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Asian Longhorned Beetle Cooperative Eradication Program in Clermont County, Ohio

Revised Environmental Assessment, January 2013

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I. Introduction

Asian longhorned beetle (*Anoplophora glabripennis*) (ALB) is a foreign wood-boring beetle that threatens a wide variety of hardwood trees in North America. The native range of ALB includes China and Korea. ALB is believed to have been introduced into the United States from wood pallets and other wood packing material accompanying cargo shipments from Asia.

A. Asian Longhorned Beetle

1. Biology

ALB is in the wood-boring beetle family Cerambycidae. Adults are 1 to 1½ inches in length with long antennae, and are shiny black with small white markings on the body and antennae. After mating, adult females chew depressions into the bark of various hardwood tree species in which they lay (oviposit) their eggs. There are 13 genera of host trees that are regulated for ALB and are considered high risk hosts: *Acer* spp. (maple and box elder), *Aesculus* spp. (horse chestnut and buckeye), *Albizia* spp. (mimosa), *Betula* spp. (birch), *Celtis* (hackberry), *Cercidiphyllum* spp. (katsura tree), *Fraxinus* spp. (ash), *Koelreuteria* spp. (golden rain tree), *Platanus spp*. (sycamore and London planetree), *Populus* spp. (poplar), *Salix* spp. (willow), *Sorbus* spp. (mountain ash), and *Ulmus* spp. (elm) (USDA–APHIS, 2008a). *Acer* is the most commonly infested tree genus by ALB in the United States, followed by *Ulmus* and *Salix* (Haack et al., 2010). These trees are considered hosts because ALB can derive its food supply and complete its life cycle on them. A host tree is still considered a host even if it is not infested.

Once the eggs hatch, small white larvae bore into the tree, feeding on the vascular layer beneath. The larvae continue to feed deeper into the tree's heartwood, forming tunnels (or galleries) in the trunk and branches. The damage cuts off nutrient flow and weakens the tree, which will eventually die if the infestation is severe enough. Sawdust-like debris and insect waste or excrement (also called frass) is commonly found on the base of afflicted trees, as well. Infested trees are also prone to secondary attack by disease and other insects.

Over the course of a year, a larva will mature and then pupate. From the pupa, an adult beetle emerges chewing its way out of the tree, forming characteristic round exit holes approximately ⅜ inch in diameter. In Ohio, the emergence of beetles typically takes place from May through October, with adults then searching for mates and new egg-laying sites to complete their life cycle.

2. History of ALB in the United States

ALB was first discovered in the United States in August 1996 in the Greenpoint neighborhood of Brooklyn, New York. Within weeks, another infestation was found in Long Island in Amityville, New York, after officials learned that infested wood had been moved from Greenpoint to Amityville. ALB was subsequently found in Queens and Manhattan, and in Nassau and Suffolk Counties, New York.

In July 1998, due to the U.S. Department of Agriculture's (USDA) national ALB pest alert campaign, a separate infestation was discovered in the Ravenswood area of Chicago, Illinois. This discovery prompted USDA's Animal and Plant Health Inspection Service (APHIS) to amend its existing quarantine of wood movement from infested areas, and place additional restrictions on importing solid wood packing material into the United States from China and Hong Kong. In 2006, these restrictions were expanded to include imports from all countries.

In October 2002, ALB was discovered in Jersey City, New Jersey, and in August 2004, ALB was discovered in the Borough of Carteret, the Avenel section of Woodbridge Township, and in the nearby cities of Rahway and Linden, New Jersey. It was subsequently found in 2007 in Richmond County, New York (Staten Island), across the Arthur Kill River from the New Jersey infestation sites.

In August 2008, ALB was discovered in Worcester, Massachusetts. This infestation includes the city of Worcester and the towns of West Boylston, Boylston, and Shrewsbury, as well as portions of the towns of Holden and Auburn.

In July 2010, an infestation was reported in the Jamaica Plain neighborhood of Boston, Massachusetts; however, to date, only six infested trees have been detected in this area.

Existing infestations in each of the locations listed above are being treated according to the New Pest Response Guidelines (USDA–APHIS, 2008a). The guidelines are not intended to be prescriptive measures that are implemented in every ALB infestation, but serve to provide general information regarding different treatment options that can be selected based on site-specific conditions of an infestation. These options consist of cutting, chipping or burning, and disposing (by mulching) of infested trees and high risk host trees (ALB host trees that are located up to a ½-mile radius from infested trees) in proximity to the infested trees. High risk host trees that are not cut are often treated with either trunk injections or soil injections at the base of the tree using the insecticide imidacloprid. The imidacloprid is taken up and distributed throughout the tree. Imidacloprid is effective against females as they are depositing eggs, adult beetles as they feed on leaves and small twigs, and young larvae in the tree before they burrow into the heartwood (USDA–APHIS, 2008a).

To date, ALB has been eradicated from Chicago, Illinois; Hudson County, New Jersey; and most recently, Islip, New York. Portions of Manhattan and Staten Island, New York, and Middlesex and Union Counties, New Jersey are undergoing a survey process that will eventually make them candidates for eradication in 2013 if no signs of infestation are found. Successful eradication efforts in these areas were based on recommendations in the New Pest Response Guidelines (USDA–APHIS, 2008a).

On June 17, 2011, ALB life stages were confirmed in Clermont County, Ohio. A Federal quarantine was enacted on July 13, 2011, including Tate Township and East Fork State Park, to stop movement of infested material outside the regulated area. On October 14, 2011, an area in Monroe Township was added to the Federal quarantine because an isolated ALB infestation (a small ALB infestation outside of the generally infested area) was detected as a result of movement of infested firewood from Tate Township. On August 30, 2012, approximately 5 square miles in Batavia and Stonelick Townships were added to the regulated area because of a detection of two ALB-infested trees, bringing the total regulated area to 61 square miles (figure 1). Surveys are being conducted in and around the regulated areas within Clermont County to determine the size of the infestation, and to identify infested host trees (a process called delimitation). As of January 13, 2013, a total of 257,365 host trees were surveyed, and 9,291 infested trees were identified within Tate, Stonelick, Batavia, and Monroe Townships. A total of 9,001 infested trees have been removed. To date, Clermont County has the second largest ALB infestation (the Worcester, Massachusetts infestation is larger) detected in the United States.

B. Purpose and Need

APHIS has the responsibility for taking actions to exclude, eradicate, and/or control plant pests under the Plant Protection Act of 2000 (7 United States Code (U.S.C.) 7701 et seq.). APHIS is proposing a program to eradicate ALB from Clermont County, Ohio. This action is necessary to prevent further spread of ALB and to eradicate it from the area.

This environmental assessment (EA) was prepared consistent with the National Environmental Policy Act of 1969 (NEPA) and APHIS' NEPA implementing procedures (7 Code of Federal Regulations (CFR) part 372) for the purpose of evaluating how the proposed alternatives, if implemented, may affect the quality of the human environment.

APHIS has prepared seven other EAs that are relevant to this current EA:

- Asian Longhorned Beetle Control Program (USDA–APHIS, 1996),
- Asian Longhorned Beetle Program (USDA–APHIS, 2000),

- Asian Longhorned Beetle Cooperative Eradication Program, Hudson County, New Jersey (USDA–APHIS, 2003),
- Asian Longhorned Beetle Cooperative Eradication Program in the New York Metropolitan Area (USDA–APHIS, 2007),
- Asian Longhorned Beetle Cooperative Eradication Program in Worcester and Middlesex Counties, Massachusetts (USDA–APHIS, 2008b),
- Asian Longhorned Beetle Cooperative Eradication Program in Essex, Norfolk, and Suffolk Counties, Massachusetts (USDA–APHIS, 2011a), and
- Asian Longhorned Beetle Eradication Efforts in Clermont and Brown Counties, Ohio (USDA–APHIS, 2011b).

The draft EA for Clermont County that was made available to the public for comment in May 2012 was prepared because the September 2011 EA for ALB eradication activities in Clermont and Brown Counties considered only two alternatives: (1) no action by APHIS, and (2) to cut down and remove infested trees to prevent further spread of ALB. However, because APHIS is considering other tools and strategies in addition to the removal of infested trees, four alternatives were evaluated for eradication of ALB in Clermont County in the May 2012 draft EA. The EA was prepared and made available to the public for a 60-day public comment period beginning on May 9, 2012, on the APHIS web site at http://www.aphis.usda.gov/plant_health/ea/alb.shtml. Notice of the availability of the EA was published in several local newspapers, including legal notices and articles; post cards to residents; fact sheets; an opinion editorial and factsheet in the Clermont Sun; a television media tour with APHIS officials in May; web site and social media posts through Facebook and Twitter accounts; distribution through email channels; and an informational meeting held on June 19, 2012. APHIS received more than 250 comments on the EA. New information regarding the program and the preferred alternative required the preparation of a revised EA for public comment.

The most important changes made in this revised EA include the identification of a preferred alternative, and a more detailed explanation of that alternative. In addition, many of the comments received on the May 2012 EA were based on the assumption that alternative B, full host removal, would be the preferred alternative, and a misconception that greater than 1 million trees would be removed from Clermont County in a short period of time. At this time, this assumption is not logistically feasible and is beyond the scope of analysis of this EA. Previous experience in other ALB programs suggests that the maximum number of trees that could be removed is approximately 15,000 trees per year. Additional information has been incorporated into this revised EA in response to comments, other than those focused solely on large scale tree removal, or they are addressed in appendix F of this EA. Appendix F provides a response to those comments on the May 2012 EA that were not incorporated into this revised EA; however, APHIS needed to provide clarification regarding the program.

It is important to note that although this EA covers the impact of the ALB program on Clermont County, APHIS does not anticipate that program activities will occur everywhere over the entire county. Rather, the purpose of this EA is to evaluate the impacts of program activities in the quarantined area and pockets of ALB infestation that may occur throughout Clermont County. This EA would allow the program to rapidly conduct eradication activities on isolated ALB infestations where they may be discovered in the county without having to first reinitiate the NEPA process. In the event that ALB has spread throughout Clermont County or beyond, APHIS would have to re-evaluate the strategy of the ALB eradication program.

C. Public Outreach

APHIS, along with the Ohio Department of Agriculture, has provided opportunities for public involvement and outreach regarding ALB program activities, such as media interviews for newspapers and television, press releases, public service announcements on local radio stations, presence at industry shows, expos, and outreach venues; presentation of "Lurking in the Trees," a documentary produced in conjunction with the Nature Conservancy on Clermont County cable access; social media including Facebook, Twitter, YouTube, and Flickr; public meetings; and, meetings with Federal and State legislators, town administrators, and other impacted groups and persons. Informational materials and sites have been made available to the public including Answers to Frequently Asked Questions, and various ALB informational sites: www.BeetleBusters.info; http://bugs.clermontcountyohio.gov/ALB.aspx; http://www.agri.ohio.gov/TopNews/asianbeetle/; http://clermont.osu.edu/news/asian-longhorned-beetle-found-in-ohio-osu-extension-offers-information-hotline; and the APHIS ALB plant pest page http://www.aphis.usda.gov/plant_health/plant_pest_info/asian_lhb/index.shtml. (See appendix A for a more complete listing of public outreach activities.)

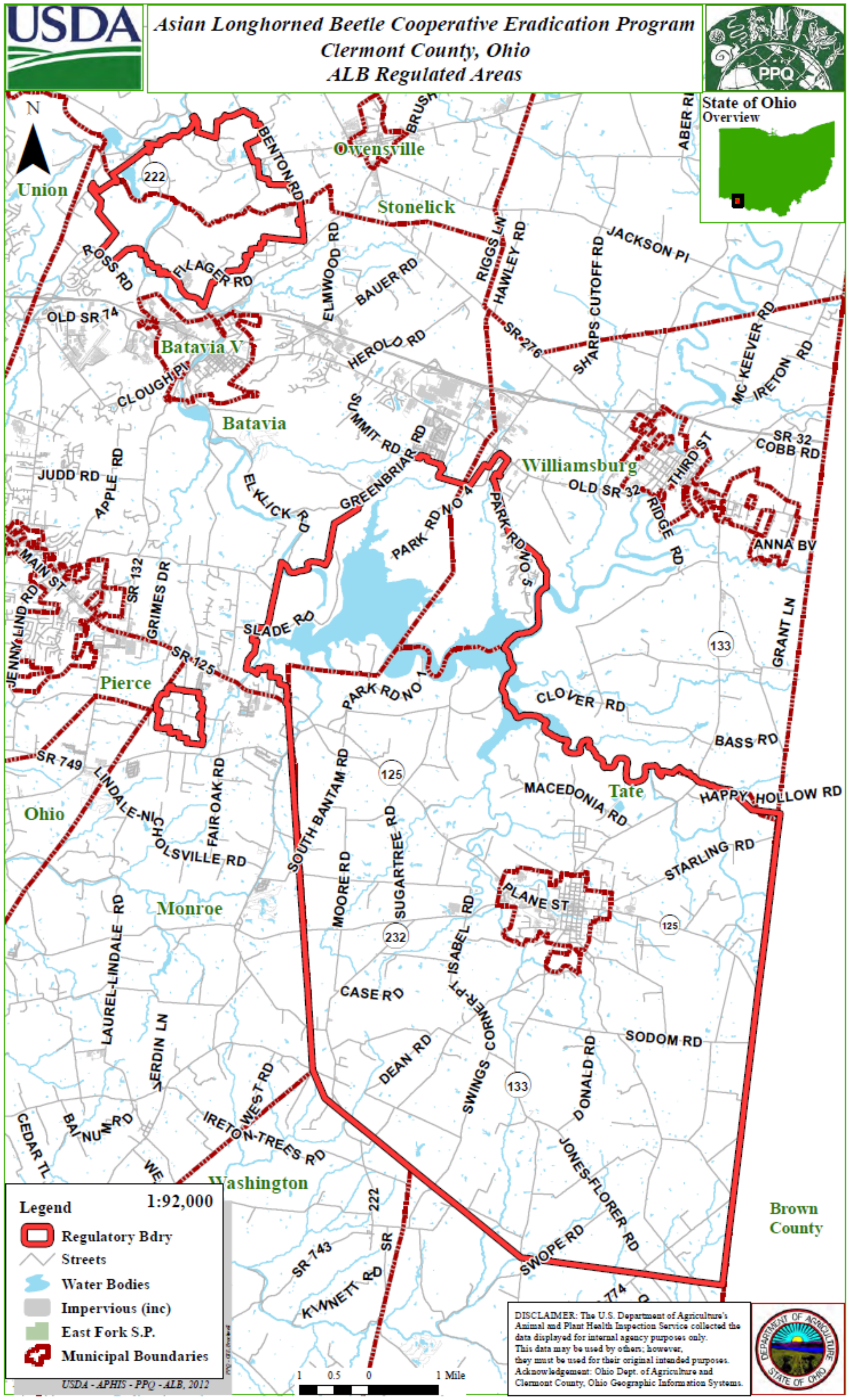


Figure 1. ALB quarantine areas in Clermont County, Ohio (61 square miles).

II. Alternatives

This EA analyzes the potential environmental consequences associated with the proposed action to eradicate ALB from Clermont County, Ohio. Four alternatives are being considered: (A) no action by APHIS; (B) removal of infested trees and high risk host trees up to ½ mile from infested trees (full host removal); (C) removal of infested trees and imidacloprid treatment of high risk host trees up to ½ mile from infested trees; and (D) infested host removal and combination of removal or imidacloprid treatment of high risk hosts (preferred alternative). Alternatives B through D are eradication program (action) options based on the New Pest Response Guidelines for ALB (USDA–APHIS, 2008a). Alternatives B through D are being evaluated within Clermont County.

A. No Action

Under the no action alternative, no eradication efforts would be undertaken by APHIS. However, APHIS would continue to implement the quarantine restrictions in the area, as defined in the Federal Orders for Clermont County, Ohio, that were issued on July 13, 2011, October 14, 2011, and August 31, 2012, and future Federal Orders, should ALB be found in new locations and counties. Some control measures could be taken by other Federal or non-Federal entities; however, these measures would not be controlled or funded by APHIS.

Certain articles present a risk of spreading ALB if the articles are moved from quarantined areas without restrictions; these are called regulated articles. Restrictions are imposed on the movement of regulated articles because ALB can survive in these materials, and could possibly be transported to uninfested areas. Implementation of a quarantine is expected to prevent the artificial (human-assisted) spread of ALB by limiting the movement of firewood, green lumber, and other living, dead, cut, or fallen material, including nursery stock, logs, stumps, roots, and branches from ALB host trees (host material) originating in ALB-infested areas into uninfested areas; however, this does not limit the natural spread of ALB.

ALB host material may not move outside the quarantine zone unless each article is issued a certificate or limited permit by an APHIS or State inspector. No regulatory treatments have been approved to allow for the interstate movement of host material. (See figure 1 for a map of the current quarantine area, although this area could expand if more ALB-infested trees are found.)

B. Full Host Removal

Under this alternative, APHIS and its cooperators would remove infested host trees and high risk host trees (full host removal) to eradicate ALB and prevent it from spreading. Signs of low infestation levels are not readily apparent on high risk trees, and can remain unnoticed by visual survey. Consequently, due to their proximity to known infested trees, there is a risk of infestation of high risk host trees. The eradication program, under this alternative, would consist of maintaining the current ALB quarantine as defined in the no action alternative:

- surveys of host trees;
- removal of all infested trees and all high risk host trees up to ½ mile from infested trees;
- chipping removed trees; and,
- stump grinding of removed trees, or application of the herbicide triclopyr on stumps that cannot be removed; foliar applications of triclopyr mixed with two other herbicides (imazapyr and metsulfuron) to sprouting foliage from stumps; or leaving stumps of high risk host trees to encourage regrowth in certain areas, such as woodlots.

Under this alternative, removal of high risk host trees would be conducted only with permission from the landowner, as with ALB programs in other States. If the landowner refuses to allow removal of high risk host trees, the program would not remove them but would continue to survey and, if those trees become infested, would remove them.

ALB inspectors use many methods to conduct tree surveys multiple times over multiple years to detect infested trees and to ensure the absence of the beetle. Inspectors conduct visual surveys from the ground using binoculars to look for signs of infestation. In addition, interest groups and organizations voluntarily assist inspectors by searching trees from the ground. Surveyors look for signs of infestation, such as round ALB exit holes and heavy sap flow from damaged sites on host trees. Aerial tree inspections may also be performed by trained professionals using bucket trucks to peer into trees from above, and by trained tree climbers to search for signs of an infestation within tree canopies. Use of tree climbers is the most effective method of detecting signs of ALB, but is also a slower and more costly method (Hu et al., 2009). Currently, no method of survey for ALB is completely effective. Inspections conducted through ground surveys are approximately 30 percent effective in detecting a lightly infested tree, and climbing surveys are about 60 to 75 percent effective in detecting a lightly infested tree. A lightly infested tree is considered to be a tree with egg masses or egg sites only, no exit holes.

Under this alternative, infested trees, as well as high risk host trees up to a ½-mile radius of infested trees would be cut down, removed, and chipped. Cutting down infested and high risk host trees removes ALB larvae that may be within those trees, thus eliminating potential adult beetle emergence and dispersal. Presence of ALB egg-laying sites or exit holes indicate that a tree is infested (USDA–APHIS, 2008a). Host removal is recommended in proximity of an infested tree because of the likelihood of infestation (USDA–APHIS, 2008a). Up to a ½-mile radius for removal of high risk host trees is utilized because of the dispersal behavior of ALB, and the level of effectiveness of visual survey on lightly infested trees. In a study in Illinois, 99 percent of trees with ALB egg-laying sites were found within ¼ mile of a tree from which adult ALB exited (USDA–APHIS, 2008a). An additional ¼ mile may be added to the radius for high risk host removal around infested trees to capture any beetles that may have spread further.

Roots of infested host trees would be removed to a minimum of 6 inches below ground level using a stump grinder. Any aboveground roots with a diameter of ½ inch or more would also be removed. Because of limitations of moving equipment into certain areas or to prevent erosion, the program may apply a cut-stump herbicide treatment of triclopyr instead of using a stump grinder. Program or contract personnel would spray or paint the root collar area, the sides of the stump, and the outer portion of the cut surface, including the cambium (thin layer of generative tissue lying between the bark and the wood of a stem, most active in woody plants) until thoroughly wet, but not to runoff.

Foliar applications of triclopyr mixed with two other herbicides, imazapyr and metsulfuron, would be applied to sprouting foliage from stumps that have been removed as part of the eradication efforts. This use would occur if the physical removal of stumps was not possible, and would be used to prevent resprouting of stumps. ALB can reinfest sprouts of host trees. However, in some cases, such as woodlots, stumps of high risk host trees may not be ground or treated with herbicides to allow for more rapid regrowth of the trees. This would only be conducted in certain circumstances, for example, if all high risk host trees have been removed within the designated radius of infested trees.

After tree removal from yards and landscaped settings, contractors restore the location of the removed trees by grading it and planting grass. This reduces the opportunity for invasive weeds to establish, and provides a groundcover that will help hold the soil in place. However, in woodlot settings grass is not planted because of the seed bank already in the ground that would result in rapid vegetation growth. Best Management Practices for Erosion Control for Logging Practices in Ohio (Bulletin 916) suggests seed grass mixtures for disturbed sites; the ALB program adheres to these practices where possible, considering weather conditions. In addition, any impacts will be mitigated to the extent that APHIS and other cooperators and stakeholders assist with replanting trees or managing impacted areas. The Ohio Department of Natural Resources (ODNR) is available to provide to residents assistance with invasive weeds and land management following the removal of trees.

All host trees that are removed from within the quarantined area are chipped to a size of less than 1 inch in at least two dimensions. Chips of this size are no longer subject to Federal or State regulations. Removed trees will be moved to an area (marshalling yard) dedicated to chipping. The chips generated from infested trees are available for free to Tate Township residents for their personal use.

Under this alternative, APHIS expects to remove a maximum of 15,000 trees per year, based on available resources and past experience with ALB eradication programs in other States.

C. Removal of Infested Trees and Imidacloprid Treatment of High Risk Host Trees

Under this alternative, APHIS and its cooperators would remove infested trees and chemically treat high-risk host trees. The eradication program, under this alternative, would consist of:

- maintaining the current ALB quarantine as defined in the no action alternative;
- conducting surveys of host trees;
- removal of infested trees;
- chipping of cut trees;
- imidacloprid trunk or soil injections of high-risk host trees up to a ½-mile radius from infested trees;
- stump grinding of removed trees;
- application of the herbicide triclopyr on stumps that cannot be removed; and,
- foliar applications of triclopyr mixed with imazapyr and metsulfuron to resprouts from stumps.

