Hylocichla mustelina* (Gmelin)	Breeding

(Source: FWS IPaC, 2017)

quarantine area). Indirect exposure and cumulative impacts to birds are highly unlikely because of the low potential for dietary consumption of invertebrates containing lethal doses of the insecticides. Lambda cyhalothrin is not translocated to seeds or leaves likely to be consumed by birds.

b. Endangered Species Act

Section 7 of the Endangered Species Act (ESA) and ESA's implementing regulations require Federal agencies to consult with the U.S. Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service to ensure that their actions are not likely to jeopardize the continued existence of threatened or endangered species, or result in the destruction or adverse modification of critical habitat.

In Niagara County, New York, there is only one federally threatened species, the northern long eared bat (NLEB) (*Myotis septentrionalis* (Trouessart)) (FWS ECOS, 2017). NLEBs require forest for roosting, raising young, foraging, and commuting between roosting and foraging habitat (USDOI, 2015). During the summer, NLEBs typically roost singly or in colonies underneath bark or in cavities or crevices of both live trees and snags, and males and non-reproductive females may use cooler locations such as caves and mines (USDOI, 2015). Northern long-eared bats roost in many species of trees, including black oak (*Quercus velutina* Lam.), northern red oak (*Quercus rubra* L.), silver maple (*Acer saccharinum* L.), black locust (*Robinia pseudoacacia* L.), American beech (*Fagus grandifolia* Ehrh.), sugar maple (*Acer saccharum* Marsh.), sourwood (*Oxydendrum arboreum* (L.) DC.), and shortleaf pine (*Pinus echinata* Mill.) (USDOI, 2015). NLEBs would not likely be found roosting in fruit trees within an orchard setting, thus they would not be exposed to malathion bait sprays or other insecticides applied by ground or air to cherry orchards. Program insecticide treatments and trapping would not affect the insect prey of the bat because treatments are targeted to specifically attract and affect exotic fruit flies, not insect prey that comprise a large part of the NLEB diet, such as moths, flies, leafhoppers, caddisflies, and beetles. Although it is very unlikely that NLEBs would be exposed to spinosad-treated plants, spinosad has low toxicity to mammals (USDA, 2014). NLEBs would also not be exposed to lambda cyhalothrin soil drenches beneath infested plants, or the ammonium acetate contained within traps. Therefore, USDA has determined that the implementation of the preferred alternative will have no effect on the NLEB.

Should the program area expand, or a new species or critical habitat be listed that may occur in the program area, USDA will initiate consultation with FWS, as necessary.

(Refer to EIS2 and EIS1 (USDA, 2008, 2001) and the supporting nontarget risk assessments (USDA, 2018b, 2015, 2014, 2003, 1998b; appendix C in this document) for more information on risks to all classes of nontarget species.)

4. Environmental Quality

The principal environmental quality concern is how to minimize the potential for environmental contamination by pesticides. Although program pesticide use is limited, especially in comparison to existing agricultural pesticide use throughout the county, the proposed action would lead to a controlled release of chemicals into the environment. The fate of those chemicals varies with the rate of degradation in air, water, or soil, and the prevailing environmental conditions (temperature, pH, dilution, etc.). The environmental fates of spinosad, malathion, and lambda cyhalothrin are outlined below (refer to EIS2 and EIS1 (USDA, 2008, 2001) and the risk assessments (USDA, 2018b, 2015, 2014, 2003, 1998a,

1998b; appendix C in this document) for additional information on the program pesticides' environmental fates.)

The bait ingredients in ECFF program trapping and control treatments are expected to have minimal effects on environmental quality, based on EPA-approved use patterns and the rapid degradation of the ingredients (NCBI, 2017; CalEPA, 2016; MCF, 2016; EPA, 2015; Reilly, 2003; Prokopy et al., 1992; appendix C in this document). Use of baits in ECFF program treatments is not expected to result in impacts to environmental quality beyond those described for the chemical compounds listed below.