Under this alternative, treatment of high-risk host trees with imidacloprid would be conducted only with permission from the landowner. If the landowner does not allow imidacloprid treatment of high risk host trees within ½ mile of an infested tree, the program will not treat them but will continue survey efforts; if trees become infested they will be removed by the program.

Surveys, infested tree cutting, stump grinding, treatment of stumps with triclopyr, imazapyr, and metsulfuron, and chipping of cut trees are conducted as described in alternative B (full host removal). However, under this alternative, stumps of cut trees would not be allowed to regrow because only infested trees would be cut.

Imidacloprid trunk or soil injections would be applied to high-risk host trees found up to ½ mile from an infested tree. Imidacloprid treatments are made in the spring and early summer, prior to and during the adult emergence period, in order to allow the insecticide to be distributed throughout the tree and, therefore, be most effective. Chemical treatments of imidacloprid are made through direct injection either into the tree trunk or into the soil immediately surrounding the tree. The rate of imidacloprid used depends on the application method. Program applicators adhere to the requirements on the chemical label.

For soil injection, imidacloprid is injected at a minimum of 4 injection sites spaced evenly around the base of the tree. It is applied under the soil around the base of the tree, normally no more than 12 inches from the base. No material may puddle or run offsite. After soil injection treatments are complete, uptake of the chemical may take up to 3 months before sufficient quantities of imidacloprid are observed in target plant tissues, depending on the size and condition of the tree and weather conditions.

For trunk injections, holes are drilled around the trunk, 2 to 6 inches above the soil-wood line. For trunk injection, a tree can be treated in several minutes and the insecticide is distributed throughout the tree in 1 to 3 weeks, depending on the size and condition of the tree and weather conditions.

For maximum efficacy, application of imidacloprid should be repeated once yearly over a 3-year period to ensure that the concentration of the insecticide within the treated tree is at an adequate level to kill ALB. Imidacloprid treatments do not ensure complete control of ALB within a tree due to variability in treatments, weather conditions, and tree health, all of which can result in nonuniform distribution of imidacloprid within a tree. In addition, the chemical treatment has not been shown to be effective against large larvae already present in the tree at the time of treatment (USDA–APHIS, 2008a).

Under this alternative, APHIS expects up to 150,000 imidacloprid treatments applied and up to 15,000 infested trees removed per year, based on logistical constraints and past experience with ALB eradication programs in other States.

D. Infested Host Removal and Combination of Removal or Imidacloprid Treatment of High Risk Host Trees (Preferred Alternative)

Under this alternative, APHIS and its cooperators would remove infested trees, and would use a combination of removal and imidacloprid treatments of high risk host trees. The eradication program, under this alternative, would consist of:

- maintaining the current ALB quarantine and adding new areas to the quarantine area where additional ALB-infested trees are discovered;
- surveys of host trees;
- removal of infested trees;
- removal or imidacloprid trunk or soil injections of high risk host trees up to ½ mile from infested trees;
- stump grinding, application of the herbicide triclopyr to stumps that cannot be removed, or leaving stumps of trees to encourage regrowth in certain cases, or treatment of stumps with a mixture of the herbicides triclopyr, imazapyr and metsulfuron to prevent resprouting; and,
- chipping of cut trees, all as described in alternatives B and C. This option is similar to the eradication programs currently in place in Massachusetts and New York.

For this alternative, the ALB program will identify areas and host genera for either chemical and/or removal of high-risk host trees. Subject areas will be identified based on levels of infestation, host tree density and distribution, potential environmental impacts, and logistical resources. This alternative provides the most flexibility in selecting an appropriate control method for a location. It is also the most cost-effective method because this alternative does not prescribe that all high-risk host trees must be treated or removed; rather, it allows flexibility in focusing treatments on the high risk host genera most preferred by ALB (i.e., *Acer*, etc.) or certain locations that would be higher risk than others. However, if controls are limited to fewer genera than all 13 high-risk host genera, more information will be required to identify which genera are most preferred by ALB in Clermont County.

As with the other action alternatives, removal or chemical treatments of high risk host trees would be conducted only with permission from the landowner. If the landowner does not allow removal or chemical treatment of select high risk host trees up to ½ mile of an infested tree, the program will continue to survey host trees for presence of ALB. However, if the trees become infested, they will be removed by the program. Under this alternative, APHIS expects up to 150,000 imidacloprid treatments applied and up to 15,000 trees removed per year, based on logistical constraints and past experience with ALB eradication programs in other States.

III. Affected Environment

A quarantine area has been defined surrounding the initial ALB detections which occurred approximately 2 miles southwest from the Village of Bethel in Tate Township, as well as areas in Monroe, Batavia, and Stonelick Townships (figure 1) in Clermont County, Ohio. This EA not only covers the initial infestation and surrounding quarantined area, but all of Clermont County where ALB may be found during delimitation.

Human Population

From 2010 census data, Clermont County has a population of 197,363, composed of 94.9 percent white, 1.2 percent black, 1.5 percent Hispanic, 1 percent Asian, and 0.2 percent Native American or Alaskan American (U.S. Census Bureau, 2012). Median household income in 2009 was reported as $57,877 with 10.4 percent reported as below the poverty level (U.S. Census Bureau, 2012).

Approximately three-quarters of the residents are considered urban in Clermont County. ALB host trees are expected to occur in urban areas because many of the host trees occur naturally throughout the State and surrounding areas, and are ideal for planting as ornamental and shade trees.

Agricultural production comprises greater than one-third of the land use in Clermont County, but can vary by watershed (USDA–NRCS, 2002). Corn, soybeans, and forage constitute a majority of the acreage within the county where agricultural production is present (USDA–NASS, 2007). The remaining acreage within the county is composed primarily of light urban/residential and forested areas. The current quarantine is within the easternmost part of middle East Fork watershed and the western portion of the East Fork Lake tributary watershed unit (EFWC, 2006b; 2009). In the middle East Fork watershed, land use is approximately 48 percent forests, 37 percent agriculture, and approximately 7 percent urban. A majority of the current quarantine lies within the East Fork Lake tributary watershed which is 25 percent forests, 33 percent urban/light residential, and the remainder in agriculture.

1. Wood Products

The distribution of urban and rural residents in Clermont County is reflected in the distribution of industries, with manufacturing and construction dominating in the more urban areas, and zero to less than 1 percent in agriculture, such as forestry. Because more heavily timbered counties occur east of Clermont County and could become infested with ALB, a discussion regarding timber-related impacts in the State is warranted if no action is taken to eradicate ALB. In Ohio, the forest product industry contributes $15 billion dollars to the State while providing employment for 119,000 people (ODNR, 2006). Furniture and cabinet production contribute more than three quarters of a billion dollars each to the economy in Ohio, while in nontimber products, such as maple syrup production, Ohio ranks fourth in the United States contributing $5 million to the State economy (ODNR, 2006). A total of 92 million cubic feet of wood was harvested from Ohio's forests in 2006 and used for products; production has shifted from pulpwood to saw logs (USFS, 2009).

2. Residential Trees

Trees provide valuable resources to residential and urban areas. Studies conducted in Connecticut, Georgia, and Louisiana estimated that the presence of trees on a site can increase property values from 2 to 6 percent (Anderson and Cordell, 1988; Dombrow and Sirmans, 2000; Morales et al., 1976; USDA–APHIS, 2009). A study in Austin, Texas indicated that trees contribute between 13 and 19 percent to the value of a property (Martin et al., 1989). Trees also provide cooling energy savings by shading and evapotranspiration, and heating energy savings by providing a windbreak (Huang et al., 1987; Akbari et al., 1997; McPherson and Simpson, 1995). Other benefits of trees include atmospheric carbon dioxide reduction and air quality improvement (Nowak et al., 2006) and storm water runoff reduction (McPherson et al., 2005; Bartens et al., 2008). Other benefits of urban trees to society that are more difficult to quantify include increased job satisfaction, faster recovery time for hospital patients, and improved child development (Kane and Kirwan, 2009). However, tree value and benefits can be affected by many factors including species composition, age distribution, condition, amount of canopy cover, and location.

3. Hunting

White-tailed deer and other wildlife are hunted in Clermont County and are a food source for residents. In the 2011–2012 season, 3,304 deer were harvested in Clermont County via gun, crossbow, vertical bow, and muzzleloader (ODNR, 2012a). Ohio Department of Natural Resources maintains Ohio's deer herd at a level that is acceptable to most, and biologically sound through harvest management. Wild turkey hunting also occurs in Clermont County, with a total of 32 turkeys harvested during the fall 2011 season, and 420 harvested during the spring 2011 season (ODNR, 2012b, c). East Fork Wildlife Area is a popular area in Clermont County for hunting. Bobwhite quail, cottontail rabbit, white-tailed deer, fox, gray squirrels, and woodchuck are the major game species there. Another wildlife area, partially in Clermont County, is the Bott Wildlife Area that is managed for quail and rabbit, and bobwhite quail, rabbits, gray and fox squirrels, and deer are the most abundant game species there.

Ecological Resources

1. Parks and Preserves

The current quarantine area includes the East Fork State Park, which is less than 5 miles to the north of the initial ALB find. East Fork State Park is one of Ohio's largest State parks offering recreational and natural history opportunities (ODNR, 2011a). It also provides hiking trails, boating, fishing, swimming, and hunting, and contains an abundance of plant and animal life with ALB host plants present in upland and bottomland forested areas. In addition to the park located within the quarantine, Stonelick State Park occurs in Clermont County outside of the quarantined area. Stonelick State Park has recreational opportunities similar to the East Fork State Park and has a variety of plant and animal life; also, ALB host plants are present throughout the park. East Fork State Park is considered an Audubon Important Bird Area. Clermont County is also home to a nature preserve managed by the Division of Natural Areas and Preserves within the Ohio Department of Natural Resources. The Crooked Run Preserve is in the extreme southern end of Clermont County, and is an artificial freshwater estuary.

2. Forests

The oak-hickory forest type is the most common forest type in Ohio, and is dominated by oak and hickory species (ODNR, undated). Associate trees include black walnut, white ash, basswood, and black cherry (ODNR, undated). This type is most frequently found in the east-central, southeastern, and south-central hill country regions of the State (ODNR, undated).

The second most common forest type is beech-maple (ODNR, undated). Species include large numbers of beech, as well as sugar maple, red oak, white ash, white oak, black cherry, basswood, and shagbark hickory (ODNR, undated). This forest type occurs in poorly drained flatlands of southwestern, west-central, north-central, and northeastern Ohio (ODNR, undated).

The third forest type is elm-ash and is interspersed throughout the other two forest types (ODNR, undated). Elm, ash, and maple are the dominant hardwoods in this forest type (ODNR, undated). It is found in the northern and western parts of the Ohio.

A fourth non-specific but common forest type exists that has no dominant tree species. This forest type occurs in early forest development and consists of a mixture of hardwoods such as red elm, white ash, black cherry, red maple, and black locust (ODNR, undated).

ALB host species that are known to occur in Clermont County forests include box elder; black, red, silver, and sugar maples; American sycamore; eastern cottonwood ; Ohio and yellow buckeye; hackberry; white, black, green, and blue ash, and; American and slippery elm (USFS–Forest Inventory, unpublished). The Ohio buckeye is the State tree of

Ohio. Other potential ALB hosts that occur in Ohio include quaking and bigtooth aspen; black, river, and yellow birch; horse chestnut, and; black and purple osier willow (ODNR, 2011b).

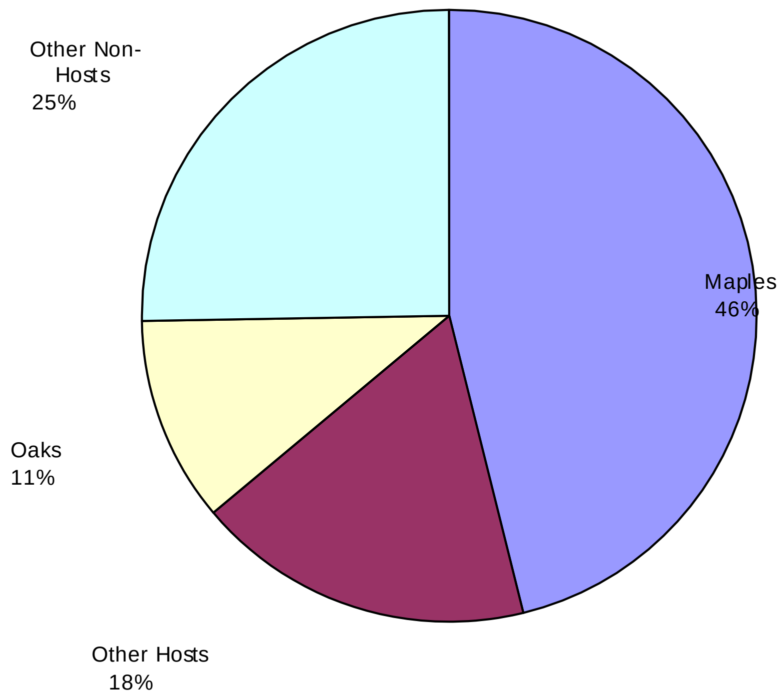
The Ohio Department of Natural Resources Division of Forestry conducted a species composition and size class survey of the forest tracts within a 25-square mile defined area of Tate Township in December, 2011. This area comprises the majority of the currently infested area in Clermont County. Sampling plots were taken in areas identified by the Ohio Department of Agriculture as "forest" within the 25-square mile section of Tate Township. Species and diameter were recorded for all trees greater than 2 inches of diameter at breast height (dbh) growing within tenth-acre sampling plots. Global Positioning System (GPS) locations were taken at the center of each of 730 plots. The forest area of the 25-square mile area was determined to be 5,744 acres. There were portions of small acreages that were outside the forest areas and would likely require control (i.e., fencerows); these areas were not analyzed. The composition study found a high amount of ALB host species both in number of stems and proportion of total forest cover in all forest age classes. The areas of the most mature forest have a slightly lower percentage of host species. Figures 2 and 3 indicate the relative average basal area and the total number of stems by species group for the entire 25-square mile study area. Maples are clearly the most abundant tree species in the current quarantine area, constituting 46 percent of the average basal area per acre, and 47 percent of stems by species group. (See appendix B for the complete study.)

3. Firewood

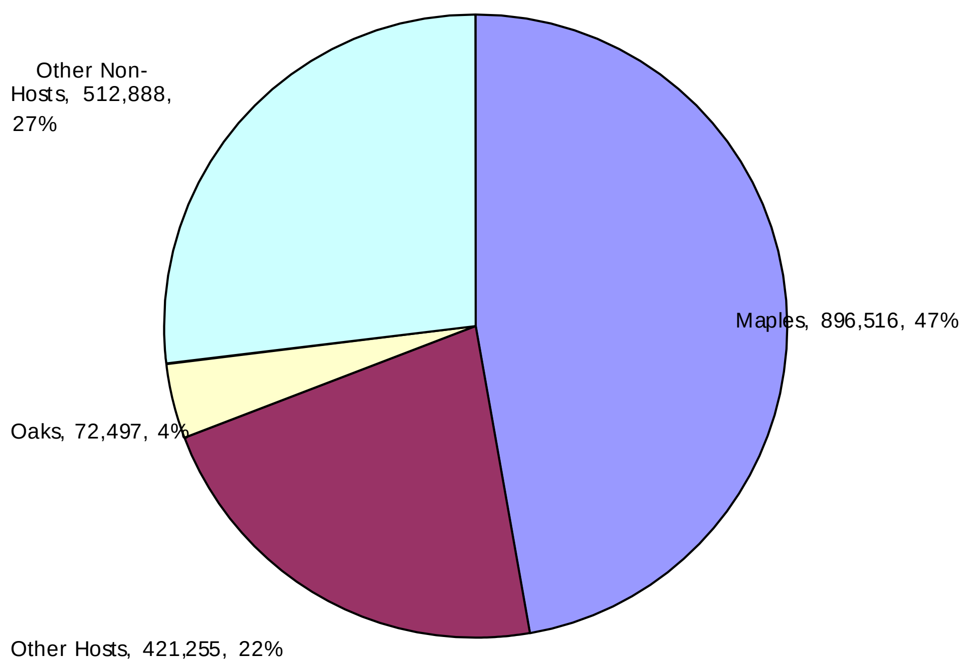
Firewood can vary widely in heat content, burning characteristics, and overall quality. Hardwoods such as oak, hickory, beech, and locust have better heat value than red maple, sassafras, black or cherry, or softwoods, such as pine, because the wood is denser. ALB host species that are considered to be commonly used for firewood in the United States include maple, elm, sycamore, ash, yellow birch, and willow, although these species vary in burning characteristics. Other ALB hosts including box elder, horse chestnut, mimosa, hackberry, buckeye, golden raintree, mountain ash, and poplar are not valued firewood species.

In a 2006 U.S. Forest Service survey, from a list of 12 reasons for owning forest land in Ohio, "part of home or cabin" was ranked first by number of people with forest ownership, and "aesthetic enjoyment" was ranked first by those who owned larger forest acreage. Firewood production ranked low in importance to Ohio's family forest owners; it was ranked as important or very important by only 19 percent of owners who hold 19 percent of the acreage (USFS, 2009). However, 51 percent of owners holding 60 percent of the family forest land reported harvesting trees, and 29 percent of owners had harvested firewood (USFS, 2009). When asked about activity planned for their land in the next 5 years, harvesting firewood was planned by 40 percent of owners (USFS, 2009).

Average Basal Area/Acre - Entire Project Area



Stems by Species Group - Entire Project Area



Figures 2 and 3. Relative average basal area in square feet per acre and the total number of stems by species group for the entire 25-square mile study area.

4. Forest Wildlife

Almost half of Ohio's wildlife species require woodland habitat (ODNR, undated). Federal- and State-listed endangered animals, such as the Indiana bat, bobcat, and timber rattlesnake are dependent on woodland habitat for survival. The sharp-shinned hawk, bald eagle, game birds such as the wild turkey and ruffed grouse, and many songbirds inhabit Ohio's forests. Approximately 100 bird species are dependent on some stage of forested habitat. All of Ohio's 22 species of salamanders require woodland habitat at some time during their life cycle (ODNR, undated). Mammals such as raccoons, red foxes, gray and fox squirrels, white-tailed deer, beavers, black bear, and opossums occur in Ohio forests.

Eleven species of bats occur in Ohio, including the big brown bat, eastern red bat, eastern small-footed bat, evening bat, hoary bat, the endangered Indiana bat, little brown bat, northern bat, Rafinesque's big-eared bat, silver-haired bat, and tricolored bat. In capture and release studies conducted in June and August 2012 within the program area, six bat species were captured: eastern red bat, big brown bat, northern bat, tricolored bat, evening bat, and little brown bat (Cardno, JFNew, unpublished report).

Ohio occurs in the Mississippi Flyway, a migratory bird route that follows the Mackenzie River in Canada to the Mississippi River in the United States, from Canada's boreal forests to the Gulf of Mexico. It is composed of the States of Alabama, Arkansas, Indiana, Illinois, Iowa, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Ohio, Tennessee, and Wisconsin, and the Canadian Province of Manitoba. This migratory route is used in large numbers by ducks, geese, and shorebirds. Nearly one half of North America's bird species and about 40 percent of its waterfowl spend at least part of their lives in the Mississippi Flyway (National Audubon Society, 2012).

The maturity of a woodland habitat influences the wildlife species using it. Early, sapling/pole timber size stages of woodland development are used by wildlife such as the indigo bunting, rufous sided towhee, and yellow-breasted chat that prefer an open stand (ODNR, undated). As the forest matures to a sawtimber stand, a different mixture of wildlife will replace the previous community.

Nearly 30 percent of all wildlife species using woodland habitat in Ohio use tree cavities as dwellings (ODNR, undated). These include bird species that make their own cavities such as the red-bellied woodpecker, pileated woodpecker, and common flicker (ODNR, undated). Other species depend upon pre-existing and/or natural formation for cavities, and include the black-capped chickadee, tufted titmouse, raccoon, and gray squirrel (ODNR, undated).

Species that feed on acorns and other hard mast, such as hickory nuts and beech nuts, include wild turkey, red-headed woodpecker, blue jay, squirrel and chipmunk, gray fox, striped skunk, and white-tailed deer (USFS, 2009).

Environmental Quality

1. Water

Clermont County is contained primarily within the Little Miami watershed and partially in the Ohio Brush-Whiteoak watershed (EPA, 2011a). The Little Miami River is designated as a national scenic river, and drains parts of Clermont County. The primary drinking water reservoir for Clermont County, Lake Harsha or East Fork Lake, lies within the East Fork Little Miami River watershed. The Little Miami River is one of the larger rivers with sections that are listed as impaired under Section 303(d) of the Clean Water Act. Other streams within the Little Miami and Ohio Brush-Whiteoak watershed are also listed as impaired. The reason these water bodies are impaired varies but is usually one or a combination of excessive nutrients (i.e., nitrogen and phosphorus), fecal coliform bacteria, habitat alteration, and sedimentation. Examples of nonpoint sources of impairment for lake tributaries, as well as other streams in the county, include agricultural production, home sewage treatment systems, and livestock (EFWC, 2007). Point sources for these types of pollutants are related primarily to wastewater treatment plants associated with East Fork Lake tributaries (EFWC, 2006b). The East Fork Watershed Collaborative (EFWC) was formed to address these water quality issues by working with stakeholders in developing recommendations for improving water quality within the East Fork Little Miami watershed, including the primary drinking water reservoir and associated tributaries. These recommendations are included in watershed action plans developed by the EFWC. These include the lower and middle East Fork and the East Fork tributary and reservoir watersheds (EFWC, 2003; 2006a,b; 2009). The current ALB quarantine area primarily encompasses the East Fork Lake tributary watershed, or planning unit.