- **Spinosad** is not considered mobile in soil as it adsorbs strongly to soil particles, and is unlikely to leach to great depths. Dissipation half-lives for spinosad in the field may last 0.3 to 0.5 days. It is photodegraded quickly on soil exposed to sunlight. Spinosad is quickly metabolized by soil micro-organisms under aerobic conditions, and has a half-life of 9.4 to 17.3 days. Spinosad is not sensitive to hydrolysis, but aqueous photolysis is rapid in natural sunlight (half-life of less than 1.0 to 1.6 days), and is the primary route of degradation in aquatic systems exposed to sunlight. Under anaerobic conditions, the degradation rate is slower, between 161 and 250 days. Spinosad has a half-life of 2.0 to 11.7 days on plant surfaces. After initial photodegradation, residues are available for metabolism by plant biochemical processes. Effects from residues of individual treatments are no longer detectable in environmental substrates within a few weeks of application (USDA, 2014; Kollman, 2003).

- **Malathion** is considered lower in toxicity and less persistent (1 to 25 days in soil) than other organophosphorus pesticides. In water, malathion has a half-life of approximately 1 week, and is more stable in acidic aquatic conditions. Malathion is soluble in water and can be highly mobile in soil. Generally, degradation occurs rapidly (a half-life of less than 1 to nearly 9 days) (Gervais et. al., 2009); application to foliage allows for exposure of residues to degradation from processes (e.g., photolysis), resulting in a reduced potential for significant movement to ground water. Malaoxon is an oxygen analogue of malathion, and it can be found either as an impurity in malathion products, or can be generated during the oxidation of malathion in air or soil. Malathion and malaoxon can be transported in air over large distances and elevations (Newhart, 2006).

- **Lambda cyhalothrin** is not mobile and tends to strongly sorb/adsorb to organic matter in soil. A 28-day leaching study showed that a majority of lambda cyhalothrin residues were recovered within the top 15 cm of the soil. Lambda cyhalothrin has a low potential to leach as dissolved residues in percolating water. In the water column, lambda

cyhalothrin tends to adsorb to suspended particulate materials (e.g., clay particles and organic matter), transport with the suspended particulates through aquatic systems, and settle in the sediments. Lambda cyhalothrin is considered nonvolatile; however, volatilization from foliage occurs more rapidly than from soil and water. Lambda cyhalothrin is moderately persistent in the environment and degrades through a combination of biotic and abiotic mechanisms (photolysis, hydrolysis, and microbial biodegradation). Lambda cyhalothrin in water and soil, when exposed to sunlight, photodegrades with half-lives of 24.5 days and 53.7 days, respectively. Lambda cyhalothrin hydrolysis does not occur at a pH below 8. Lambda cyhalothrin biodegrades at moderate rates (half-lives ranging from 12 to 72 days) under both aerobic and anaerobic soil metabolism conditions. Studies show that lambda cyhalothrin half-lives in aerobic soil and anaerobic aquatic conditions are 42.6 days and 21.9 days, respectively. But overall, lambda cyhalothrin aquatic biodegradation is slow with metabolic half-lives ranging from 113–142 days. Lambda cyhalothrin in soil is not easily taken up by the roots of vascular plants because it strongly adsorbs to soil. The roots of aquatic macrophytes can take up lambda cyhalothrin in water and translocate the chemical throughout their plant biomass. Lambda cyhalothrin partitions to lipids suggesting a high potential to bioconcentrate and low water solubility (USDA, 2015).