The predominant aquifer type in the program area is interbedded shale/carbonate which is part of a larger carbonate aquifer type in the western part of the State. Depth to water varies within the county based on available well data that shows depths of 5 to 15 feet near rivers and values ranging from 15 to 50 feet in upland areas (ODNR, 1994). Background water hardness in this aquifer type generally requires treatment to remove calcium and magnesium, and average levels of total dissolved solids, sulfates, and iron are typically above secondary maximum contaminant levels (SMCL) (Ohio EPA, 2008). The most common group of pollutants detected in this aquifer belongs to a group of chemicals known as volatile organic compounds (VOC). The detection of VOCs is correlated with population centers where sources for these types of chemicals (i.e., factories, machine shops, landfills) are more prevalent.

2. Air

Air quality in Clermont County is variable based on proximity to urban areas. The air quality index (AQI) is a measurement of the level of pollutants in the atmosphere. An AQI above 100 indicates that air quality conditions exceed health standards, while values below 100 indicate pollutant levels are below air quality standards. An AQI that exceeds 100 suggests that air quality may be unhealthy for certain sensitive groups of people, with more groups being impacted as the AQI number increases. Based on data from 2008, portions of Clermont County had AQI values above 100 more than 10 days out of the year (EPA, 2011b). The non-attainment of air quality standards in these areas is most likely associated with the City of Cincinnati and the surrounding area, and is related to exceedance of small particulate matter air standards.

3. Soil

Clermont County has seven primary soil associations representing a range of soil series that have varying characteristics regarding soil chemical/physical characteristics, as well as drainage and relief (USDA–NRCS, 2002) (appendix C). The Rossmoyne-Cincinnati and Avonburg-Clermont soil associations make up approximately two-thirds of the county, the Edenton-Eden and Hickory-Cincinnati-Edenton comprising another 23 percent, and the remaining approximate 10 percent the other three soil associations. The Rossmoyne-Cincinnati soils are generally sloping and moderately well-drained, but susceptible to severe erosion in sloping areas due to the silty nature of the soils. These soils occur on ridgetops and hillsides, as well as areas adjacent to drainageways (USDA–NRCS, 2002). The Avonburg-Clermont soils occur on level to slightly sloping areas, and are typically poorly drained. These soils are less prone to erosion due to their low slope; however, sheet and gully erosion can occur when disturbed due to the high silt content. The Edenton-Eden and Hickory-Cincinnati-Edenton are soils that are considered moderately deep and well-drained, occurring in steep to very steep areas, and are susceptible to erosion especially when no vegetative ground cover is present (USDA–NRCS, 2002; EFWC, 2006b).

IV. Environmental Impacts

A. No Action

Environmental impacts from the no action alternative are related to the damage caused by the establishment and spread of ALB and impacts from the quarantine. Implementation of quarantine reduces the artificial spread of ALB by prohibiting the movement of host material that could be infested with ALB. However, this alternative does not reduce the natural dispersal of the insect. Under this alternative, the beetle would be expected to expand its range into uninfested areas of the United States wherever hosts are available. Nevertheless, implementation of the quarantine is effective in slowing the spread of ALB and preventing it from becoming established in new locations by artificial movement; this limits the area where eradication methods would need to be applied. Limiting the spread of ALB to new areas is an important tool in the eradication of ALB; however, alone this not adequate to eradicate ALB from the United States.

The wide distribution of ALB host trees suggests the danger that ALB could spread across much of the country with increases in damage and loss commensurate with its spread (figure 4). ALB establishment in the United States could result in the loss of as much as 60 percent of the tree population in some areas; preferred host trees would not be expected to significantly recover and regenerate (USDA–APHIS, 2009).

Human Population

The potential establishment of ALB in the United States would cause damage to and loss of valuable ornamental and commercial trees, as well as naturalized and forested areas. Economic impacts from the localized and widespread establishment of ALB will result in management costs, as well as loss of market and nonmarket values related to ALB host trees. Management costs related to pest risk evaluation, survey, eradication activities, and implementation of domestic/international quarantines would increase as ALB would expand to other areas of Ohio, as well as other parts of North America. The increase in costs to eradicate invasive forest pests as the geographic area increases has been observed with other introduced forest pests (Brockerhoff et al., 2010). To date, the program has spent greater than $450 million dollars to eradicate ALB.

1. Wood Products

The establishment and spread of ALB within Ohio poses a threat to the forest products industry because many of the host species for ALB support forest product activities, such as timber production, furniture manufacturing, and maple syrup production. Furniture and cabinet production contribute more than three quarters of a billion dollars each to the economy in Ohio. In nontimber products, such as maple syrup, Ohio ranks fourth in the United States contributing $5 million to the State economy (ODNR, 2006). According to the Ohio Department of Agriculture, ALB could decimate maple trees in Ohio, impacting up to $200 billion worth of standing timber, adversely affecting maple sugar processors, damaging the State's multi-billion dollar nursery industry, and diminishing Ohio's fall foliage season (Espinoza, 2011). Recreational opportunities to State parks within Clermont County (e.g., East Fork and Stonelick State Parks) would be expected due to the presence of many ALB host trees which would begin to dieback and eventually die as ALB becomes established.

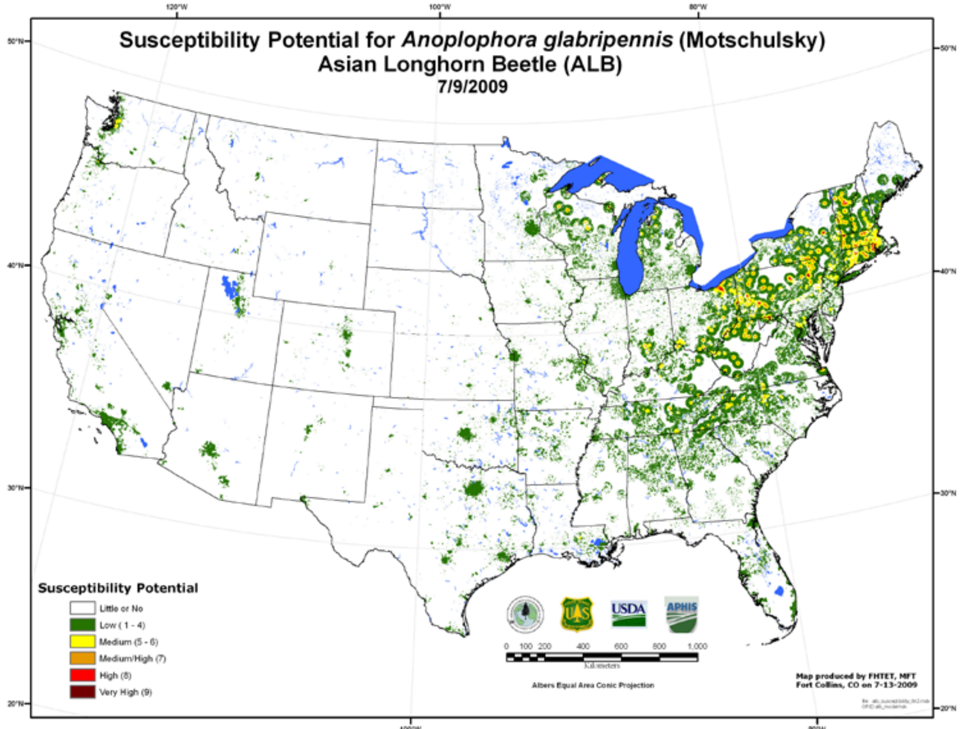


Figure 4. Susceptibility potential for the Asian longhorned beetle in the United States (USDA–Forest Service–Forest Health Technology Enterprise Team, 2009).

Economic impacts outside of Ohio where preferred host trees occur would also be expected in the United States and Canada. In the Northeastern United States, the percentage of saw timber hardwood volume at risk from ALB damage ranges from 27 percent in Rhode Island to 80 percent in Vermont, based on information for nine States (USDA–APHIS, 2009). In addition to the saw timber market, many of the ALB host species in the Northeastern United States have value in other markets, such as veneer logs, pulpwood, fuel wood, maple syrup, and nursery production—all of which would also be at risk from ALB damage. Economic impacts beyond those in the United States would also be expected where ALB host species occur. Colautti et al. (2006) estimated significant economic impacts in Canada as a result of ALB infestations impacting timber harvest, exports, and other forest-related products.

Although implementation of a quarantine is important to reduce artificial movement of ALB, it restricts the movement of firewood, green lumber, and other living, dead, cut, or fallen material including nursery stock, logs, stumps, roots, and branches from potential ALB host trees. This can result in economic losses to industries that rely on transporting host trees and their products outside of the quarantine zone.

2. Residential Trees

Aukema et al. (2011) estimated significant annualized damage on a national scale related to invasive wood boring pests in the United States. Federal and local government expenditures were estimated to be $1.7 and

$0.92 billion, respectively, with residential property losses of $830 million. Borer estimates were based primarily on damage from emerald ash borer (*Agrilus planipennis*), which has a much narrower host range compared to ALB. ALB feeds on a wider range of host trees; therefore, costs could be much greater. Nowak et al. (2001) presented a worst-case scenario of the effects of ALB establishment in several U.S. urban landscapes, with potential value losses exceeding $600 billion and 30.3 percent tree mortality.

Impacts from loss of residential trees may include loss of property value, and increased heating and cooling costs. In addition, trees can have a protective effect on human health by reducing pollutant exposure and diminishing illnesses related to this exposure. Presence of trees and natural environments have positive psychological effects on humans by reducing stress, reducing the length of hospital stays, and reducing the need for pain-relieving drugs (HCNDACRSPNE, 2004; Kuo and Sullivan, 2001; Ulrich, 1984, as cited in USDA–APHIS, 2009).

3. Hunting

The East Fork Wildlife Area and Bott Wildlife Area are popular hunting areas in Clermont County. Loss of ALB host trees may change the appearance of these areas and affect habitat quality for game species. However, tree species that produce mast (e.g., acorns, hickory nuts, and beech nuts) would still be present to provide important food for wildlife.

Ecological Resources

1. Parks and Preserves

East Fork State Park and Stonelick State Park have the greatest potential for adverse impacts from ALB. Damage to forest habitat from ALB infestation could affect the quality of forest resources, and lead to decreased participation in outdoor recreational activities and hunting. Impacts to forested habitats from the expansion of ALB could result in decreased outdoor use activities (e.g., wildlife viewing) as forested areas are reduced (USDA–APHIS, 2009).

2. Forests

ALB infestations result in dieback and eventual death of host trees over a period of time. This type of response in forests where host trees are dominant is similar to other forest pests and disease, and has resulted in significant impacts to ecosystem function where those invasive species became established and spread to large areas (Lovett et al., 2006; Gandhi and Herms, 2010). For example, the creation of canopy gaps through the loss of host trees can alter soil moisture, forest floor lighting, and temperature (Stadler et al, 2006; Orwig, et al., 2008). These types of changes can alter forest stand composition and age structure, as well as understory plant diversity, and may facilitate growth and dominance of invasive plants (Gandhi and Herms, 2010).

3. Firewood

Spread of ALB through Clermont County would reduce ALB host species that are considered to be commonly used for firewood in the United States, including maple, elm, sycamore, ash, yellow birch, and willow. However, other important firewood species would remain available to residents, including oak, hickory, beech, and locust. In Ohio, 40 percent of forest landowners plan to harvest firewood from their property (USFS, 2009); therefore, widespread loss of ALB hosts could reduce the availability of firewood for personal use or sale, depending on the quantity of ALB hosts in a given forest. As with the other three alternatives considered in this EA, restrictions imposed on the movement of firewood could impact those who live within the quarantined area and depend on the sale of firewood outside of the quarantined area.

4. Forest Wildlife

Reductions in forest stands and ALB host trees would also impact terrestrial fauna (e.g., birds and mammals) that use these areas. Impacts would vary dependent upon the habitat requirements for different species and the extent of the ALB infestation. For example, some neotropical bird species that require contiguous interior forests may be negatively impacted by forest fragmentation as a result of extensive ALB infestations. However, other bird species that occupy edge habitat may increase in population (USDA–APHIS, 2009).

Loss of ALB host trees in riparian areas can adversely impact vertebrate and invertebrate species that exist in that particular habitat (Smock and MacGregor, 1988; Lee et al., 2001).

Certain species may benefit from ALB-infested trees, such as secondary wood-boring pests and associated vertebrates that depend on dead trees for habitat and prey. A reduction in canopy cover or complete loss of ALB host trees would favor understory vegetation. This would benefit species that depend on fragmented stands, and would create more open riparian areas for foraging and nesting (Bell and Whitmore, 2000). However, potential benefits to certain species from the loss of ALB host trees are minor compared to the widespread terrestrial and aquatic benefits related to the conservation of forested habitats.

The magnitude of impacts on wildlife would vary, depending on the density and abundance of host trees and the plants and animals that rely on them for habitat (USDA–APHIS, 2009).

Environmental Quality

1. Water

Many of the ALB host species occupy riparian areas; extensive loss of these species, as a result of ALB expansion, would also impact water quality. Loss of tree cover and density in riparian areas from ALB infestations can have negative impacts on streambank stabilization, water temperature, sediment loading, hydrology, nutrient cycling, and contaminant removal in aquatic habitats (Jones et al., 2006; Lee et al., 2004; Wenger, 1999). In cases where ALB-susceptible trees decline or are lost, they are often replaced by other plant species which may contribute different or lower nutritive qualities, alter decomposition rates, and reduce in-stream woody vegetation.

2. Air

Trees have beneficial effects on air quality by removing pollutants from the air and, thus, reducing human exposure to these substances and associated risk (USDA–APHIS, 2009). Loss of large numbers of trees to ALB will adversely affect air quality in Clermont County.

3. Soil

In cases where a species may be a keystone species (i.e., one that defines forest structure and controls ecosystem dynamics), the impacts from invasive forest pests will be more significant (Ellison et al., 2005). For example, maple trees are considered a critical component in soil nitrification in the Northeastern United States, and their loss could impact nitrogen retention and cycling in forested watersheds (Lovett and Rueth, 1999; Lovett and Mitchell, 2004). A decrease in maple stands, as a result of ALB infestations, would lead to higher nitrogen retention in soils and reductions in nitrogen transport into aquatic systems. The alteration of nitrogen cycling due to the loss of sugar maple would alter plant succession and diversity in terrestrial environments, as well as impact aquatic ecosystems which are dependent on higher nitrogen inputs. Impacts to nitrogen cycling in forested ecosystems, as well as other biogeochemical processes, have also been reported with other defoliating invasive forest insects (Clark et al., 2010; Gandhi and Herms, 2010; Kizlinski et al., 2002; Lovett et al., 2002).

As ALB continues to spread, other Federal agencies or non-Federal entities may try to control or eradicate ALB through the use of chemical treatments. There are elevated environmental risks from the uncoordinated application of insecticides to limit the damage from ALB.

B. Full Host Removal

Under this alternative, areas found to have ALB would be quarantined; the impacts from this action are the same as those examined under the no action alternative. The environmental impacts of full host removal and application of herbicides to stumps and resprouts of trees that have been removed are discussed below. The benefit of this alternative is that tree removal can be done year round, weather permitting, and circumvents the need for multiple surveys, removal of additional infested trees, and multiple chemical treatments to individual trees over time. If implemented in all areas where ALB infestations occur, this would be the most aggressive method to eradicate ALB. However, one of the limitations of this alternative is that the program has not removed more than 15,000 trees per year historically, limiting the ability to treat other uninfested ALB host trees that may be within the radius of known infested trees.

The analysis for this alternative considers the next 5 years for full host removal in Clermont County. This does not imply that eradication is expected to be completed within a 5-year timeframe, rather that the greatest number of tree removals in Clermont County would likely occur within the next 5 years. After that, it is expected that tree removals would be reduced as fewer infested trees are found. For the analysis under this alternative, 15,000 is estimated as the number of trees that could be removed per year. This is a conservative estimate. In Massachusetts, where the largest ALB eradication program is taking place, only 32,000 trees have been removed in total over the past 5 years. The Ohio infestation is not expected to be as large.

The total number of trees that could be removed under this alternative is small relative to the total number of trees in the current quarantine, as well as Clermont County. Information from a Forest Species Composition Report analyzed total number of stems, as well as species composition within a 25-square mile area within the Tate Township (appendix B). Assuming that the maximum number of trees that could be removed over the next 5 years was removed from the 25-square mile study area, the number of trees lost would be approximately 3.9 percent of the total number of trees, and 5.7 percent of ALB host tree species. These percentages would be much less when extrapolated to the current quarantine area, which is 61 square miles, and the county level, which covers slightly more than 452 square miles. Assuming the number of trees in the composition report is representative of Clermont County, the total number of trees that could be removed over the next 5 years represents less than 0.3 percent of the total number of trees in the county. However, under this alternative, tree removal would be more concentrated compared to alternatives C and D even if a maximum of 15,000 trees is removed per year for the three alternatives. This is because infested hosts and all high risk hosts surrounding infested trees would be removed, thereby resulting in higher levels of tree removals in a given area.

Human Population

1. Wood Products

Potential impacts to the forest industry from the implementation of alternative B would be greater than those under the no action alternative initially because high risk host trees would be removed in an area up to ½ mile from ALB infested trees. This could include trees that would have use as saw logs or other wood products. The percentage of trees that would be removed over the next 5 years is low in the current quarantine area and county when extrapolating the information from the Species Composition Report. Because the number of trees that could be removed is limited to 15,000 per year, the potential for ALB dispersal would be greater compared to alternatives C and D and, over time, would result in greater economic impacts to the forest industry in Ohio and beyond if ALB were to expand its range.

2. Residential Trees

Economic impacts from the loss of trees in the ALB-infested area are expected; however, the impacts will be variable based on where the removed trees are located within residential areas. These impacts may include loss of property value and increased heating and cooling costs. Studies conducted in Connecticut, Georgia, and Louisiana estimated that the presence of trees on a site can increase property values from 2 to 6 percent (Anderson and Cordell, 1988; Dombrow and Sirmans, 2000; Morales et al., 1976; USDA–APHIS, 2009).

In addition, trees can have a protective effect on human health by reducing pollutant exposure and diminishing illnesses related to this exposure. The presence of trees and natural environments have positive psychological effects on humans by reducing stress, reducing the length of hospital stays, and reducing the need for pain-relieving drugs (HCNDACRSPNE, 2004; Kuo and Sullivan, 2001; Ulrich, 1984, as cited in USDA–APHIS, 2009). Besides the no action alternative, full host removal would be expected to have the greatest impact on residential trees when compared to alternatives C and D because all infested trees and all high risk host trees would be removed. The economic impacts to residential areas would be less than the no action alternative but more than alternatives C and D, as high risk host trees could be treated under alternative C and D if the program determines that those trees would be candidates for chemical treatment. In cases where the landowner refused removal of high risk host trees, surveys would be conducted and, if additional trees become infested would be then be removed.

To offset some of the impacts of residential tree removal, an ALB Replanting Pilot Program has been undertaken by Ohio Department of Natural Resources, Division of Forestry. Property owners can request a 1 for 1 replacement for each eligible yard tree up to 10 trees. Replacement trees are species that are not ALB hosts, such as swamp white oak, tuliptree (yellow poplar), northern pin oak, and gingko. Trees removed from areas where regeneration occurs naturally, such as woodlots, thickets, stream banks, fencerows, and non-maintained areas, are not covered under this effort. Removals from areas that normally will not support tree regeneration, such as frequently maintained residential lawns, municipal streets and parks, and commercial landscapes, are the focus of this program. The first 300 trees were distributed by the program on October 20, 2012.

3. Hunting

Full host removal could temporarily reduce hunting opportunities in localized areas, depending on the number of trees removed and disturbance caused by those activities. However, oak, beech, and hickory trees will not be removed because they are not ALB hosts. Therefore, acorns, beech nuts, and hickory nuts (hard mast) that serve as an important food source for white-tailed deer, squirrels, and other wildlife will remain available. The amount of mast in the environment is important to the survival and reproduction of many wildlife species, and can predict the harvest of white-tailed deer, black bear, squirrel, and wild turkeys in an area.

Ecological Resources

1. Parks and Preserves

State parks and preserves within the infested area could be adversely affected as infested and high risk ALB host trees are removed, depending on the number of host trees present within their forested areas. The effects of tree removal can result in losses related to aesthetic values for residents and tourists, and use values from recreational activities such as hiking, bird watching, and fishing. Damage to forest habitat from tree removal could affect the quality of forest resources in parks and preserves, and lead to decreased participation in outdoor recreational activities, depending on the extent of tree removal. As previously discussed, the total number of trees that could be removed is small relative to the total number of ALB host trees or the total number of trees including both ALB host and non-host trees. Removal of trees within parks and preserves requires special consideration due to the importance of these areas as recreational opportunities and their ecological significance. Any removal of infested or high risk host trees from local or State parks would be coordinated with the appropriate agencies. Currently, East Fork State Park lies within the quarantine, while Stonelick State Park is within Clermont County. The program would coordinate with both parks prior to any tree removal activities.

2. Forests

Impacts to the elm-ash forest type would be expected as this contains many ALB host species and is present in southwestern Ohio. The Forest Species Composition Report (appendix B) indicates that 69 percent of trees in the infested area in Clermont County are considered ALB host trees. However, this does not represent the actual percentage of trees that would be removed by the ALB program because only a maximum of 75,000 trees could be removed over the next 5 years. The maximum number of trees that could be removed represents approximately 5.7 percent of the total number of host trees within the 25-square mile study area. This number decreases when the information from the Forest Species Composition Report (appendix B) is extrapolated to the size of the current quarantine area and the entire county. Less than 2.5 percent of the total number of host trees would be removed in the current quarantine area, and less than 0.4 percent in Clermont County.

Species composition within forest stands could be impacted in localized areas where all infested and high risk host trees are removed. However, based on the limited number of trees that could be removed because of logistical limitations, the impacts are not anticipated to be significant over larger contiguous forest stands. Infested trees will be removed; however, high risk ALB host trees would only be removed with owner permission. Clearcutting of natural areas is not expected to occur, and nonhost trees, such as hickory and oak, will remain standing. In unmanaged areas such as woodlots, uninfested stumps may not be treated with herbicide. This would allow resprouting, encouraging more rapid regrowth of these areas.

The use of heavy equipment for tree removal can impact the quality of the remaining forest. Heavy equipment can cause soil disturbance, soil compaction, and root damage of neighboring nonhost trees, eventually causing the death of those trees. In addition, the removal of all host trees in a location can leave remaining trees without support, causing them to be susceptible to damage in high winds. This impact is dependent on the number of ALB hosts removed in an area.