Urban and agricultural runoff may flow directly into local waters, picking up trash, dirt, chemicals, and other contaminants along the way. If treatment is indicated in close proximity to a body of water where pesticides might be directly discharged into the water, the Niagara Area ECFF Program will analyze the environmental setting, and establish and follow site-specific best management practices. The prescribed method of spray application directly to host plants minimizes drift and runoff. Mitigation measures will be applied to protect marine and freshwater resources. Treatment buffers will maintain a minimum distance of 30 feet from surface water. Personnel applying pesticides will adhere to label directions, State and Federal laws, and recommendations of the environmental compliance staff associated with the program. Contact with bodies of water is not anticipated due to the targeted application measures, and the environmental fate of the pesticides used in the ECFF cooperative control program. Departure from the standard operating procedures or modification of mitigation measures allow the program flexibility to adjust for site-specific characteristics. In the proposed program area, it is highly likely that modifications will be necessary to adequately treat watersheds while minimizing the potential for environmental impact. (See EIS1 (USDA, 2001) for a description of the the approaches used to mitigate for adverse impacts to bodies of water.)

This EA compared action alternatives with respect to their potential to affect environmental quality. The preferred alternative presents minimal risk to environmental quality because a well-coordinated control program using IPM technologies would result in the least overall use of pesticides. The no action alternative and the quarantine/commodity certification alternative would likely result in broader and more widespread use of pesticides by homeowners and commercial growers, with a correspondingly greater potential for adverse impacts.

5. Cumulative Impacts

This section considers the potential for implementation of the alternatives to cause cumulative impacts on the human environment. The first alternative, no Federal action, is likely to create cumulative impacts similar to those that arise from tolerating uncontrolled ECFF infestations in the United States. Under the second alternative, imposed quarantine restrictions and commodity certification requirements would add to the burden of control efforts and expenses on producers. Either of these alternatives may increase the time needed for commodities to reach intended markets or preclude sales, which may contribute to commodity shortages and negative public perception of the affected industry.

USDA considered implementation of the preferred alternative in the context of, and in conjunction with, other pest control and quarantine programs occurring in the Niagara area of New York State (NYSDAM, 2018). These programs target different pests by using pesticides with different mechanisms of toxic action. Additionally, the pesticides are applied at different times. Such differences suggest there is limited potential for pesticide interaction or for multiple exposures. The potential total pesticide use by programs in the same location is, therefore, not expected to create significant cumulative impacts in the human environment.

Current and future in-State ECFF programs potentially could merge into one larger program area. If site-specific ECFF control programs become part of programmatic trapping and control actions across multiple counties, USDA expects two beneficial cumulative impacts on the environment: reduced ECFF populations causing damage to fruit, and an overall reduction in chemical treatments.

Program pesticides approved for use against ECFF also may be used as treatments against other *Rhagoletis* species. As of February 28, 2018, USDA has identified no active quarantines or pest control programs in New York State that target *Rhagoletis* or other species of exotic fruit flies; there is currently no risk of intersecting treatment areas (NYSDAM, 2018). Should this situation change, potentially overlapping uses of program pesticides would be monitored and adjusted on an as-needed basis in order to minimize adverse environmental impacts.

There are no significant environmental impacts expected from proper implementation of an ECFF Cooperative Control Program. The Niagara Area ECFF Program and other pest control programs in New York State are not likely to create significant cumulative impacts in the human environment based on the differences in (a) pesticide mechanisms of toxic action, (b) target organisms for control, (c) potentially affected resources and locations, and (d) application timing. USDA does not expect synergistic or cumulative impacts from pesticide applications with the following delimitation and control programs managed by New York State (NYSDAM, 2018):

- Asian long-horned beetle program—not active in Niagara County
- Emerald ash borer program—**active in Niagara County**
- Fruit tree tortrix moth program—**active in Niagara County**
- Golden nematode program—not active in Niagara County
- Plum pox program—**active in Niagara County**

USDA will take appropriate precautions when there are multiple pest species in the same area targeted for control using the same chemical. For example, spinosad's other labeled food and non-food uses make it useful in a variety of pest control efforts, including the control of fire ants, beetles, caterpillars, termites, and thrips (Merchant, 2014; USDA, 2004). Implementation of a governmental ECFF control program is likely to increase local spinosad use, leading to an overlap of program and non-program treatments.

Lambda cyhalothrin is commonly mixed with buprofezin, pirimicarb, dimethoate or tetramethrin. It is compatible with most other insecticides and fungicides (Extoxnet, 1996). However, lambda cyhalothrin use for other purposes in areas where non-native fruit fly detections are likely to occur is expected to be minimal (USDA, 2015). Lambda cyhalothrin is used to control a wide range of pests in a variety of applications (NPIC, 2001):

- agricultural insecticides for food and non-food crops
- insecticides used indoors and outdoors for homes, hospitals, and other buildings
- greenhouse, ornamental plant, and lawn insecticides
- insecticide products for use on cattle

- termite treatments
- insecticide products for use on rights-of-ways
- aerially applied insecticides

It is uncertain how pesticides may be used by private entities in areas proposed for USDA fruit fly programs. In terms of Federal and State program activities, there are no significant cumulative impacts anticipated as a consequence of implementing the preferred alternative. The preferred alternative would allow program pesticide applications to avoid overlapping treatment areas, which reduces the potential for nontarget exposure as pesticide residues degrade. The targeted use of baits within the Niagara Area ECFF Program area is not expected to result in cumulative impacts in the human environment. Reasonably foreseeable occurrences were identified that could result in incremental increases in effects on the human environment (see table 4), but it is uncertain how much impact such occurrences might have.

Table 4. Future Occurrences and Their Potential Impacts

Reasonably Foreseeable Occurrences	Potential Impacts of Unknown Degree
Continued pesticide use in the program area	Increased pesticide resistance of target organisms in that area
Additional treatment areas and quarantines	Increased socio-economic disruption
Establishment of ECFF on wild hosts	Control becomes impractical; local ecosystems and agriculture altered by ongoing ECFF presence

If the Niagara Area ECFF infestation expands, additional actions may be implemented by USDA and NYSDAM, including additional quarantines and regulatory treatments. Based on USDA's review of the context and intensity of the existing, ongoing, and potential future treatments, there will be no cumulative impacts to the human environment resulting from proper implementation of the preferred alternative. ECFF program treatments are considered to pose minimal risk to the human environment, as determined in EIS2 and EIS1 (USDA, 2008, 2001), and the nontarget species and human health risk assessments (USDA, 2018b, 2015, 2014, 2003, 1999, 1998a, 1998b; appendix C in this document).

V. Agencies Consulted

Deputy Director, Office of National Tribal Liaison
Office of the Administrator
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
P.O. Box 950
Fairmont, NC 28340

New York State Department of Agriculture and Markets
Division of Plant Industry
10B Airline Drive
Albany, NY 12235

New York State Historic Preservation Office
Peebles Island State Park
P.O. Box 189
Waterford, NY 12188

New York State Office of Parks, Recreation &
Historic Preservation
625 Broadway
Albany, NY 12207

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Center for Plant Health Science and Technology
1730 Varsity Drive, Suite 400
Raleigh, NC 27606

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Policy and Program Development
Environmental Risk and Analysis Services
4700 River Road, Unit 149
Riverdale, MD 20737

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Appendix A. Niagara Area ECFF Program as of November 1, 2017

(Source: USDA)

Appendix B. Outside-USDA Spatial Data Resources Used to Prepare this Document

The following resources were used by USDA.