3. Firewood

The most valuable hardwood species used for firewood (including oak, hickory, beech, and locust) are not ALB host species and would not be removed. Maple species vary in their firewood value, but are commonly used for that purpose and are a preferred ALB host. Maples comprise 47 percent of host trees in the currently infested area (Forest Tree Composition Report (appendix B)). Under this alternative, some landowners could experience reductions in the amount of firewood available to them for personal use or sale, depending on the number of infested trees and high risk hosts that are present on the property. However, the ALB program would not remove high risk host trees without first receiving permission, thus reducing impacts to a landowner dependent on maples or other ALB host species for firewood for home heating or income. Nevertheless, as with all of the alternatives, restrictions imposed on the movement of firewood could impact those who live within the quarantined area and depend on the sale of firewood outside of the quarantined area.

4. Forest Wildlife

The cutting and removal of trees infested with ALB may have adverse effects on local wildlife that depend on those trees for food, cover, and related needs. These include birds, squirrels, and other animals that nest in trees, insects that live on or in trees, and animals that use trees for cover or shelter. Most stands of trees within Ohio are mixed with several different species; there are few areas where any one tree species represents more than one half of the stock of live trees (USFS, 2009). Common tree species (e.g., oak, hickory, beech, basswood, black walnut, black cherry, and black locust) would remain standing because they are not ALB hosts. However, because both infested and high risk host trees would be cut down, a large number of host trees may be removed in certain areas where a single or few ALB host species dominate an area, such as in the elm-ash forest type that consists mainly of American and red elm, white and green ash, and red and silver maples. Canopy-forming and understory trees are expected to respond strongly to increases in sunlight and soil moisture resulting from tree removals. Unimpeded succession processes of partially cleared areas will restore the forested character of woodlots.
Temporary impacts to animals include disturbance by noise from tree removal activities. Some animals may be displaced when their home is cut down; however, nonhost trees would not be removed, allowing

animals to relocate to habitat in the surrounding trees. Cutting trees will likely occur year round, but cutting in the fall and winter months would lessen impacts to nesting birds and other mammals during their breeding months when they are most vulnerable.

For birds, species restricted to the interiors of mature woodlands may be impacted from fragmented forests, or may suffer high rates of nest predation or parasitism by the brown-headed cowbird. However, other bird species dependent on early successional habitats may benefit from cutting as those species have declined as Ohio's forests have matured into sawtimber-size classes (ODNR, undated).

Species that dwell in tree cavities and hollows could be impacted if these trees are cut down. Ohio tree species that are prone to form cavities for woodpeckers include elm, ash, box elder, and basswood (ODNR, undated); three of these are ALB host trees. Live trees with hollows that furnish den sites for species (e.g., wood duck and fox squirrel) are sycamores and beeches (ODNR, undated).

For species that depend on hard mast, oak, beech, and hickory trees will not be removed because they are not ALB hosts. Therefore, acorns, beech nuts, and hickory nuts (hard mast) that serve as an important food source for white-tailed deer, squirrels, and other wildlife will remain available.

Timbering can adversely affect salamander populations, particularly under clearcutting conditions where there is increased surface temperature and litter drying (Sattler and Reichenbach, 1998; Harpole and Haas, 1999). (It should be noted that clearcutting will not be used under this alternative or any other discussed in this document). However, other silvicultural methods, such as shelterwood cutting, resulted in reduced impacts on salamanders (Sattler and Reichenbach, 1998; Harpole and Haas, 1999). Grialou et al. (2000) found that light forest thinning may cause a short-term decline in abundance of salamander species, but that populations may increase as understory growth increases after thinning. Program impacts on salamander populations in any area will be dependent on the level of canopy removal. However, because only host trees are removed, other nonhost tree species are likely to remain as part of the canopy, reducing adverse impacts to salamanders in the area.

Some bat species may benefit from thinning and tree removal. Bat activity is increased in disturbed forests compared to undisturbed forests (Silvis, 2011; Dodd et al., 2012). Uncluttered areas may allow for energy-efficient foraging for insect prey (Titchenell et al., 2011).

Impacts would be greater for some invertebrates and other animals that have limited foraging ranges or depend solely on host trees. However, the low number of host trees that would be removed relative to the total number in the quarantine and county would not be expected to have population level impacts as other host trees in the surrounding area would be present.

To encourage regrowth of forested areas, stumps of high risk host trees may not be ground down or treated with herbicide in woodlots. Cut stumps will resprout to more rapidly replace trees that have been cut down. This would assist in creating early successional (immature) stands that result in the greatest diversity of wildlife (ODNR, undated).

Environmental Quality

A. Tree Removal

1. Water and Soil

The extent of impacts to soil and water quality would vary based on the number of host trees that could be removed relative to the total number of trees within a given area, as well as the proximity and surface gradient of these areas to receiving streams and other aquatic resources. As previously discussed, the number of ALB host trees that could be removed relative to the total number of host trees within the quarantine or county is small, 2.5 or 0.4 percent respectively. These values decrease further when the number of ALB host trees that could be removed is compared to the total number of trees that exist within the quarantine and county. While the number of trees that could be removed is small relative to the total number of trees available, there could be concentrated areas of tree removal. Changes in soil temperature and moisture, as well as soil erosion and loss of nutrients in areas where clearcutting has occurred, can impact the ability of a forest to regenerate (Ballard, 2000). However, no clearcutting will occur in an area because other nonhost trees would be present. The small number of trees that would be removed would reduce the potential for watershed level impacts to soil and water quality.

Soil erosion in proximity to aquatic resources can result in impacts to water quality. In particular, the movement of soil into receiving bodies of water can result in sedimentation, eutrophication (a process where bodies of water receive excess nutrients that stimulate excessive plant growth which decomposes and reduces the oxygen available to aquatic organisms), increased turbidity or cloudiness, and alteration of stream flow. In addition, tree removal adjacent to bodies of water can also impact shading, which is important in maintaining water temperature. Degradation of water quality due to sedimentation can result in trophic level impacts to aquatic organisms through direct or indirect impacts to fish, aquatic insects, and crustaceans, such as freshwater mussels and crayfish (Richter et al., 1997; Henley et al., 2000). The risk to soil quality and aquatic resources from tree removal can be reduced by the implementation of timber harvest practices, such as selective removal of trees and Best Management Practices (BMPs) (Aust and Blinn, 2004).

The Ohio Division of Forestry, within the Ohio Department of Natural

Resources, has established BMPs that are being implemented by the ALB program, and are designed to protect soil and water quality (ODNR, 2012d). These BMPs include recommendations to minimize erosion and runoff from haul roads and log landings where runoff and resulting stream sedimentation can be substantial, if not managed properly. The BMPs also provide protection measures regarding the protection of riparian areas that not only provide erosion control, but also shading and other benefits to water quality.

Stream management zones (SMZs) are protected areas that have been established adjacent to bodies of water with the zone width increasing with increasing slope (ODNR, 2012d). The buffer widths proposed have been shown to provide protection to receiving waters from sedimentation and nutrients that are water quality concerns within select watersheds in Clermont County (Wenger, 1999). The SMZs are areas where no, or very limited, cutting would be allowed. Infested ALB host trees that could occur within an SMZ would still need to be selectively removed, but without the use of heavy equipment. This could also occur with some high risk host trees; however, in those cases, the removals would only be conducted with landowner approval, consultation with the Ohio Department of Natural Resources, and/or the county soil and water district to minimize impacts in these areas.

In cases where high risk host trees could not be removed due to concerns regarding erosion, water quality, or lack of landowner consent, additional survey work would be required to monitor ALB infestations. Highly erodible soils and areas along water bodies, such as some of the hydric soils that exist in the county, may require additional measures beyond replanting; this will be determined on a case-by-case basis working with the Ohio Department of Natural Resources and the county soil and water district.

Selective tree removal of high risk host trees within infested areas that would occur within larger stands of trees that would not be removed would minimize the impacts to soil quality with potential impacts localized to the areas of removal. In addition to the BMPs, any impacts from tree removal would be reduced further by replanting disturbed areas with grass after tree removal activities have been completed. Tree replanting is also occurring with non-ALB host trees in certain cases, based on availability of State funding, which will also minimize the impacts to soil and water quality from tree removal activities.

2. Air

Once trees have been removed, they will be chipped to eliminate the potential for ALB spread. Removed trees will be moved to areas dedicated to chipping to minimize noise pollution from chipping. APHIS has been working in cooperation with the Southwest Ohio Air Quality Agency to evaluate the potential for dust from program operations at the marshalling yard where logs are transported and chipped. Inspections at the yard demonstrate minimal dust during program operations. Impacts to human health (e.g., respiratory effects) for those residents in proximity to the marshalling yard are not anticipated based on evaluations by the Southwest Ohio Air Quality Agency. These conclusions are consistent with what has been observed in past experiences with ALB eradication efforts in Illinois, New York, New Jersey, and Massachusetts where no human health impacts have been reported from chipping similar amounts of material.

In addition to potential air quality concerns from the chipping of trees, there is the potential for air quality impacts from the removal of trees. Trees provide beneficial impacts to air quality by removing pollutants (USDA–APHIS, 2009). Nowak et al. (2006) demonstrated that in large urban areas, trees are able to reduce air pollutant levels of ozone, particulate matter, nitrogen dioxide, sulfur dioxide, and carbon monoxide. The percent improvement varies based on several factors; however, the average air quality improvement observed was typically less than 1 percent. Available air quality data shows that in areas in proximity to Cincinnati, nonattainment of air quality standards for small particulate matter has occurred in the past.

The proposed total number of trees that will be removed over the next 5 years under this alternative is small relative to the number of trees within the quarantine and the county. In addition, grass is being planted in yards and landscaped areas as part of the restoration effort and can remove pollutants. The ALB Replanting Pilot Program is providing non-ALB host trees that will also offset potential impacts to air quality. The low number of trees that would be removed relative to the total number available, the small incremental improvement in air quality from trees in large urban areas, and the replanting of areas with grass and non-ALB host trees would not result in significant negative impacts to air quality parameters (e.g., particulate matter and other pollutants) within the current quarantine or Clermont County.

B. Herbicide Use

In addition to tree removal, there is the possibility some herbicide use will occur in cases where tree stumps cannot be physically removed. The herbicide triclopyr is the preferred herbicide for the program and is commonly used for control of woody and broadleaf plants under a variety of use patterns, ranging from poison ivy control by homeowners to maintenance of rights-of-way. For this program, it would be applied only to the stumps of cut trees in specific areas, thus limiting its exposure to humans and other plant and animal wildlife. Toxicity is considered low with the exception of terrestrial plants. Risk of exposure to humans would be greatest during the time of application; however, this would apply to workers that are making applications. Low ingestion and dermal toxicity to mammals, and the lack of significant exposure would result in minimal risk to the public, including children. Drift and runoff would be limited because of the application method (direct hand application to infested trees and some high risk host trees). The method of application and adherence to label requirements will minimize the exposure and risk to human health, as well as aquatic and terrestrial nontarget organisms near areas of treatment (see appendix E).

In addition to herbicide treatment of stumps with triclopyr, APHIS would also make foliar applications of triclopyr mixed with two other herbicides (imazapyr and metsulfuron) to treat sprouting foliage from stumps that that were removed as part of the eradication efforts. This use would occur if physical removal of stumps was not viable, and would be used to prevent resprouting of stumps which ALB could reinfest due to their presence in host trees that have not been identified as infested and removed. Risk to human health and the environment is expected to be low from these treatments because of the method of application that involves spot applications to sprouting host material using a hand sprayer, the low mammalian toxicity, and lack of toxicity to most other nontarget organisms (appendix E).

C. Removal of Infested Trees and Imidacloprid Treatment of High Risk Host Trees

Under this alternative, areas found to have ALB would be quarantined; the impacts are the same as those examined under the no action alternative. The impacts from stump and resprout treatments using the herbicides triclopyr, imazapyr, and metsulfuron, and chipping of removed trees would be reduced compared to alternative B because fewer trees would be removed and thus fewer stump treatments and less chipping would occur. Environmental impacts from the application of imidacloprid are discussed below.

As for alternative B, the analysis for this alternative considers the next 5 years for imidacloprid treatments and infested tree removal in Clermont County. Again, this does not imply that eradication is expected to be completed within a 5-year timeframe, but rather that the greatest number of imidacloprid treatments and tree removals in Clermont County would likely occur within the next 5 years. Beyond that, it is expected that controls would be reduced as fewer infested trees are found. For the analysis under this alternative, 150,000 is estimated as the number of imidacloprid treatments applied in Clermont County per year. This is a conservative estimate because in Massachusetts, a larger ALB infestation, the maximum number of imidacloprid treatments applied in 1 year was 137,000. In addition, as for alternative B, 15,000 is estimated as the number of trees that could be removed per year, although it is likely to be less because only infested trees will be removed.

Imidacloprid is used in a wide variety of sites to control many pests including certain beetles, leafhoppers, and whiteflies. (The use of imidacloprid to treat host trees within a defined radius from an ALB find is discussed in detail in appendix C.) Imidacloprid would be applied according to label directions by injection into soil or directly into uninfested, high risk host trees.

The most important impacts of this alternative are from the application of an insecticide to a large number of trees. In addition to the 15,000 infested trees that could be removed annually, the program would also be able to apply a maximum of 150,000 imidacloprid treatments to high risk host trees per year. This is the maximum number of trees that could be treated, based on past experience in other ALB eradication programs. These trees could receive up to 3 successive years of treatment; therefore, a maximum of 150,000 trees would receive treatment the first 3 years, and then an additional 150,000 trees could be treated the fourth year. In other situations, the number of treatments per tree may be less than three. Logistical and site-specific considerations will dictate the number of treatments per tree.

An important advantage of treating high risk host trees with imidacloprid is that more trees can be treated over a period of time compared to the number of trees that can be removed. Although removal of high risk trees is more aggressive for eradication of ALB, fewer trees can logistically be removed compared to the number that can be chemically treated. However, available efficacy data indicates that preventative insecticide treatment of trees does not ensure complete control of ALB, and should not be used as the only control method for eradication (Poland et al., 2006).

The uptake and distribution of imidacloprid can vary based on the timing and type of application, host species, and health of an individual tree (Wang et al., 2005). The variability in imidacloprid levels within and between treated trees would result in some ALB receiving a lethal dose while others would not. This means that some ALB would survive and potentially disperse to other areas. Also, because infested trees are difficult to identify, unidentified infested trees may be left in the environment and treated with imidacloprid instead of being removed. Insecticide treatment of infested trees is not as efficacious as tree removal; therefore, the long-term impact of this alternative could be a potential prolongation of the eradication effort.

Human Population

Potential exposure of imidacloprid to humans will be greatest for applicators and workers. Imidacloprid has low acute, dermal, and inhalation toxicity, and has not been shown to be carcinogenic, mutagenic, or teratogenic in mammals (appendix D). Human health effects associated with the application of imidacloprid will be mitigated through adherence to pesticide label requirements and standard operating procedures. The required protective gear for applicators and safety precautions will minimize exposure and risk. Imidacloprid is considered mobile in soil, and has properties that suggest it could occur in groundwater. Precautionary label language regarding the protection of groundwater, the method of application proposed in the ALB program, and the depth to groundwater in the area will minimize the potential for contamination posing negligible risks to human health.

1. Wood Products

Forest industry effects under this alternative would be less than those described under the alternative of no action or full host removal. Trees that are considered high value timber products and are high risk ALB host trees could receive chemical treatments, rather than being removed, if they were within the radius of treatment from an infested host tree. In addition, the program would be able to treat a number of trees beyond the limit of that which could be removed. The additional chemical treatments could provide a preventative treatment to uninfested ALB host trees, and assist in reducing the natural dispersal of ALB from infested areas.

2. Residential Trees

Impacts to urban and residential tree plantings would be less than those described under the no action and full host removal alternatives. Uninfested high risk host trees within the established radius of a known infested tree would be treated with an insecticide based on program recommendations and landowner consent. High risk host trees would remain in place to provide valuable resources such as increased property values, energy savings for cooling and heating, and air quality improvement.

3. Hunting

Impacts to hunting are expected to be similar to those described under the full host removal alternative. Many of the wildlife game species that are hunted in Ohio are dependent on hard mast food items available from tree species such as oak, hickory, and beech. These trees are not ALB host trees and those types of food sources would not be impacted. There could be fewer impacts on any game species that may use ALB host trees for nesting or roosting because trees would be treated with an insecticide rather than being removed as described under alternative B. Chemical treatments would occur in the spring and early summer, which is outside of the hunting seasons of most game, with the exception of wild turkey.

Ecological Resources

1. Parks and Preserves

The use of chemical treatments for high risk host trees would result in fewer impacts to parks and preserves than described under the no action and full host removal alternatives. Full host removal (alternative B) would result in larger areas of tree removal when compared to this alternative of removal of infested trees and chemical treatment of high risk host trees. The smaller areas of removal would minimize the potential to impact outdoor recreational opportunities in parks and preserves. Impacts from tree removal of infested trees would be the same as those previously described. Any removal of infested or chemical treatment of high risk host trees in local or State parks would be coordinated with the appropriate agencies. Currently, East Fork State Park lies within the quarantine, while Stonelick State Park is within Clermont County. The program would coordinate with both parks prior to any program activities occurring there.

2. Forests

This alternative would result in species composition and diversity remaining within forested areas, as compared to full host removal. High risk host trees that are not known to be infested would be chemically treated rather than being removed which would maintain tree species diversity within a stand. Chemical treatment would also result in less ground disturbance because of the reduced need for the heavy equipment that is used during tree removal. Decreased tree removal could benefit ALB nonhost trees because of reduced soil compaction and root damage from heavy equipment, and reduced loss of neighboring trees that keep those trees supported.

However, treatment with imidacloprid is not as effective as tree removal to eradicate ALB, particularly if infested trees are not identified and removed but instead treated with imidacloprid. Currently, no method of survey for ALB is completely effective, particularly on lightly infested trees. Inspections conducted through ground surveys are approximately 30 percent effective in detecting a lightly infested tree, and climbing surveys are about 60 to 75 percent effective in detecting a lightly infested tree. There is variability in imidacloprid levels within and between treated trees; if infested trees are missed and are chemically treated instead, this could result in some ALB receiving a lethal dose while others would not. Surviving ALB could disperse to new areas if the infested tree is not eventually discovered and cut down. Thus, this alternative could result in more infested trees in Ohio forests and a prolonged eradication program.

3. Firewood

A potential exposure pathway for the public is the use of imidacloprid-treated trees that would be harvested and used as firewood. The levels of imidacloprid in treated trees that could be used as firewood is expected to be low because the insecticide moves to the leaves and smaller actively growing branches in the tree where insect feeding is greatest. These parts of the tree would not typically be used as firewood. In cases where trees are treated, their removal would not be expected to occur in the same growing season as treatment, allowing degradation of imidacloprid. In addition, trees harvested for firewood are usually allowed to dry for a period of time before they are used as fuel, which would allow for additional degradation of imidacloprid.

Previous studies that have assessed pesticide exposure from firewood have demonstrated that rapid combustion and high temperatures, as can occur in a fireplace, result in rapid degradation of other types of pesticides and that residues are more likely under slow combustion and temperatures less than 600 ^{o}C (McMahon et al., 1985; Bush and Taylor, 1987; Bush et al., 1987). Imidacloprid would be expected to degrade at temperatures similar to those that would occur from burning firewood based on its measured thermal decomposition temperature, which is below 500 ^{o}C. Potential thermal degradation products from the use of the imidacloprid formulations that could be used in this program include hydrogen cyanide, carbon monoxide, and oxides of nitrogen and carbon. Concentrations of these degradation products would be very low due to the expected concentrations of imidacloprid in firewood and potential temperatures that could occur in burning firewood.

As with all of the alternatives, restrictions imposed on the movement of firewood could impact those who live within the quarantined area and depend on the sale of firewood outside of the quarantined area.

4. Forest Wildlife

Based on the proposed method of application and available effects data, exposure and risk to terrestrial vertebrates is expected to be minimal. Imidacloprid exposure to terrestrial invertebrates, particularly honey bees, is expected to be minimal based on expected residues from the proposed method of application, the presence of other nontreated flowering plants, and the available acute and chronic honey bee toxicity data for imidacloprid (see appendix D). There is some uncertainty in this assumption because nectar and pollen imidacloprid levels in trees using soil or trunk injection application methods are not well understood.

APHIS has funded research to address the potential for pollen levels in trees that have received a soil or tree injection using imidacloprid. Preliminary results show that imidacloprid levels are typically higher in maple leaves and pollen from soil-injected applications compared to tree injections; however, the levels of imidacloprid in pollen is below levels that have been shown to cause sublethal impacts to honey bees. These results are similar to other treatment methods in crops that typically demonstrate imidacloprid residues in nectar and pollen below levels that could impact honeybee populations. Pollinator exposure and risk would increase in cases where a large number of trees are treated and then flower, attracting honey bees and other pollinators. The risk is minimized by the availability of other pollinating plants and the data collected, to date, that show low levels of imidacloprid in pollen from treated trees. Impacts to other terrestrial invertebrates that are sensitive to imidacloprid, and feed on leaves and twigs containing imidacloprid, would be expected. Population level impacts to invertebrates that feed on treated trees would not be expected because a small percentage of trees will be treated relative to the total number of trees available.

Environmental Quality

1. Soil and Water

The soil and trunk injection method of imidacloprid application eliminates the potential for drift and, in the case of trunk injections, eliminates the probability of offsite transport via runoff that may affect aquatic species. There is a potential for subsurface transport of imidacloprid to aquatic habitats for applications made directly into soil because of its mobility; however, this type of exposure and risk will be minimized by only making applications where the groundwater table is not in proximity to the zone of injection, and in soil types that would minimize the probability of pesticide transport. Any residues that could reach aquatic environments under this scenario would be expected to be below effect levels for aquatic biota and not pose a significant risk (appendix D).

There is the potential for leaf litter from treated trees to reach aquatic areas. The likelihood of impacts to aquatic invertebrates that feed on leaf litter will increase where treated trees adjacent to water bodies would drop leaves that could enter aquatic resources. Impacts to some aquatic invertebrates have been noted in cases where leaf litter that contained imidacloprid residues were introduced into receiving streams (Kreutzweiser et al., 2009; Kreutzweiser et al., 2008). Some aquatic insects assist in the decomposition of vegetation. Two of these types of insects have been shown to be impacted by imidacloprid in leaves from treated trees. Although no mortality was observed, there were sublethal impacts, such as reduced growth. The potential for these types of impacts would be less in the field because other nontreated vegetation would be present in the watershed and deposit into receiving streams reducing exposure to these types of aquatic organisms.