Web-Based Mapping Application for Environmental Assessments

- **NepaAssist:** http://nepassisttool.epa.gov/nepassist/entry.aspx

For Information on—

- **Airports:** www.googlemaps.com
- **Bing Maps Road:** http://www.esri.com/software/arcgis/arcgisonline/bing-maps.html
- **Boundaries:** http://epamap9.epa.gov/arcgis/rest/services/NEPAssist/Boundaries/MapServer
- **Crop Data:** http://nassgeodata.gmu.edu/CropScape/
- **Historic Sites:** http://www.nps.gov/nr/
- **Land Use:** http://nassgeodata.gmu.edu/CropScape/
- **Local Parks:** www.googlemaps.com
- **National Wildlife Refuges:** http://viewer.nationalmap.gov/
- **Native American Areas:** http://viewer.nationalmap.gov/ and http://viewer.nationalmap.gov/
- **Nonattainment Areas:** http://geoplatform2.epa.gov/arcgis/rest/services/PM_Designations_Mapping/Nonattainment_Areas/MapServer
- **Nurseries and Garden Centers:** www.googlemaps.com
- **Organic Farms:** http://www.ams.usda.gov/AMSv1.0/nop
- **Places:** http://epamap9.epa.gov/arcgis/rest/services/NEPAssist/Places/MapServer
- **Seaports:** www.googlemaps.com

- **Transportation:** http://epamap9.epa.gov/arcgis/rest/services/NEPAssist/Transportation/MapServer

- **Tribal Ceded Lands/Tribal Connections:** http://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=fe311f69cbld43558227d73bc34f3a32

- **USFWS (Critical Habitat, Migratory Birds):** http://ecos.fws.gov/crithab and http://ecos.fws.gov/ipac/

- **Water:** http://epamap9.epa.gov/arcgis/rest/services/NEPAssist/Water/MapServer

- **Wetlands:** http://nassgeodata.gmu.edu/CropScape/

Appendix C. Ammonium Acetate Risk Analysis Summary

This summary was provided by USDA in June 2017 and revised in January 2018.

Ammonium acetate is an inert ingredient approved by the U.S. Environmental Protection Agency (USEPA) for non-food use. The U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA) uses ammonium acetate as an attractant in traps for the fruit fly program because of its attractiveness for both male and female *Rhagoletis sp.* fruit flies (Pelz-Stelinski et al., 2006).

Ammonium acetate is an ammonium salt of acetic acid. Ammonium acetate has a similar chemical structure, environmental fate, and aquatic and mammalian toxicity profile to acetic acid. USEPA uses toxicity data on acetic acid because limited data is available for ammonium acetate (USEPA, 2015a).

Ammonium acetate has an acute intraperitoneal injection LD_{50} of 632 mg/kg in rats and an acute intravenous injection LD_{50} of 98 mg/kg in mice. Acetic acid has a low acute oral toxicity (LD_{50} >3,310 mg/kg in rats and LD_{50} >4,960 mg/kg in mice), moderate acute dermal toxicity in rats (LD_{50} >1,060 mg/kg) and high acute dermal toxicity in mice (> 100 mg/kg produced irritation), and very low acute inhalation toxicity in rats (LC_{50}> 11.4 mg/L). In rabbits, it is an acute dermal irritant causing skin corrosiveness, and an acute eye irritant (USEPA, 2015a).

Two 28-day oral gavage toxicity studies using ammonium acetate and Wistar rats or Sprague Dawley rats found different overall toxicities. With Wistar rats, the study reported a low observed adverse effect level (LOAEL) of 100 mg/kg/day based on histopathological lesions in the brain, liver and kidney. In contrast, the Sprague Dawley rats study reported a no observed adverse effect level (NOAEL) of 100 mg/kg/day, and did not find test substance-related clinical signs or effects on body weight, clinical chemistry, absolute or relative organ weights, gross necropsy, or in the histopathology of the brain, liver or kidneys.

A 90-day oral toxicity study in rats administered acetic acid in drinking water reported a NOAEL of 390 mg/kg/day with non-adverse effect of reduction in weight gain, which was likely due to reduced appetite and food consumption. An inhalation toxicity study of acetic acid in rats and mice observed decreased activity, behavioral changes and reduced work capacity at 10 mg/kg/day (LOAEL) with a NOAEL of 7 mg/kg/day. The developmental toxicity studies of acetic acid in rats, mice, or rabbits observed no maternal and developmental toxicity at up to 1600 mg/kg/day and no fetal susceptibility. There do not appear to be any reproductive toxicity studies using acetic acid.