2. Air

The potential for impacts to air quality would be similar to those described under full host removal. The same number of trees could potentially be removed, and the impacts to air quality from imidacloprid applications are not expected to be significant. Treatments will occur by tree or soil injection; therefore, no imidacloprid would be available to drift into the atmosphere. In addition, any material that may be exposed to the atmosphere would not readily volatilize as imidacloprid does not exhibit chemical characteristics that could result in movement to the air.

D. Infested Host Removal and Combination of Removal or Imidacloprid Treatment of High Risk Hosts (Preferred Alternative)

The environmental impacts described in the previous two alternatives would apply to this alternative. However, the impacts for alternative D would be reduced compared to those alternatives because neither imidacloprid treatment nor removal of high risk hosts would be used exclusively. In addition, this alternative does not prescribe that all high risk host trees must be treated or removed within a radius of an infested tree; rather, it allows flexibility in focusing treatments on higher risk host genera (Haack et al., 2010). The selection of tree removal, chemical treatment, or treatment of select high risk host trees would be based on recommendations by the program and landowner consent. For instance, under this alternative, imidacloprid treatment may be applied—

- to certain high risk host trees that are considered high value or significant,
- located on a property listed in the National Register of Historic Places,
- in a landscape/managed situation, in areas where soil erosion is of concern, or
- to comply with Endangered Species Act tree removal restrictions.

Imidacloprid treatments could also be applied to high risk host trees surrounding an isolated ALB infestation. Removal of high risk hosts could occur under this alternative in unmanaged areas, such as woodlots. Removal may also be conducted on high risk host trees surrounding an isolated ALB infestation.

If landowner consent is not granted for the recommended method of control, additional survey work would continue; if host trees become infested, they would be removed. The number of trees that could be removed or treated is low within the quarantine and Clermont County, as previously described under alternatives B and C. The number of trees that could be treated under this alternative would be less in certain areas where there is an emphasis to treat high risk host trees within certain genera, such as *Acer*, etc. Information in the Forest Species Composition Report indicates that trees in the *Acer* genus represent 47 percent of the available number of trees, compared to 69 percent when considering all ALB host trees (appendix B). The low percentage of trees that would be impacted under this alternative, and the flexibility of an option to remove or chemically treat high risk trees, based on site conditions and program recommendations, would reduce the impacts of having only tree removal or chemical treatment alone as an option for high risk host trees.

Flexibility in the appropriate treatment for a site would also ensure a treatment for high risk host trees could be implemented, further reducing the chance of ALB spread and increasing the chance of a successful eradication program. This alternative would also better fit into the logistical constraints of the ALB program by allowing the targeting of controls to areas of highest risk.

E. Cumulative Effects

Cumulative impacts are those impacts on the environment which result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

For the purposes of this EA, cumulative impacts are discussed for each of the four alternatives identified in the alternatives section.

Under the no action alternative APHIS would implement the quarantine restrictions in the area, as defined in the Federal Orders for Clermont County, Ohio, and expand the quarantine based on new detections; however, no eradication efforts would be undertaken by APHIS. The lack of a coordinated program to eradicate ALB would result in the spread of ALB to other host trees beyond the current area in Clermont County. The expansion of ALB beyond the current areas could result in additional stressors to host trees causing both economic and environmental impacts. Abiotic and biotic stressors such as climate change, other invasive pests, and air pollution all pose threats to ALB host trees; the addition of ALB to urban and natural forest ecosystems would be expected to result in cumulative impacts beyond those already identified as potential stressors (Iverson et al., 2008; Poland and McCullogh, 2006; Horsley et al., 2002). Economic losses to the timber industry would be anticipated, as well as increased costs to homeowners that choose to treat trees or have them removed once they are infested. Economic data for the loss of ash trees in Ohio, which are just one of the hosts for ALB, show that landscape loss, tree removal, and replacement costs could range between $1.8 and $7.6 billion due to the emerald ash borer (*Agrilus planipennis*) (Sydnor et al., 2007). Cumulative impacts to the environment would also be expected as ALB host trees are lost from urban and natural forests.

Under alternative B, full host removal, cumulative impacts to water quality due to sedimentation, which is a causal agent for impairment in watersheds within Clermont County, could occur in cases where large areas of timber are removed in proximity to water, or from watersheds vulnerable to soil erosion. The potential for cumulative impacts in these scenarios is reduced due to the implementation of BMPs by the program and recommended by the Ohio Department of Natural Resources (ODNR, 2012d). The BMPs will reduce the potential for sedimentation and nutrient impacts to watersheds, as well as reduce the impacts in the areas where tree removal would occur. The removal of infested and high risk host trees that are up to ½ mile away from infested trees would reduce the potential for ALB to spread beyond the current infested area, as well as allow for regeneration of host trees. There would be some loss of wildlife habitat in areas where host trees are removed; however, those losses would not be considered permanent because in unmanaged habitats, such as woodlots, stumps of high risk host trees would be allowed to resprout, and replanting activities may occur in managed areas.

The potential for cumulative impacts from alternatives C and D relate to a combination of tree removal and insecticide use. The potential for cumulative impacts related to insecticide use would be greatest for alternative C because all high risk trees that are uninfested and are up to ½ mile from infested trees would be treated with either a trunk or soil injection of the insecticide imidacloprid. In addition, herbicide use would increase because all stumps that are not removed would require treatment with triclopyr or, in cases where resprouting occurs, an herbicide mix application using triclopyr, imazapyr, and metsulfuron may be applied. Herbicide treatments for both alternative C and D would be needed because treatment with insecticides is not as immediately efficacious as host tree removal, and ALB could infest stumps and sprouting vegetation.

All pesticides proposed for use have residential and/or agricultural uses. Based on the large number of trees that could potentially receive imidacloprid treatments, there would be an increase in pesticide release into the environment beyond what is currently used in Clermont County. Imidacloprid is widely used in urban and agricultural settings; however, the increase in loading beyond current use, in addition to that which could be added due to ALB treatments, is difficult to quantify because the number of treated trees is unknown relative to current use patterns in the county. However, conservative assumptions regarding the chemical treatment of trees (based on information from the Forest Tree Species Composition Report for tree injections) and maximum label rates for soil injection suggest that any offsite contributions would not result in significant impacts to the environment.

The amount of imidacloprid added to the environment would be greater under alternative C because all high risk trees within a ½-mile radius of infested trees would receive treatment, compared to alternative D where only select trees would receive imidacloprid treatments. The cumulative risk to aquatic resources would be greatest when considering large-scale imidacloprid treatments of deciduous trees, such as ALB host trees. Imidacloprid residues in leaf litter in the fall from treated trees can be transported to aquatic environments; this has been shown to result in sublethal impacts to some aquatic invertebrates (Kreutzweiser et al., 2009; Kreutzweiser et al., 2008; Kreutzweiser et al., 2007). In those studies, the more significant impacts occurred in cases where exposure to imidacloprid in leaf litter was at concentrations greater than anticipated under the current proposed use pattern. These impacts are selective to certain types of aquatic invertebrates due to their feeding preference, and would not be anticipated for other aquatic invertebrates. In addition, other non-treated leaf litter and other organic matter would be present in streams reducing exposure and risk to aquatic invertebrates that feed on leaf litter in streams. Streams that may already be impacted due to other factors could have cumulative impacts related to imidacloprid use in cases of large-scale treatments. An incremental increase in risk due to imidacloprid use is expected to be minor for aquatic communities because the potential for imidacloprid risk to aquatic habitats is low, based on the proposed method of application, environmental fate, and available information regarding imidacloprid effects to aquatic organisms.

Large-scale treatment of trees using imidacloprid could also increase pesticide exposure to pollinators above current levels. Some pesticides, as well as other stressors, have been identified in native pollinators, as well as domestic honey bees (Potts et al., 2010). Recent studies have also shown that honeybees exposed to sublethal concentrations of imidacloprid and pathogens can have interactive negative effects (Pettis et al., 2012; Alaux et al., 2010). The potential for exposure and cumulative impacts to honey bees, and other pollinators from imidacloprid use, will be reduced by the availability of other species of flowering plants and treating trees in small areas. Stump and sprouting host vegetation herbicide treatments will be localized because stump removal is preferred; however, for areas where herbicide treatments are applied, pesticide loading will increase relative to other current uses for each of the three herbicides. The potential for cumulative impacts to the environment from these treatments will be minimized by the method of application; this reduces nontarget exposure and risk compared to other methods of pesticide application.

F. Threatened and Endangered Species

Section 7 of the Endangered Species Act and its implementing regulations require Federal agencies to ensure 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 June, 2011, APHIS first contacted the U.S. Fish and Wildlife Service (FWS) in Columbus, Ohio for technical assistance regarding impacts to federally listed species in Clermont County. Currently, six endangered species (Indiana bat, *Myotis sodalis*; running buffalo clover, *Trifolium stoloniferum*; fanshell, *Cyprogenia stegaria*; rayed bean, *Villosa fabalis*; snuffbox, *Epioblasma triquetra*; and pink mucket pearlymussel, *Lampsilis abrupta*, and one species proposed for listing as endangered (sheepnose, *Plethobasus cyphyus*) occur in Clermont County. FWS conducted a site visit on July 7, 2011 and provided an interim guidance letter on July 19, 2011 that provided recommendations for the removal and destruction of trees infested with ALB. Measures to protect the Indiana bat, running buffalo clover, and rayed bean were provided to APHIS. APHIS prepared a biological assessment (BA), including the measures provided by FWS, in the interim guidance letter; subsequently. APHIS requested concurrence with its determination that with implementation of the proposed measures, the program was not likely to affect federally listed species in the infested area for activities associated with infested tree removal occurring until September 30, 2011. APHIS received a concurrence letter from FWS dated August 15, 2011.

APHIS then prepared a second BA that analyzed the effects of host tree removal occurring from October 1, 2011 to April 1, 2012 to federally listed species in Clermont, Brown, Warren, and Hamilton Counties. APHIS received a concurrence letter from FWS dated September 30, 2011. In addition, FWS revisited the infested area on October 27, 2011, and trained ALB program personnel to recognize Indiana bat habitat. APHIS is coordinating closely with FWS, and has completed a Section 7 consultation for control activities associated with infested tree removal occurring after April 1, 2012. Section 7 consultation with FWS for expanded program activities will be completed prior to the implementation of the alternative selected in this EA to ensure the protection of listed species in the program area. APHIS will continue to coordinate closely with FWS throughout the duration of program activities.

G. Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668–668c) prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle…[or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

According to the Ohio Department of Natural Resources, there is one eagle nest in Clermont County. Without the implementation of the protection measures outlined below, tree cutting could disturb eagles nesting at this site. FWS has recommended buffer zones from active nests which require different levels of protection (FWS, 2007). They are as follows:

1. Avoid clearcutting or removal of overstory trees within 330 feet of a nest at any time. (It should be noted that clearcutting will not be used under any alternative discussed in this document.)

2. Avoid timber harvesting operations (including road construction, and chain saw and yarding operations) during the breeding season within 660 feet of the nest. The distance may be decreased to 330 feet around alternate nests within a particular territory—
   - including nests that were attended during the current breeding season but not used to raise young, and
   - after eggs laid in another nest within the territory have hatched.

According to FWS, the breeding season for bald eagles in Ohio is mid-January through July. As such—
- APHIS will contact the Ohio Department of Natural Resources for the locations of eagle nests in the program area; and
- APHIS will contact FWS before tree removal begins during the breeding season within 660 feet of a nest to confirm that all eagles have left the nest.

Outside of the breeding season, cutting may occur within the buffer zone around nests.

H. Migratory Bird Treaty Act

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.

FWS has provided the following recommendations to minimize impacts to migratory birds:

1. Minimize tree removals during nesting season.

2. Minimize disturbance as much as possible (avoid impacts to areas of nonhost shrub/brush areas).

3. Replant areas that have been significantly deforested.

4. Use existing trails for equipment to avoid disturbance to pastures/open fields that could be used as breeding sites for ground-nesting birds.

5. Have the names and contact information for local wildlife rehabilitators so that if there is an issue (e.g., as a raptor nest or fledging in the area) guidance can be provided regarding how to handle the situation.

I. Other Considerations

Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," focuses Federal attention on the environmental and human health conditions of minority and low-income communities, and promotes community access to public information and public participation in matters relating to human health and the environment. This EO requires Federal agencies to conduct their programs, policies, and activities that substantially affect human health or the environment in a manner so as not to exclude persons and populations from participation in or benefiting from such programs. It also enforces existing statutes to prevent minority and low-income communities from being subjected to disproportionately high or adverse human health or environmental effects.

The human health and environmental effects resulting from the four alternatives are expected to be minimal, and are not expected to have disproportionate adverse effects to any minority or low-income family. Low-income families may depend on woodlots for firewood for heating their homes; however, the most valuable species used for firewood (including oak, hickory, beech, and locust) are not ALB host species and would not be removed. Although some maple species may be less valued for firewood, they are commonly used for that purpose and are a preferred ALB host. Nevertheless, if no action is taken, allowing ALB to spread could result in permanent loss of maples and all other ALB hosts from the area. For full host removal, stumps from high risk host trees in woodlots may be allowed to resprout which would then to allow more rapid regrowth.

Wood treated with imidacloprid and used as firewood is not expected to cause adverse health effects. The potential for impacts to hunting will be greatest for alternative B, compared to alternatives C and (the preferred alternative) D; however, the number of trees proposed for removal and the lack of removal of important mast-producing tree species will minimize these impacts, and not result in disproportionate effects to minority or low-income families. Therefore, the human health and environmental effects from the action alternatives (B through D) are not expected to have disproportionate adverse effects to any minority or low-income family.

EO 13045, "Protection of Children from Environmental Health Risks and Safety Risks," acknowledges that children, as compared to adults, may suffer disproportionately from environmental health and safety risks due to their developmental stage, greater metabolic activity levels, and their behavior patterns. This EO (to the extent permitted by law and consistent with the agency's mission) requires each Federal agency to identify, assess, and address environmental health risks and safety risks that may disproportionately affect children. No disproportionate risks to children are anticipated as a consequence of any of the three action alternatives (B, C, or D).

Consistent with the National Historic Preservation Act of 1966, APHIS has examined the proposed action in light of its impacts to national historic properties, and is coordinating with the State Historic Preservation Officer (SHPO) to ensure that the program will not affect historic properties, including sites of tribal importance in Clermont County. To ensure no adverse effects to any of the 27 historic places identified in Clermont County, APHIS will contact the Ohio Historic Preservation Office prior to conducting control actions, if any work is anticipated to be done, within a 1-mile radius of any of the historic sites in Clermont County. If necessary, APHIS will initiate consultation with the Ohio SHPO at that time.

V. Listing of Agencies and Persons Consulted

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
PPQ–Pest Management
4700 River Road
Riverdale, MD 20737

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
PPQ–Environmental Compliance
4700 River Road
Riverdale, MD 20737

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

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
PPQ–ALB Eradication Program
920 Main Campus Drive, Suite 200
Raleigh, NC 27606

U.S. Department of Agriculture
Forest Service
Forest Health Protection
1601 North Kent Street
Arlington, VA 22209

U.S. Department of Agriculture
Forest Service
Forest Health Protection
180 Canfield Street
Morgantown, WV 26505

U.S. Department of Interior
Fish and Wildlife Service
Ecological Services
4625 Morse Road, Suite 104
Columbus, OH 43230

Ohio Department of Agriculture
8995 E. Main St.
Reynoldsburg, OH 43068

Ohio Department of Natural Resources
Division of Forestry
2045 Morse Road, Bldg. H
Columbus. OH 43229

Ohio Environmental Protection Agency
Division of Surface Water
P.O. Box 1049
50 West Town Street, Suite 700
Columbus, OH 43216

Ohio State University–Extension Service
110 Boggs Lane, Suite 315
Cincinnati, OH 45246

Ohio Historical Society
State Historic Preservation Officer
800 E. 17th Avenue
Columbus, OH 43211

Clermont Soil and Water Conservation District
P.O. Box 549
1000 Locust Street
Owensville, OH 45160

U.S. Army Corps of Engineers
Cincinnati Field Office
10557 McKelvey Road
Cincinnati, OH 45240

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Appendix A. Public Outreach for the Asian Longhorned Beetle Program in Clermont County, Ohio

Media

- Weekly media updates
- Media interviews and articles, including proactive opinion editorials
- Press releases (see APHIS ALB Newsroom page: http://www.aphis.usda.gov/newsroom/hot_issues/alb/alb.shtml
- Public service announcements airing on local radio stations
- Presence at industry shows, expos and outreach venues
- "Lurking in the Trees" documentary on Clermont County cable access, and provided to the public
- Use of social media online (Facebook, Twitter, YouTube, Flickr)
- Frequently Asked Question documents available at: http://www.aphis.usda.gov/publications/plant_health/index.shtml

Public Meetings

- June 19, 2012 Batavia, Ohio; Ohio State University (OSU), Ohio Department of Natural Resources (ODNR) and ALB program (Ohio Department of Agriculture (ODA) and APHIS)
- November 7, 2011 Bethel, Ohio; OSU, Young's General Contracting, ODNR, ODA, and APHIS
- September 22, 2011 Bethel, Ohio; APHIS, ODA, ODNR, OSU
- July 14, 2011 Bethel, Ohio; APHIS, ODA, OSU
- June 30, 2011 Bethel, Ohio; APHIS, ODA, OSU

Other Meetings and Presentations

- June 23, 2011 OSU ALB overview for Green Industry Professionals, ALB program (ODA and APHIS) in Batavia, Ohio
- November 29, 2011 telephone town hall with Congresswoman Jean Schmidt and ALB program (ODA and APHIS)
- December 1, 2011 Asian Longhorned Beetle: The Threat in Black and White, Ohio State University, Bethel, Ohio
- January 9, 2012 Asian Longhorned Beetle Update for Green Industry Professionals, ALB program with Ohio State University, Cincinnati, Ohio
- February 2, 2012 OSU ALB update at Tri-State Green Industry Conference, Cincinnati, Ohio
- February 6, 2012 at East Fork State Park, Clermont County, Ohio, meeting with Federal and State legislators, town administrators, Ohio Department of Natural Resources, Ohio State University, and ALB program (Ohio Department of Agriculture and APHIS)

- February 9, 2012 at Bethel, Ohio, meeting with Village Council of Bethel, and Ohio Department of Natural Resources and ALB program (Ohio Department of Agriculture and APHIS)

Legal Notifications

- Door hangers during survey and infested tree removal activities
- Letters from ODA to affected property owners prior to infested tree removal activities (legal notice)
- Federal Orders (July 13, 2011; October 14, 2011; August 30, 2012)
- State regulations: Ohio Administrative Code Chapter 901:5–57 Asian Longhorned Beetle

Environmental Assessments

- Asian Longhorned Beetle Eradication Efforts in Clermont and Brown Counties, Ohio, Environmental Assessment, September 2011 and Finding of No Significant Impact, September 6, 2011.
- Asian Longhorned Beetle Cooperative Eradication Program in Clermont County, Ohio, Environmental Assessment, May 2012. (Comment period May 9 – July 9, 2012.)

Informational Websites

- ALB informational site: www.BeetleBusters.info
- ODA website: http://www.agri.ohio.gov/TopNews/asianbeetle/
- Other websites: Clermont County ALB: http://bugs.clermontcountyohio.gov/ALB.aspx; OSU http://clermont.osu.edu/news/asian-longhorned-beetle-found-in-ohio-osu-extension-offers-information-hotline
- APHIS ALB plant pest page http://www.aphis.usda.gov/plant_health/plant_pest_info/asian_lhb/index.shtml

Appendix B. Forest Tree Species Composition Report

Introduction

At the Ohio Department of Agriculture's request, the Ohio Department of Natural Resources Division of Forestry conducted a species composition and size class survey of the forest tracts within a 25-square mile defined area of Tate Township. Given the timeframe and parameters, this report represents an industry accepted approach to the gathering and interpretation of that data. The Division of Forestry is confident in the methodology used and results generated.

Data Collection

Sampling plots were taken in areas identified by the Ohio Department of Agriculture as "forest" within a 25 square mile section of Tate Township. Species and diameter were recorded for all trees greater than 2 inches dbh growing within tenth-acre sampling plots. GPS locations were taken at each plot center. Seven hundred thirty (730) individual plots were taken and transcribed to a spreadsheet.

Data Analysis

To create the most valuable dataset, spatial data was used for post stratification. Plots were placed in their spatially identified strata and analyzed with like plots. The data was then expanded based on the amount of acres per stratum. This approach not only removes bias on plot locations by field staff, but also if additional areas are added to the quarantine nearby, this system could be applied and a reasonable estimate of stems could be assessed without taking more field data. Finally, individual areas within the 25 square mile study area could be individually assessed and estimated without additional field work.

Strata were identified based on tree height using LiDAR imagery. Tree height is the greatest available indicator of diameter and relative forest maturity. Height classifications were chosen based on what was believed to be genuine differences in forest maturity. Error sources include GPS data, LiDAR quality, and human bias and error in assigning strata.

Although specific species information was taken in the field, the reports are based on four broad species groups – maples (*Acer*), other hosts (*Aesculus, Betula, Celtis, Fraxinus, Platanus, Ulmus*), oaks (*Quercus*), and other non-hosts. The results attempt to describe what is believed to be statistically sound. The individual species are too numerous and various to have reliable statistical error values.

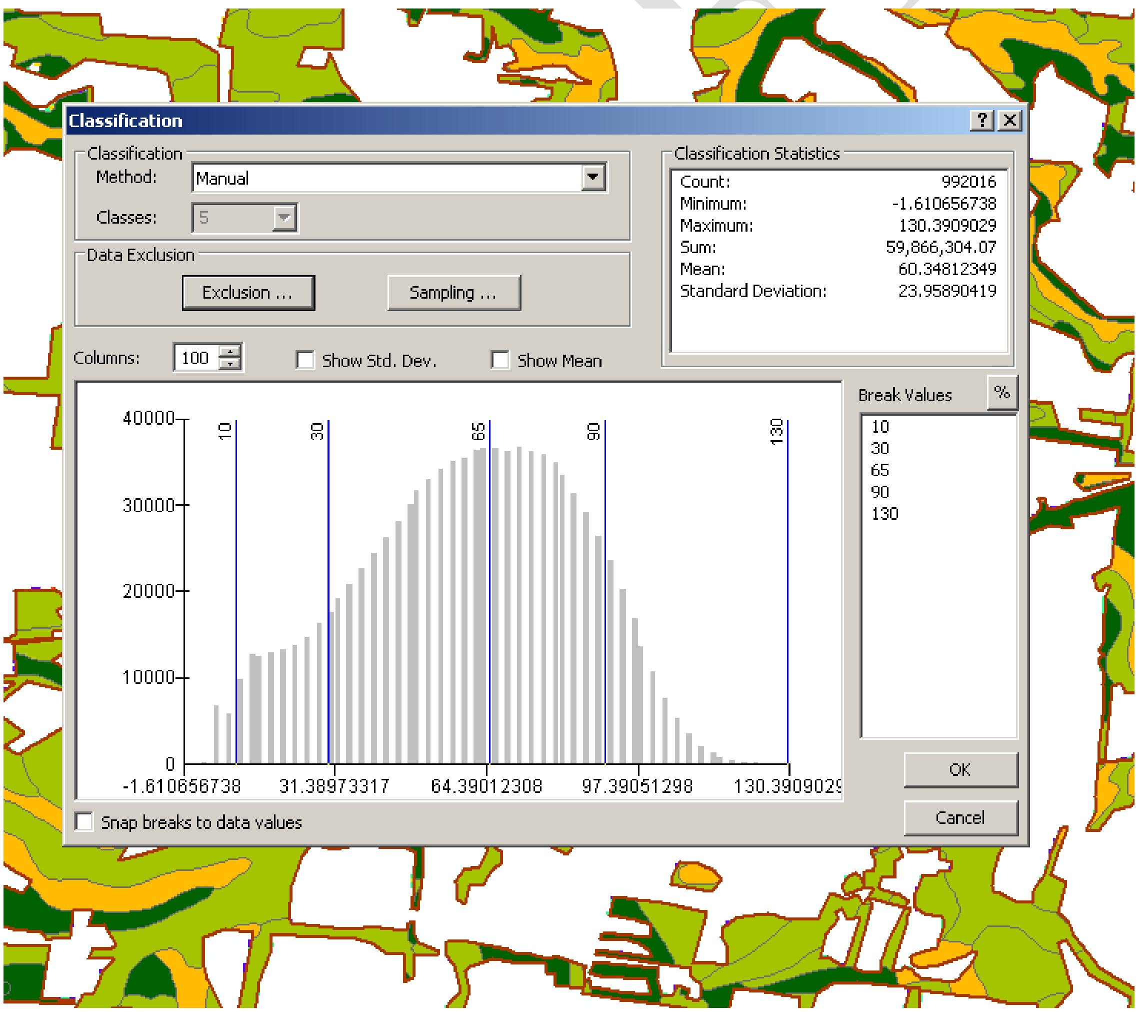
Three products were produced for each strata – stems by species group, basal area/acre by species group and diameter, and total stems by diameter class and species group. The first dataset is for the entire 25 square mile area and includes the total number of stems by diameter class and species group and average basal area per acre for each species group.

Vertical Stand Development

OSIP I lidar data (7 foot average post spacing, 30'x30' cell size) was used to develop DEM (classification = 2) and a DSM of high vegetation (classification = 5). These two rasters were then subtracted resulting in a raster (tate_height) where each cell contained a height value. The raster was then clipped to the digitized Bethel woodlot boundary layer (Bethel_Woodlots_25sqmi3). This raster was then reclassified (tate_reclass) in the following method:

Height minimum (feet)	Height maximum (feet)	Reclass value
minimum	10	1
10.0	30	2
30.1	65	3
65.1	90	4
90.1	130	5

Distribution of Classification below:



Total area for each height class was calculated. Refer to table:

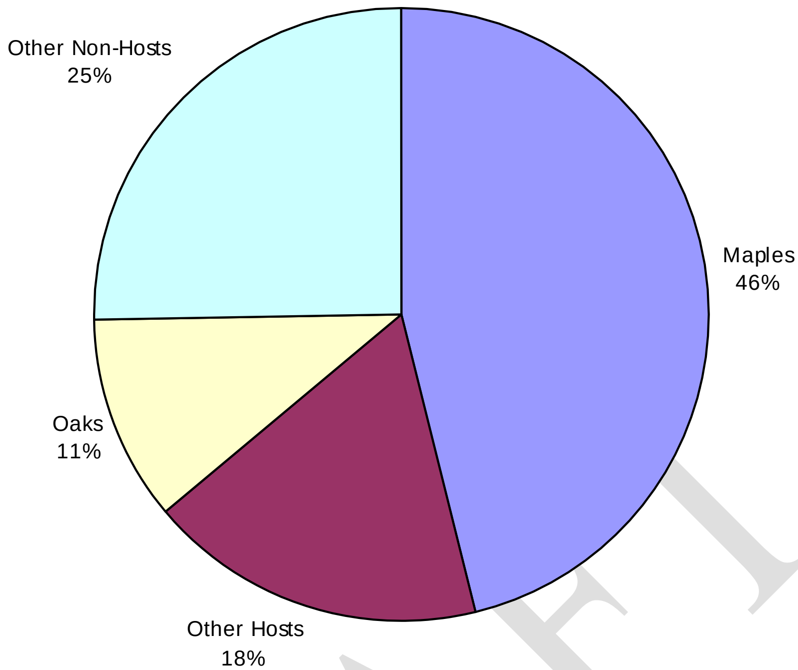
Height class	Height range (feet)	acres
1	0–10	25.52
2	10–30	292.73
3	30–65	1979.51
4	65–90	2503.09
5	90–130	943.29
		5,744 acres

Results and Discussion

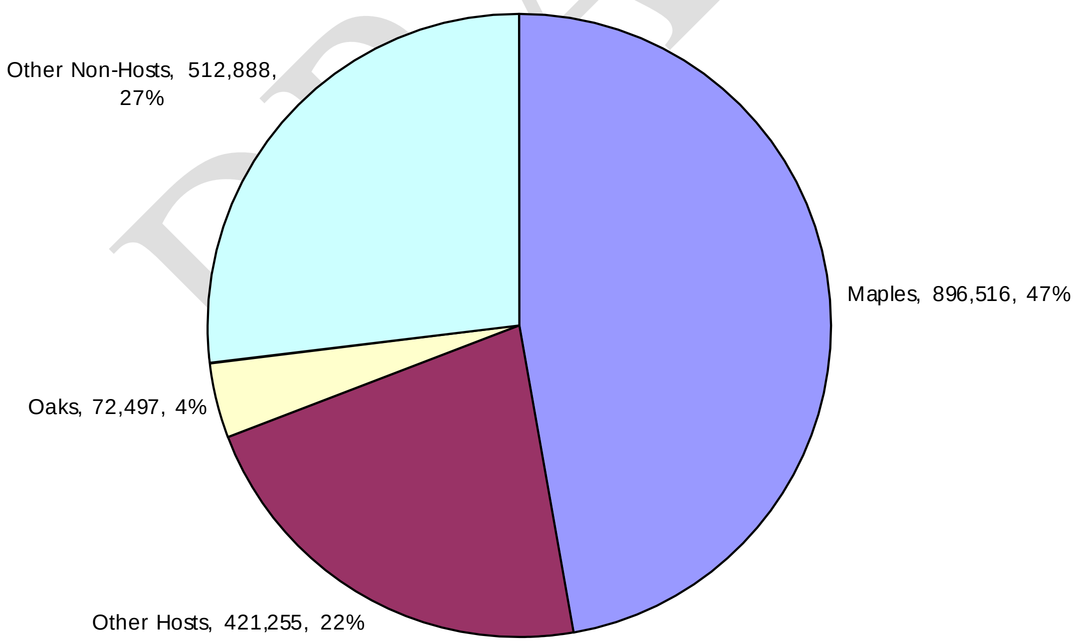
The Ohio Department of Agriculture had identified 6,069 acres of forest within the 25 square mile area. Based on the LiDAR data several areas were identified as non-forest within these polygons and were removed from data analysis leaving a forest area of 5,744 acres. It is worth noting that there are portions of small acreages outside the “forest polygons” that will likely require treatment such as fencerows. These areas were not analyzed.

All datasets clearly show a high amount of host species both in number of stems and proportion of total forest cover in all forest age classes. The areas of the most mature forest present have a slightly lower percentage of host species. The figures below indicate relative average basal area in square feet per acre and the total number of stems by species group for the entire 25 square mile study area.

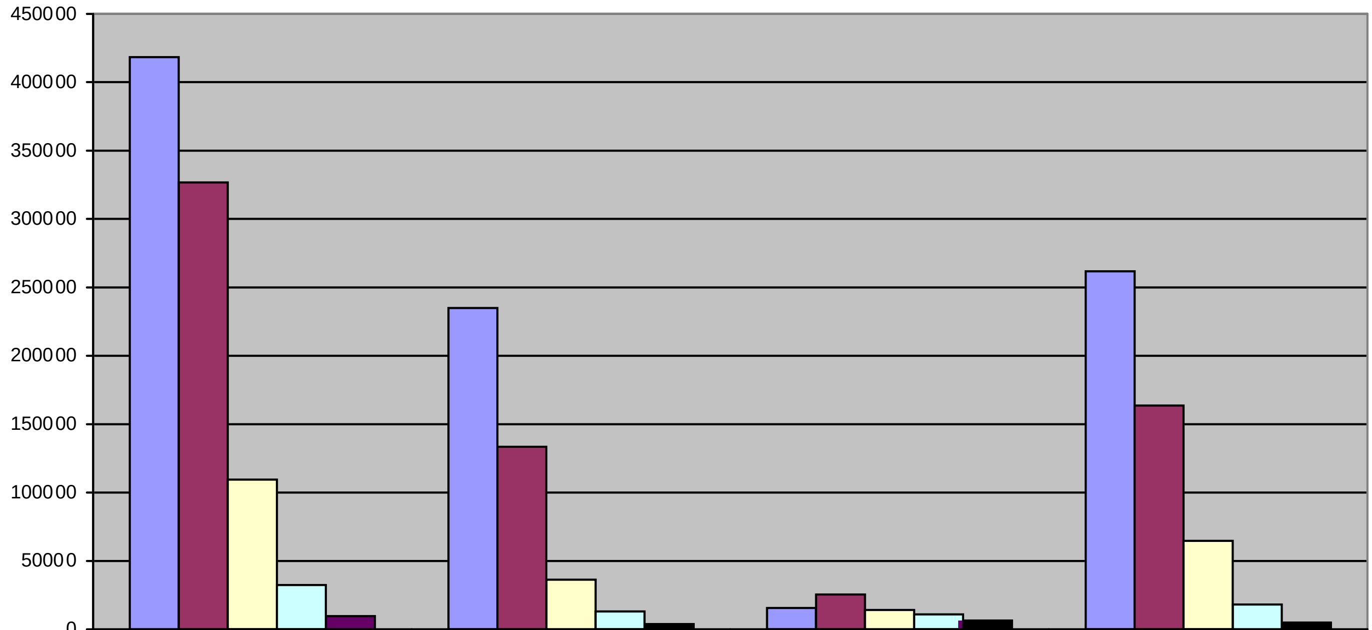
Average Basal Area/Acre - Entire Project Area



Stems by Species Group - Entire Project Area

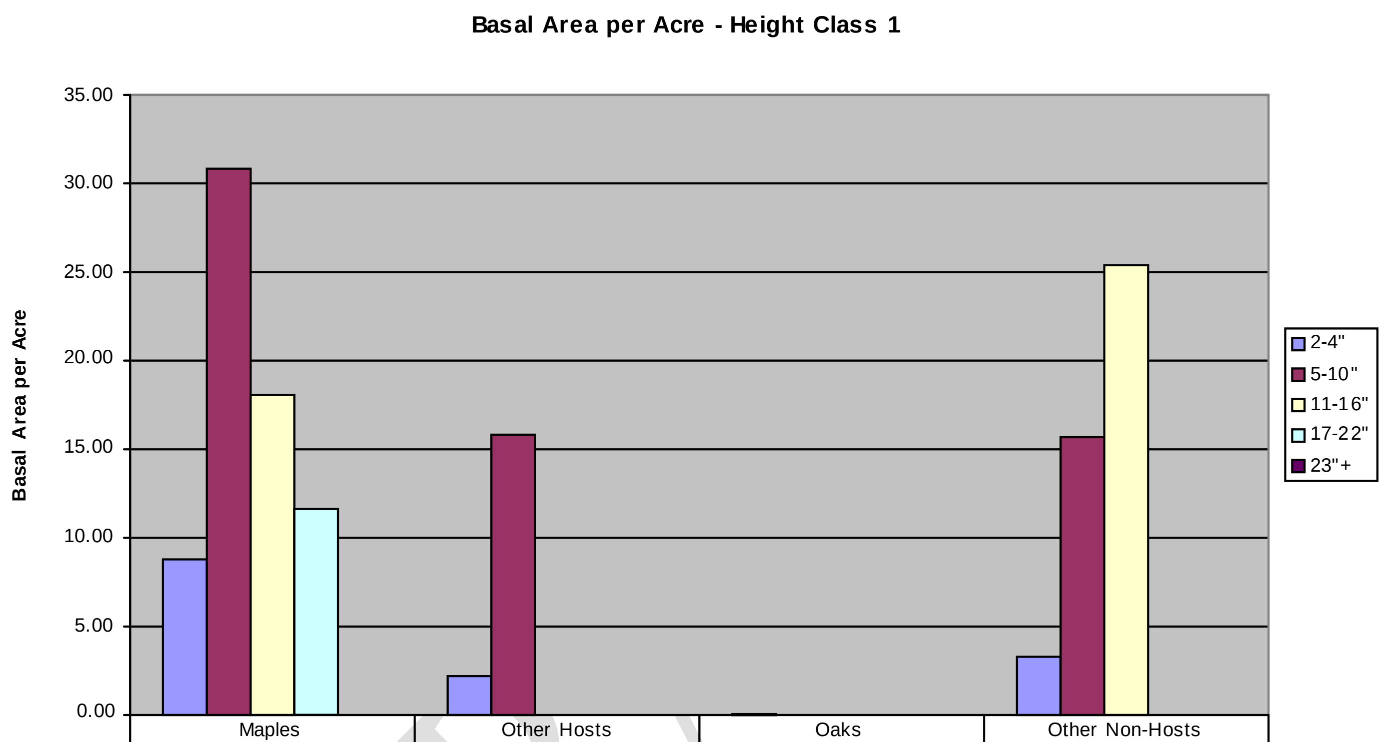


Total Number of Stems - Entire Project Area



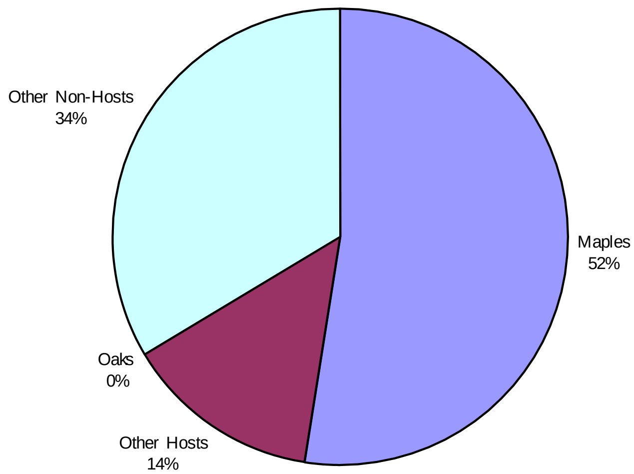
	Maples	Other Hosts	Oaks	Other Non-Hosts
2-4"	418394	234897	15696	261831
5-10"	326791	133362	25356	163624
11-16"	109371	36267	14120	64661
17-22"	32317	13066	10887	18140
23"+	9643	3662	6438	4631

Height class 1 (0-10 feet tall average tree height) contains only 25.5 acres within the study area. Seventy-eight percent of stems within this group are potential hosts representing 66 percent of the basal area (expressed in square feet per acre).

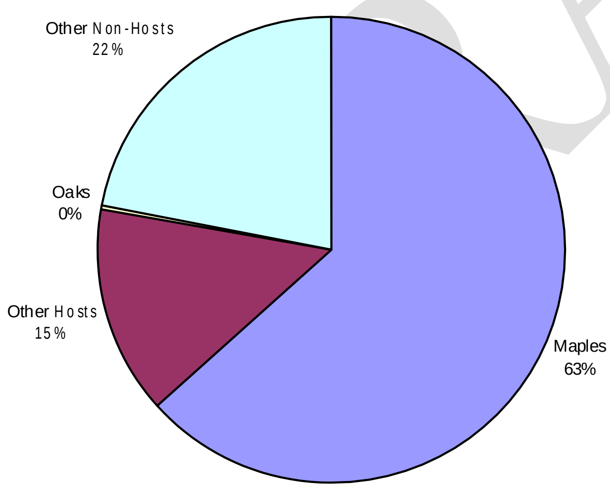


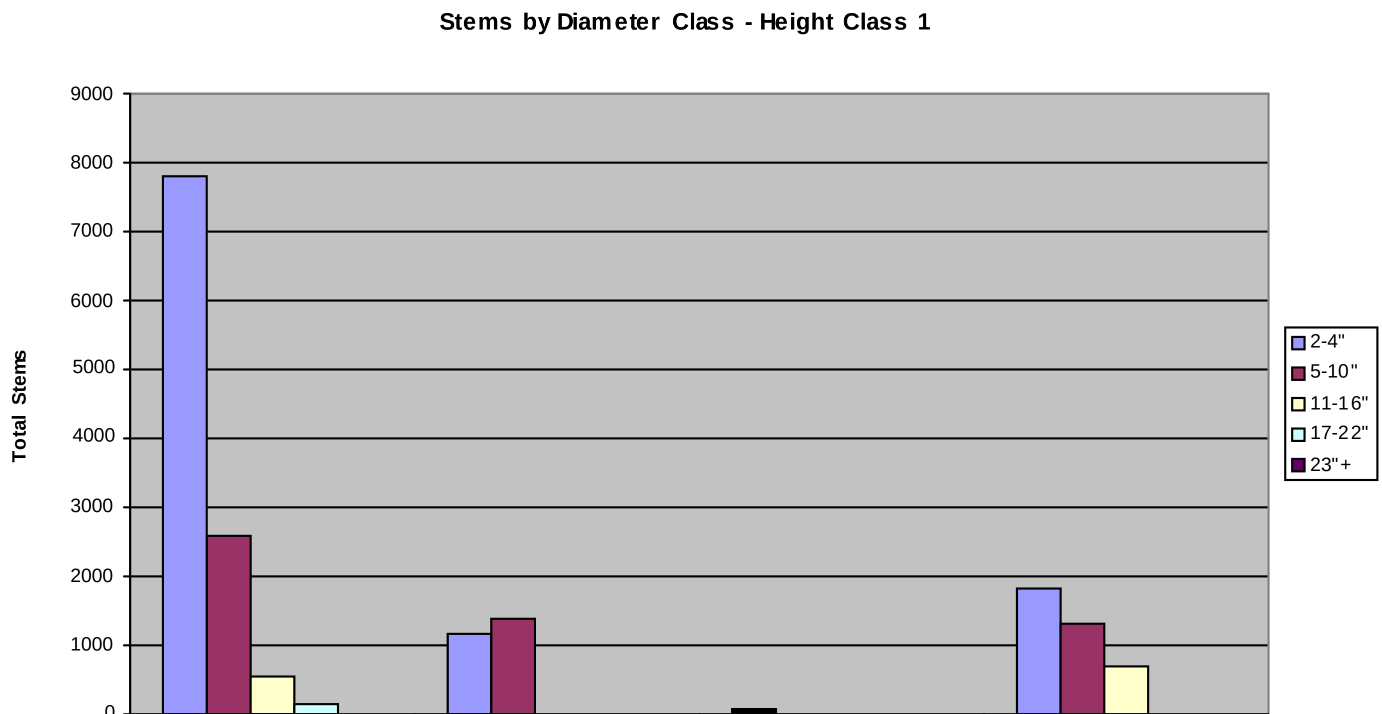
	Maples	Other Hosts	Oaks	Other Non-Hosts
2-4"	8.78	2.19	0.06	3.29
5-10"	30.83	15.82	0.00	15.68
11-16"	18.07	0.00	0.00	25.39
17-22"	11.63	0.00	0.00	0.00
23"+	0.00	0.00	0.00	0.00

Basal Area - Height Class 1



Stems by Species Group - Height Class 1

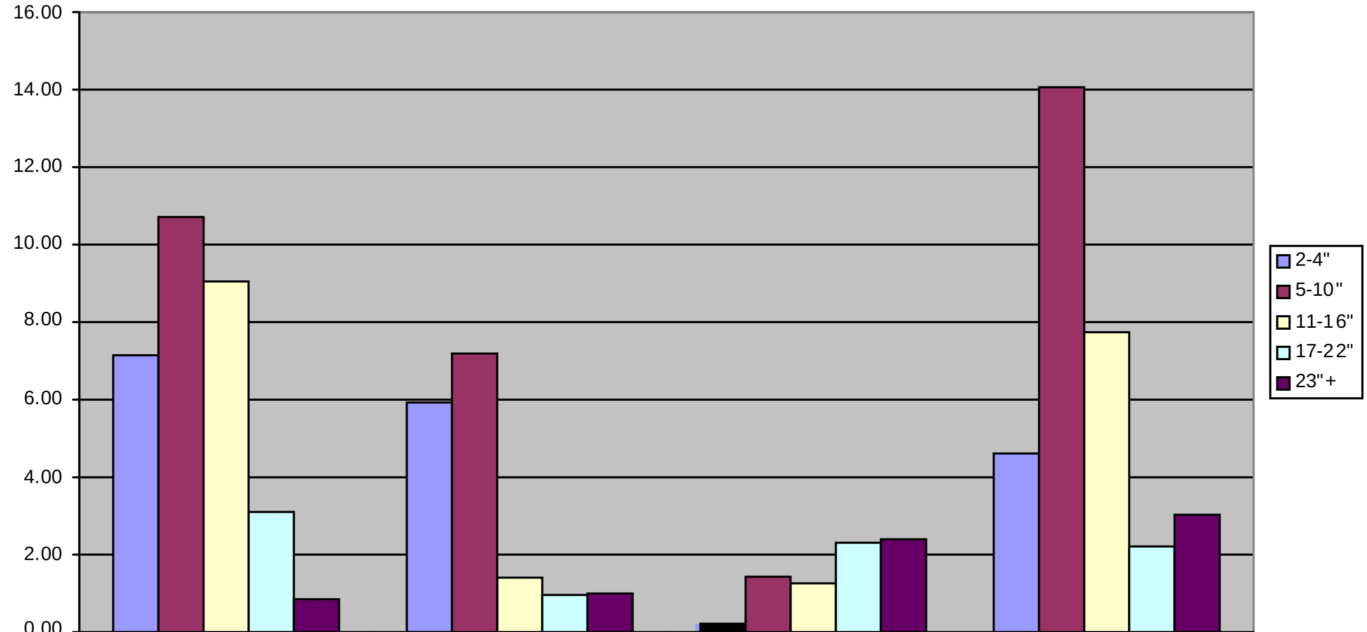




	Maples	Other Hosts	Oaks	Other Non-Hosts
2-4"	7802	1167	73	1823
5-10"	2588	1385	0	1312
11-16"	547	0	0	693
17-22"	146	0	0	0
23"+	0	0	0	0

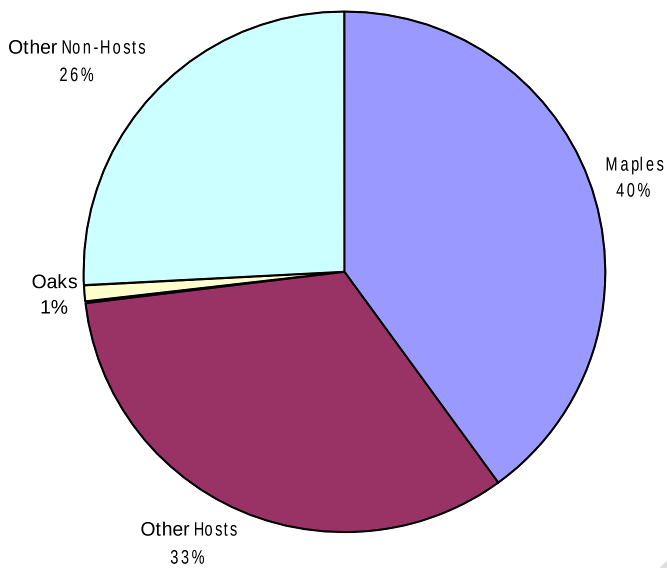
Height class 2 (10–30 feet tall average tree height) contains only 292.7 acres within the study area. Seventy-three percent of stems within this group are potential hosts also representing 73 percent of the basal area (expressed as square feet per acre).