There is limited information available on the neurotoxicity of ammonium acetate. A 28-day oral study using ammonium acetate and Wistar rats observed signs of neurotoxicity, such as mild chromatolysis of nuclear material, moderate gliosis, neuronal vacuolation and edema in the cortex of the brain, moderate neuronal degeneration and pyknosis in the nuclei of pyramidal neurons in the hippocampal region, and moderate pyknosis and necrosis in Purkinje neurons in the cerebellum at 100 mg/kg/day. However, a second study using ammonium acetate and Sprague Dawley rats with the same dose and duration showed no indication of systemic toxicity, neurotoxicity, neuropathological or histological lesions.

There is little information on the immuntoxicity of ammonium acetate. An inhalation study exposing rats to acetic acid observed increased spleen weight at 23-31 ppm due to red blood cell destruction instead of an immunotoxic response. USEPA (2015a) concluded there is no concern for potential immunotoxicity because residential exposure to the registered use of ammonium acetate via inhalation (shorter duration to diluted acetic acid) is expected to be much lower than the American Conference of Governmental Industrial Hygenists' threshold limit value of 10 ppm for occupational inhalation exposure (8 hours to more concentrated acetic acid).

There is no information available regarding whether ammonium acetate or acetic acid are endocrine disruptors based on a search of available literature. Ammonium acetate or acetic acid has not been screened under the USEPA Endocrine Disruptor Screening Program (USEPA, 2017).

There was no evidence of carcinogenicity in an oral toxicity study in rats and there was a negative response for mutagenicity (USEPA, 2015a). The study dosed animals with acetic acid via gavage for 8 months observing hyperplasia in the esophagus and forestomach, but no tumors. Acetic acid was not mutagenic in an Ames test or clastogenic in a cytogenetic assay.

USEPA (2015a) concluded that there are no toxicological endpoints of concern from exposure to ammonium acetate for the U.S. population, including infants and children based on the lack of toxicity of ammonium acetate in the available studies and its chemical properties. Risk to workers and the general public from USDA's use of ammonium acetate as an attractant in traps is expected to be negligible based on the lack of toxicity at relevant doses and low probability of exposure.

Ammonium acetate is not persist in the environment. It has a vapor pressure of 0.00014 mm Hg at 20°C and is expected to volatilize to the atmosphere. Ammonium acetate dissociates into the ammonium cation and acetate anion in aqueous solution (USEPA, 2015a). Acetic acid degrades in the presence of microbes with an aerobic half-life of about a day (USEPA, 2015b).

Ammonium acetate is not expected to be toxic to aquatic organisms, mammals and birds based on a literature review and USEPA's evaluation of acetic acid (USEPA, 2015b, 2014; 2017b). Acetic acid is a naturally occurring substance found in plants, animals, and humans. Acetic acid is practically non-toxic to terrestrial mammals in acute studies, and is not expected to pose acute or chronic risk to birds and mammals. Acetic acid has low risk to insects based on available data with an LD_{50} > 50 µg/honey bee in an acute contact toxicity study. In another study acute exposure of 26,225 mg active ingredient of acetic acid per hive reported no mortality to honey bees or the varroa mites inhabiting the hive. Acetic acid is practically non-toxic to fish with acute LC_{50} values ranging from 303-515 mg/L for the rainbow trout, and slightly toxic to the freshwater cladoceran, *Daphnia magna*, with a 48 hour median effective concentration (EC_{50}) of 65 mg/L (USEPA, 2017b, 2014). Toxicity to non-target aquatic plants is also low with median inhibition concentrations (IC_{50}) ranging from 844.3 to 1,582.9 mg/L. USEPA (2015b) concluded that the potential risk of acetic acid to aquatic organisms is expected to be minimal based on current labeled uses and the buffering capacity of water that would counteract any pH-related impacts of acetic acid entering water bodies. The use of ammonium acetate in the fruit fly program also eliminates the potential for exposure to aquatic organisms since it is used in traps and would not be subject to offsite runoff or drift.

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