Basal Area by Species Group - Height Class 2

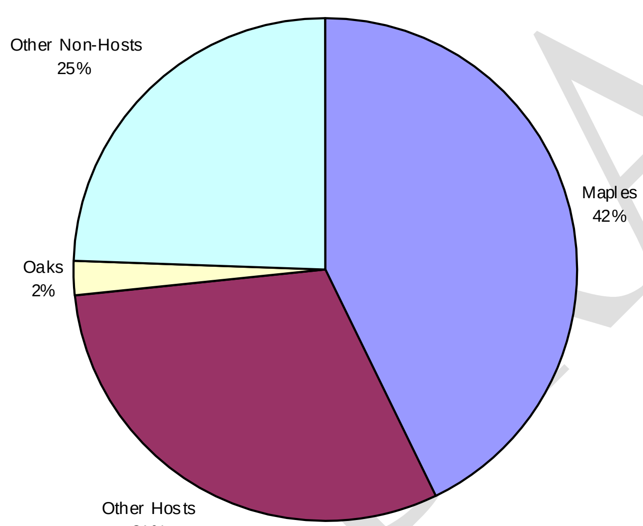


	Maples	Other Hosts	Oaks	Other Non-Hosts
2-4"	7.14	5.93	0.22	4.61
5-10"	10.71	7.19	1.43	14.06
11-16"	9.05	1.41	1.26	7.74
17-22"	3.10	0.96	2.31	2.21
23"+	0.85	1.00	2.40	3.03

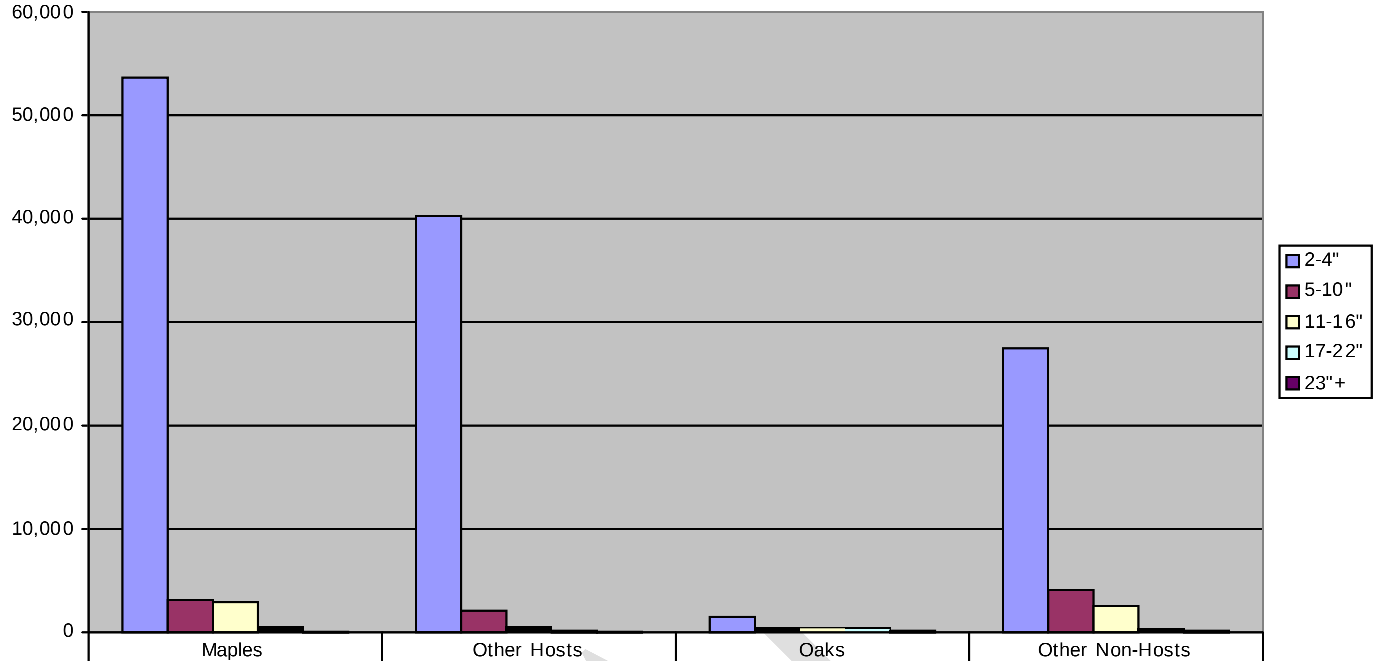
Basal Area by Species Group - Height Class 2



Total Stems - Height Class 2



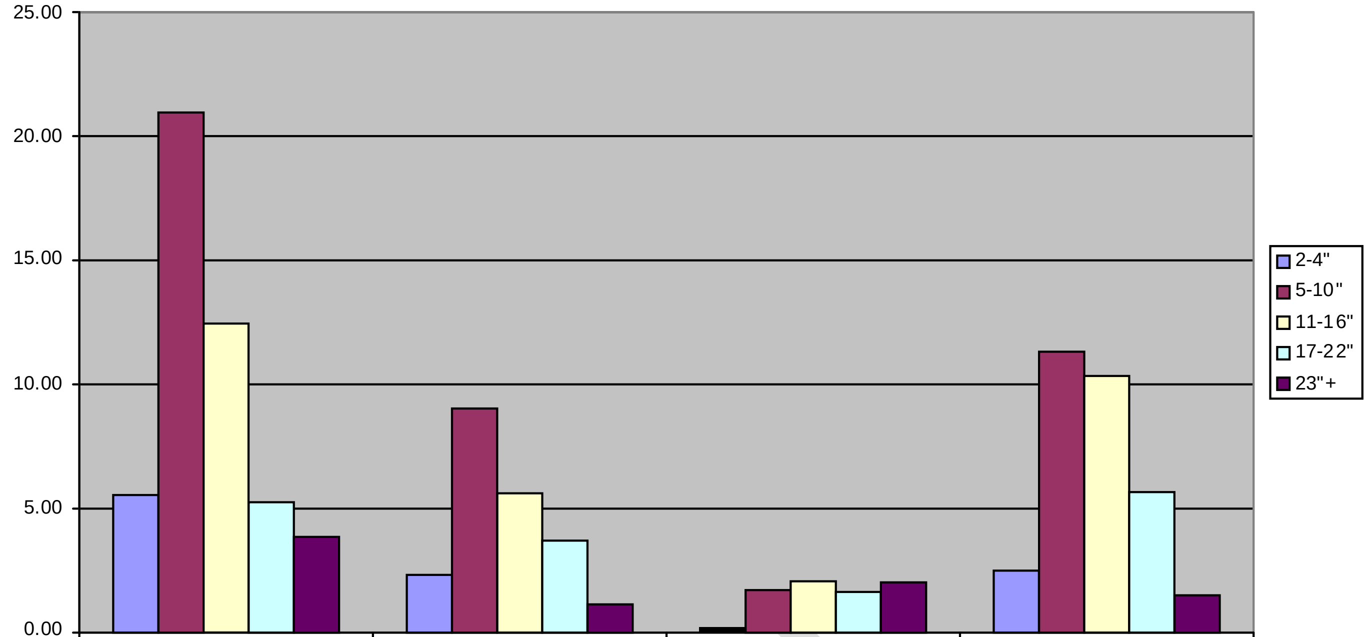
Total Stems - Height Class 2



	Maples	Other Hosts	Oaks	Other Non-Hosts
2-4"	53,640	40,271	1,505	27,452
5-10"	3,135	2,105	419	4,116
11-16"	2,927	474	395	2,532
17-22"	474	158	316	316
23"+	79	79	158	158

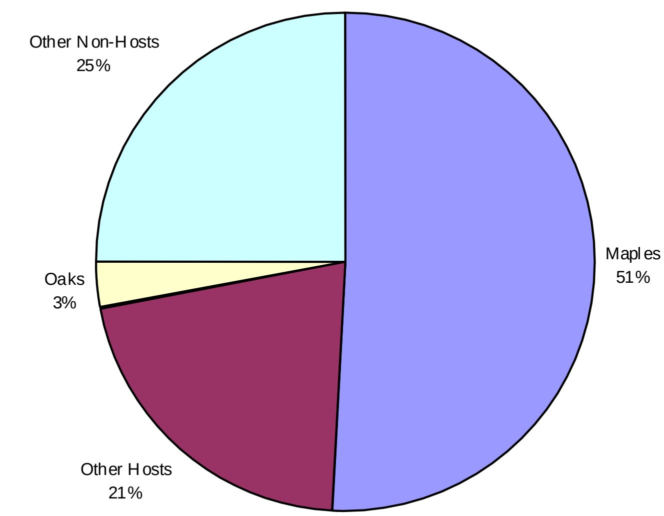
Height class 3 (30–65 feet tall average tree height) contains 1979.5 acres within the study area. Seventy-two percent of stems within this group are potential hosts also representing 64 percent of the basal area.

Basal Area (sq.ft./acre) by Species Group and Diameter Class

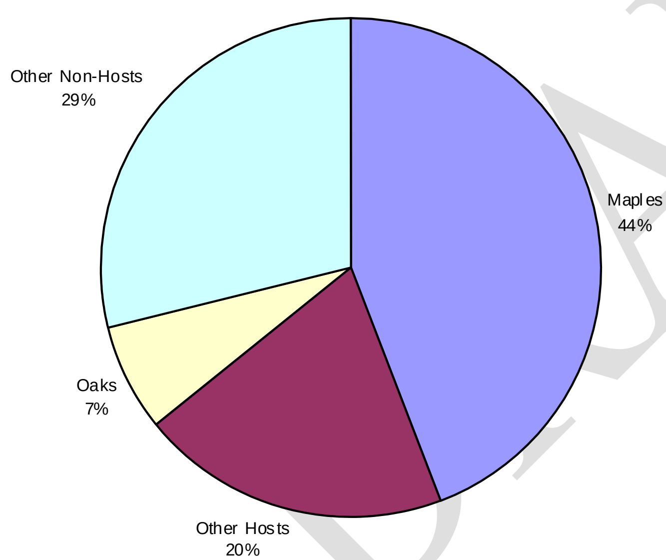


	Maples	Other Hosts	Oaks	Other Non-Hosts
2-4"	5.55	2.33	0.18	2.50
5-10"	20.95	9.03	1.72	11.32
11-16"	12.45	5.62	2.07	10.34
17-22"	5.26	3.71	1.64	5.67
23"+	3.86	1.14	2.03	1.51

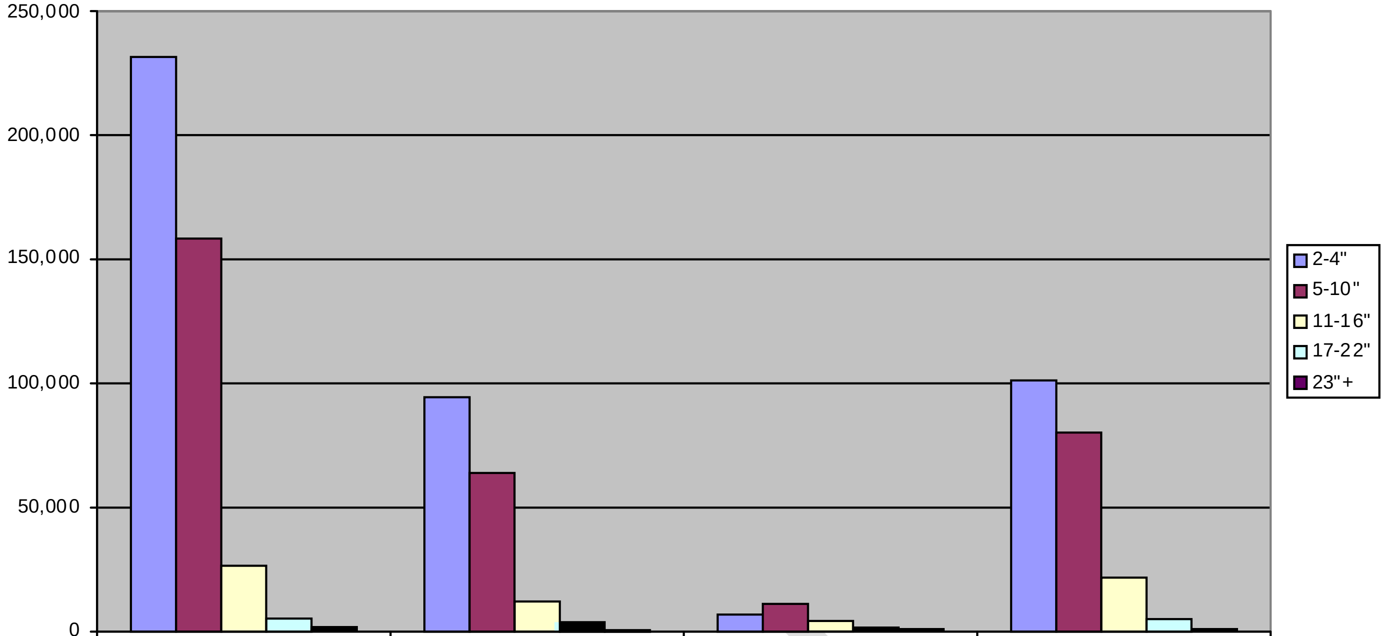
Stems by Species Group - Height Class 3



Basal Area by Species Group - Height Class 3

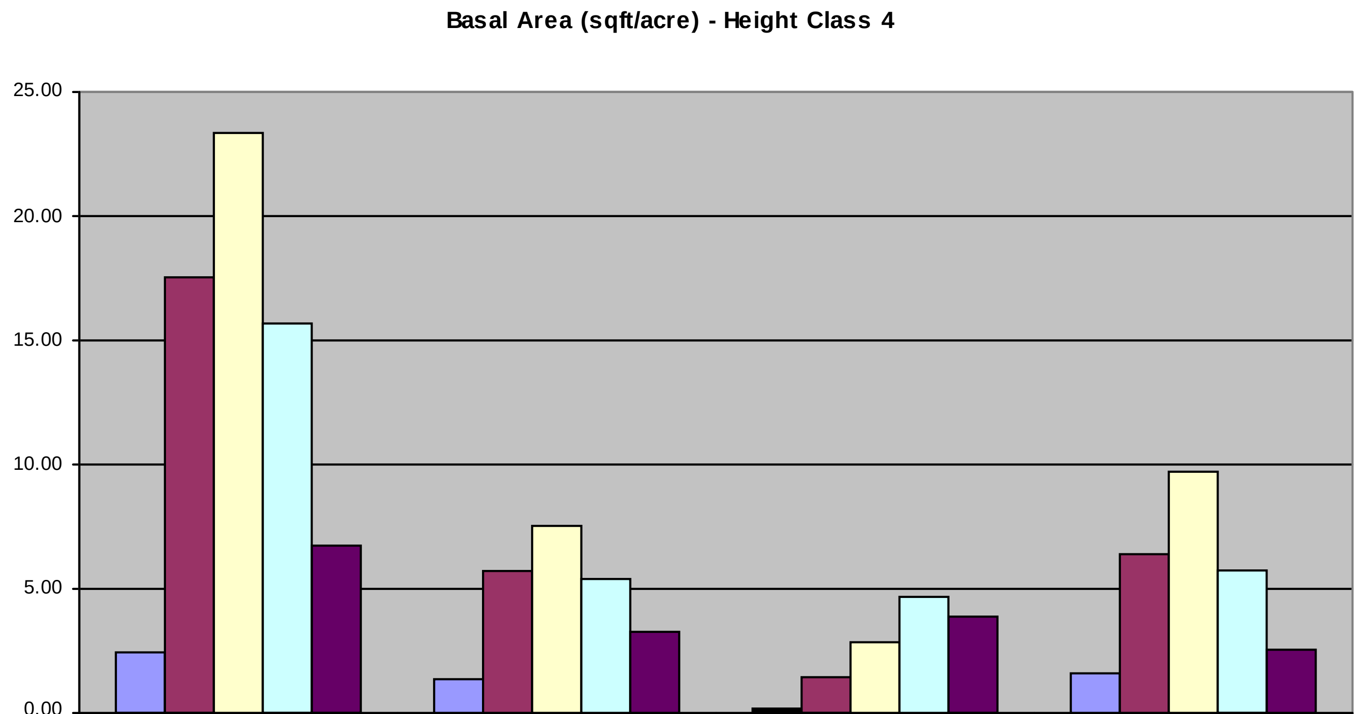


Total Stems by Species Group and Diameter Class - Height Class 3

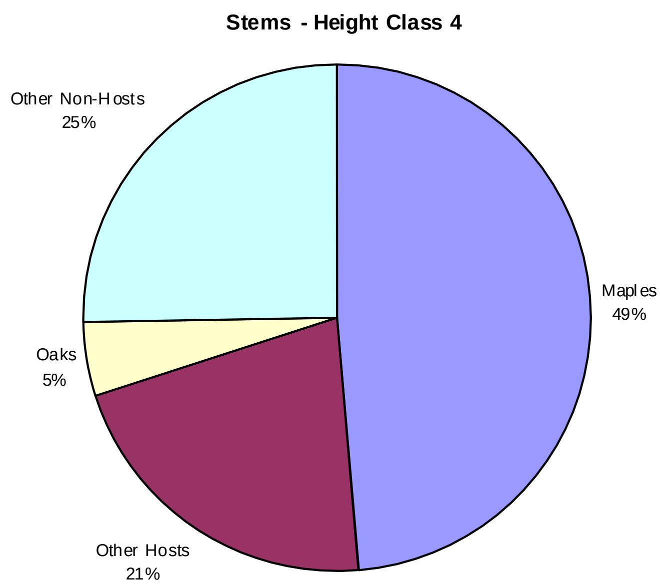


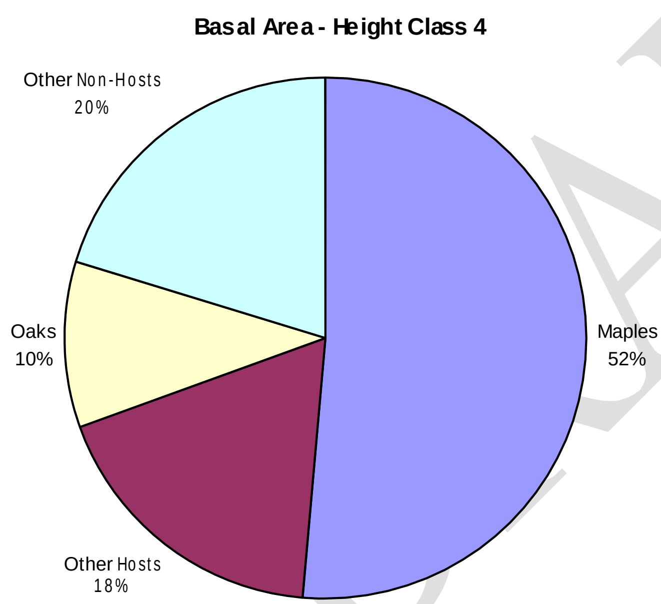
	Maples	Other Hosts	Oaks	Other Non-Hosts
2-4"	231,523	94,383	6,889	101,193
5-10"	158,361	63,978	11,224	80,249
11-16"	26,605	12,194	4,335	21,735
17-22"	5,305	3,801	1,584	5,127
23"+	1,861	614	891	891

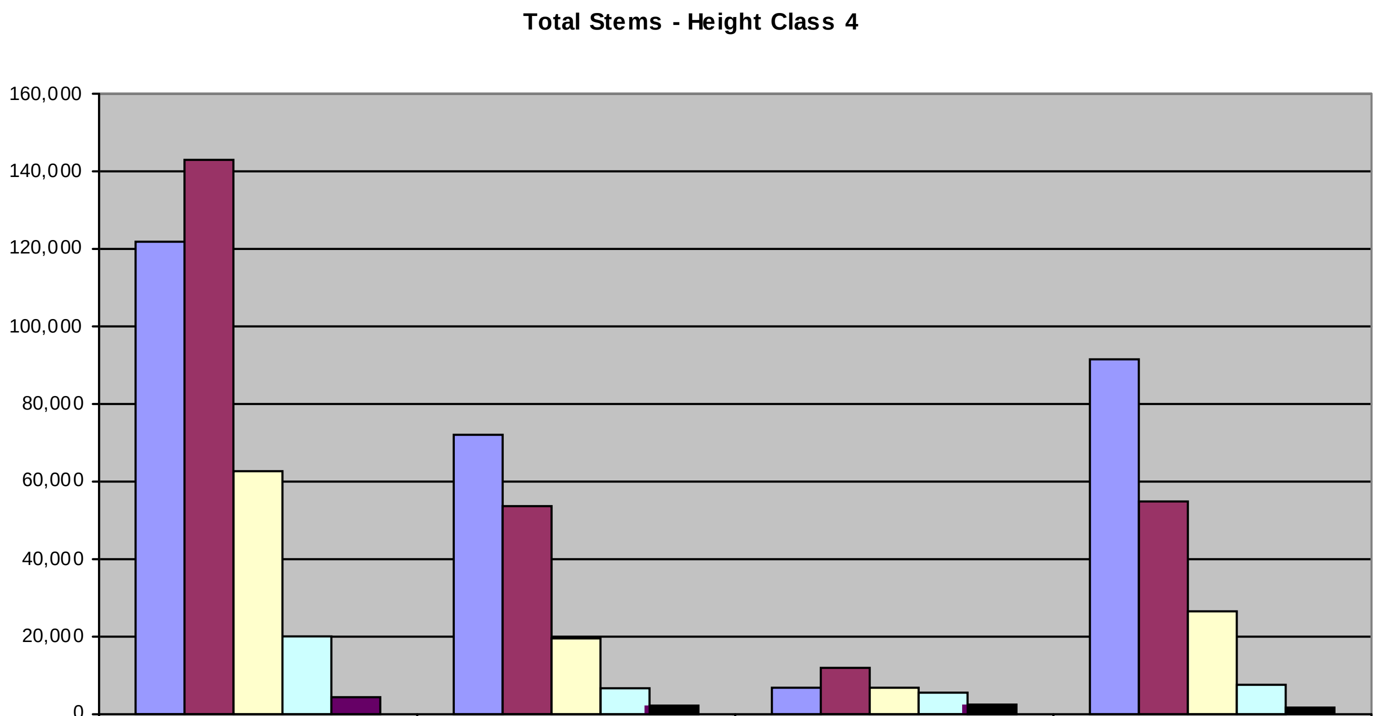
Height class 4 (66–90 feet tall average tree height) contains 2503.1 acres within the study area. Seventy percent of stems within this group are potential hosts also representing 70 percent of the basal area.



	Maples	Other Hosts	Oaks	Other Non-Hosts
2-4"	2.44	1.36	0.16	1.60
5-10"	17.54	5.72	1.44	6.39
11-16"	23.35	7.53	2.85	9.71
17-22"	15.68	5.40	4.68	5.74
23"+	6.73	3.27	3.88	2.55


Stems - Height Class 4
Other Non-Hosts
25%
Maples
49%
Oaks
5%
Other Hosts
21%

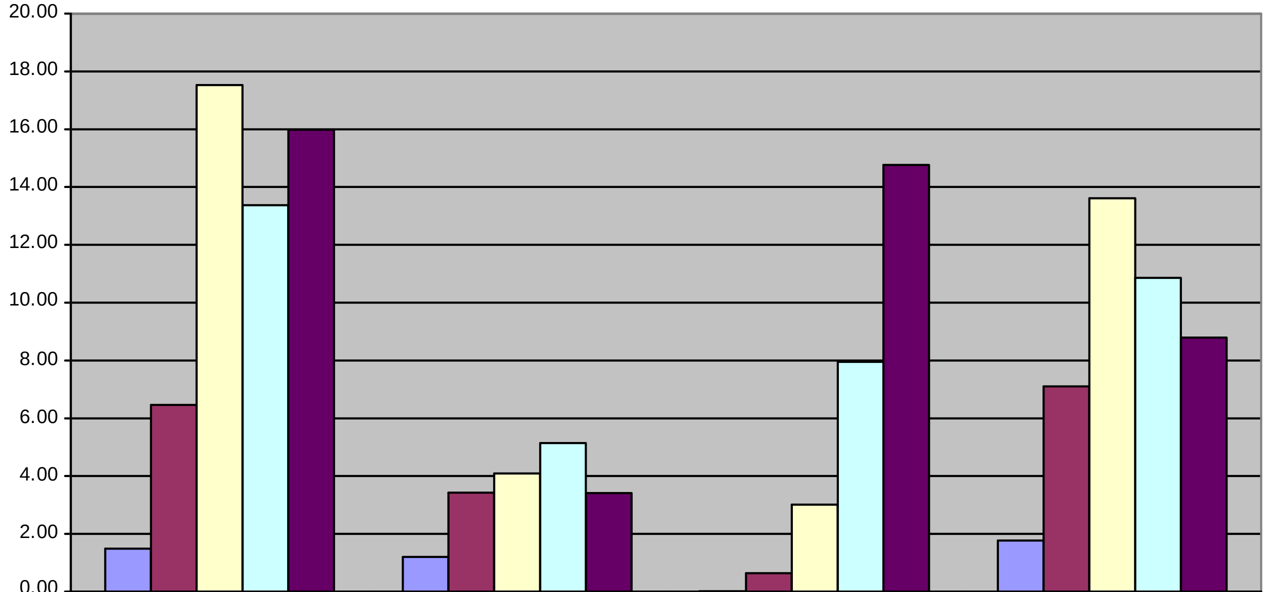

Basal Area - Height Class 4
Other Non-Hosts
20%
Oaks
10%
Maples
52%
Other Hosts
18%



	Maples	Other Hosts	Oaks	Other Non-Hosts
2-4"	121,825	72,089	6,833	91,538
5-10"	142,926	53,641	11,940	54,893
11-16"	62,652	19,599	6,833	26,533
17-22"	20,100	6,683	5,582	7,584
23"+	4,430	2,253	2,503	1,752

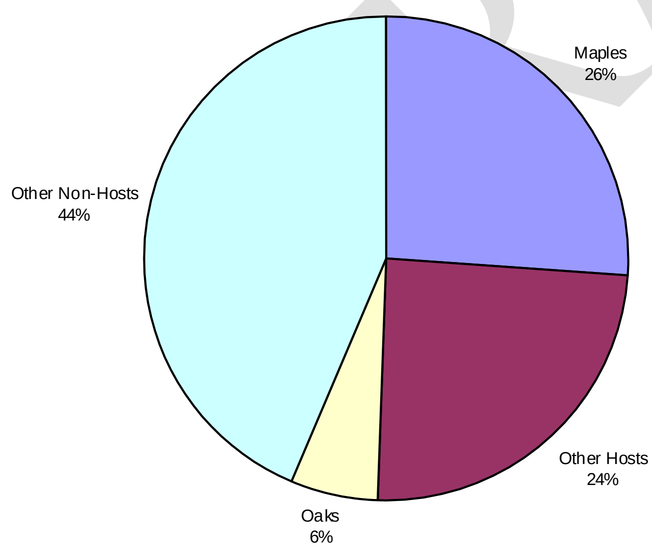
Height class 5 (90–130 feet tall average tree height) contains 943.3 acres within the study area. Fifty percent of stems within this group are potential hosts also representing 51 percent of the basal area.

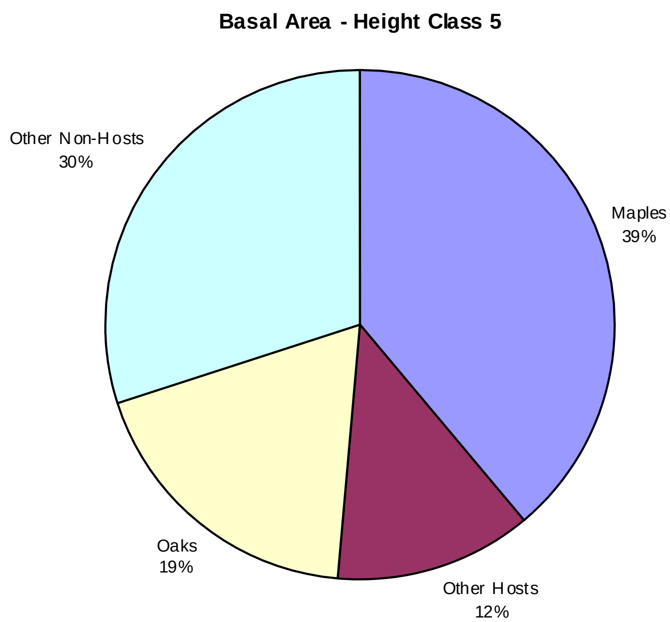
Basal Area (sqft/acre) - Height Class 5

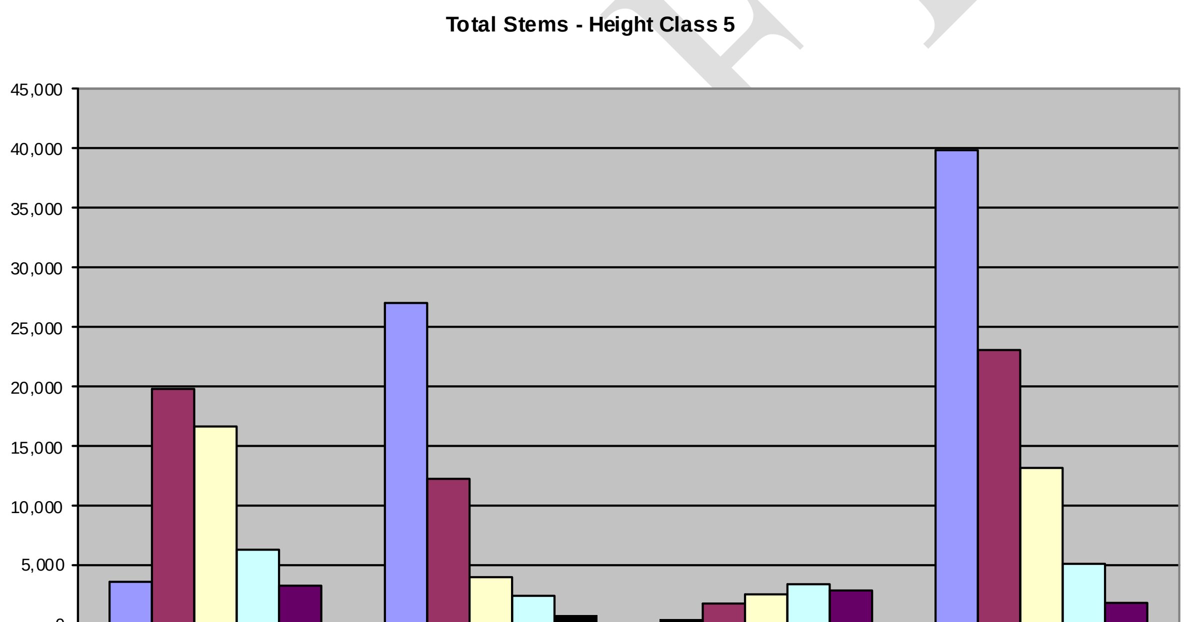


	Maples	Other Hosts	Oaks	Other Non-Hosts
2-4"	1.49	1.20	0.02	1.77
5-10"	6.46	3.43	0.64	7.10
11-16"	17.53	4.09	3.01	13.61
17-22"	13.37	5.14	7.95	10.86
23"+	15.98	3.41	14.76	8.79

Stems - Height Class 5







	Maples	Other Hosts	Oaks	Other Non-Hosts
2-4"	3,603	26,988	396	39,826
5-10"	19,781	12,253	1,773	23,054
11-16"	16,640	4,000	2,556	13,168
17-22"	6,292	2,424	3,405	5,113
23"+	3,273	717	2,886	1,830

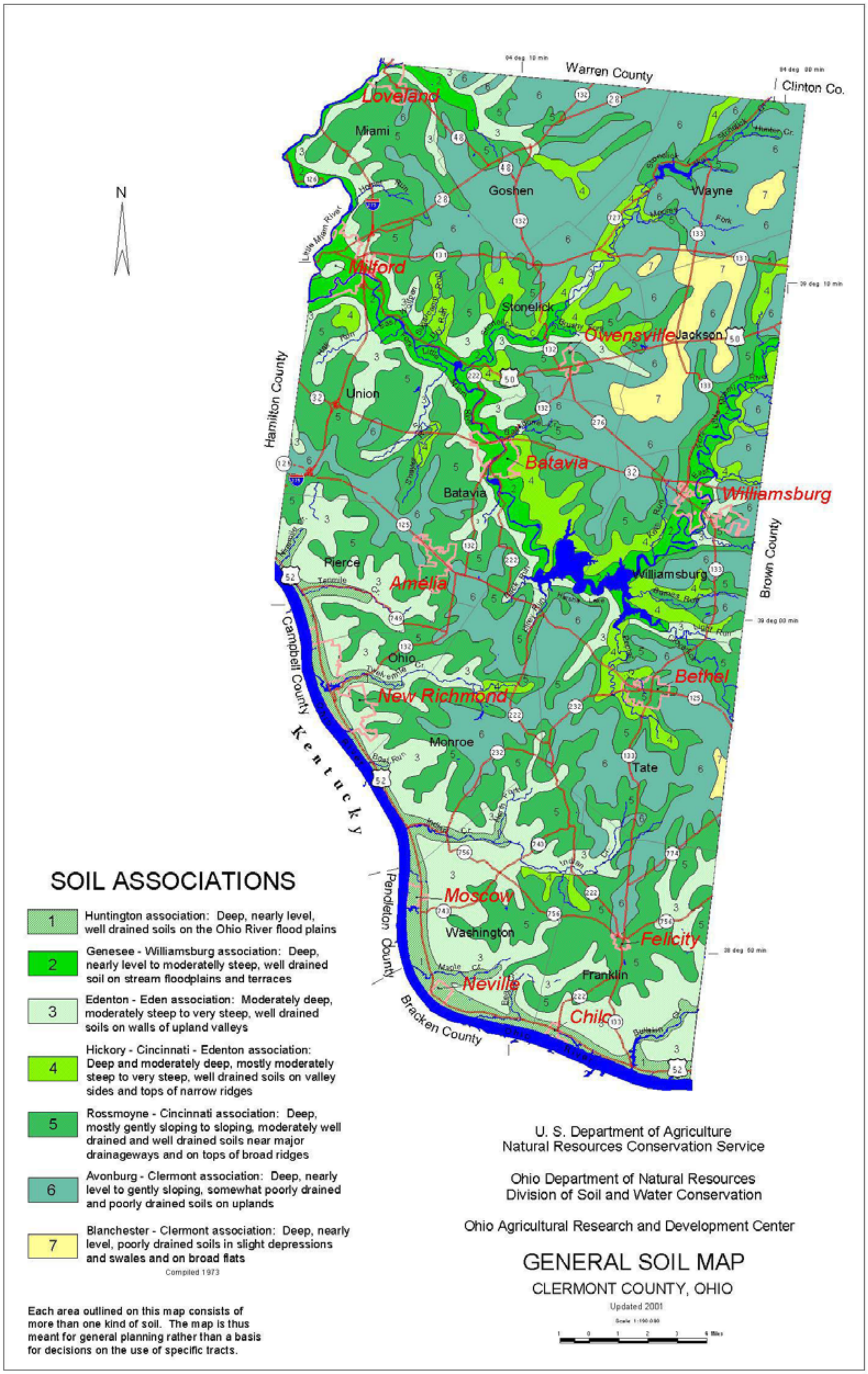
Error Values for Data

For each stratum standard deviation and standard error were determined for total stem count per plot as an indicator of overall data quality. Eighteen plots were not assigned to a stratum due to inaccurate GPS coordinates and are not included in any of the strata. Height classes 3, 4, and 5 (representing over 90 percent of the total forested area) were combined to give error estimates for the strata as a group, and all strata were combined to give total area error estimates. Error estimates are higher for height classes 1 and 2 due to low sampling numbers, but these sampling numbers were established based on the percentage of the total area covered by these strata following the field sampling protocol. For this reason, all strata together were analyzed for error, as well as strata 3, 4, and 5 alone to give a more accurate representation of the overall error.

height class	N	% of plots	Average	SD	SE of Mean	SE%	Acres	% of total area
1	7	0.96%	69	42.824	16.18599	23.56%	25.5	0.44%
2	37	5.07%	57	43.784	7.198077	12.66%	292.7	5.10%
3	224	30.68%	42	24.833	1.659242	3.94%	1979.5	34.46%
4	300	41.10%	28.757	16.274	0.939582	3.27%	2503.1	43.58%
5	144	19.73%	23.1389	11.472	0.956037	4.13%	943.3	16.42%
unassigned height class	18	2.47%						
3, 4, 5	669	91.64%	33		1.31579	4.03%	5425.9	94.46%
all (not including unassigned)	712	97.53%	36		3.71896	10.32%	5744.2	100.00%

unassigned = plot located outside of lidar data extent resulting in no reference to assign height.

Appendix C. Soil Association Map for Clermont County, Ohio (USDA–NRCS, 2002)



Appendix D. Imidacloprid

APHIS is proposing the use of imidacloprid, an insecticide available in various formulations, as a means to control ALB in susceptible tree species. The product will be applied according to label rates and requirements. Imidacloprid is a systemic insecticide in the neonicotinoid insecticide class which is used on a variety of crops to control a large number of pests including certain beetles, leafhoppers, and whiteflies.

I. Effects

A. Human Health

Technical and formulated imidacloprid has low to moderate acute oral mammalian toxicity with median toxicity values ranging from 400 to greater than 2,000 mg/kg. The technical material, and several formulations, are also considered practically nontoxic from dermal or inhalation exposure (USFS, 2005; USDA–APHIS, 2002a). Acute lethal median toxicity values are typically greater than 2,000 mg/kg and 2.5 mg/L for dermal and inhalation exposures, respectively. Available data for imidacloprid and associated metabolites suggest a lack of mutagenic, carcinogenic, or genotoxic effects at relevant doses. Developmental, immune, and endocrine related effects were observed in some mammal studies. In all developmental studies, the effects to the offspring occurred at doses that were maternally toxic (USFS, 2005).

B. Terrestrial Nontarget Organisms

Imidacloprid has low to moderate acute toxicity to wild mammals based on the available toxicity data. Imidacloprid is considered toxic to birds with acute oral median toxicity values ranging from 25 to 283 mg/kg (USDA–APHIS, 2002a; EPA, 2008; USFS, 2005). Reproduction studies using the mallard and bobwhite quail have shown no effect concentrations of approximately 125 ppm for both species.

Technical and formulated imidacloprid is considered acutely toxic to honey bees, and other related bee species, by oral and contact exposure. Median lethal toxicity values range from 3.7 to 230 nanograms (ng)/bee (Schmuck et al., 2001; Tasei, 2002; USFS, 2005; EPA, 2008). Acute sublethal effects in laboratory studies have shown that the no observable effect concentrations (NOEC) may be less than 1 ng/bee (USFS, 2005). Imidacloprid metabolite toxicity to honey bees is variable with some of the metabolites having equal toxicity to imidacloprid while other metabolites are considered practically nontoxic (USFS, 2005). Due to concerns regarding the potential sublethal impact of imidacloprid to honey bees, several studies were conducted to determine potential effects in laboratory and field situations. Studies to assess the effects of imidacloprid on homing behavior, colony development, foraging activity, reproduction, wax/comb production, colony health, as well as other endpoints, revealed that there was a lack of effects, or effects were observed at test concentrations above those measured in nectar and pollen in the field under various application methods (Tasei et al., 2000; Tasei et al. 2001; Tasei, 2002; Bortolloti et al., 2003; Maus et al., 2003; Morandin and Winston, 2003; Stadler et al., 2003; Schmuck, 2004; Nguyen et al., 2009). Concerns regarding the impact of sublethal exposure to imidacloprid by honey bees in the presence of other stressors has also been evaluated in laboratory studies. Recent data suggests an interaction between imidacloprid, as well as other neonicitinoids, and pathogens such as *Nosema* that result in colony and immune function impacts to honey bees (Pettis et al., 2012; Vidau et al., 2011; Alaux et al., 2010).

C. Aquatic Nontarget Organisms

Imidacloprid has low toxicity to aquatic organisms including fish, amphibians, and some aquatic invertebrates. Acute toxicity to fish and amphibians is low with acute median lethal concentrations typically exceeding 100 mg/L (EPA, 2008; USFS, 2005). Chronic toxicity to fish is in the low parts per million range depending on the test species and endpoint. Aquatic invertebrates are more sensitive to imidacloprid, when compared to fish with acute median toxicity values in the low parts per billion, range to greater than 100 mg/L depending on the test species (USDA–APHIS, 2002a; EPA, 2008; USFS, 2005).

II. Exposure and Risk

Imidacloprid is soluble in water and is considered to have moderate mobility based on soil adsorption characteristics for several soil types. Based on field dissipation studies, the foliar half-life is less than 10 days, while the persistence in soil can range from 27 to 229 days, (CA DPR, 2006; USFS, 2005). In water, imidacloprid is stable to hydrolysis at all relevant pH values but breaks down rapidly in the presence of light with aqueous photolysis half-life values typically less than 2 hours. The low volatility and proposed method of application in this program minimizes the potential for exposure to imidacloprid by air.

A. Human Health Exposure and Risk

Based on the expected use pattern for both types of imidacloprid applications, potential exposure will be primarily for applicators and workers. Exposure to applicators will be reduced by following label directions, including recommendations for personal protective equipment, resulting in minimal risk to applicators.

There is the potential for dietary exposure to the public in cases where sugar maple or silver maple trees that may be treated are used in the production of maple syrup, or if residues leach into groundwater supplies that are used as a drinking water source. In regard to treatment of sugar maple trees, USDA–APHIS will tag each sugar maple tree to inform the public not to tap these trees since they were treated with imidacloprid. Exposure to groundwater is expected to be minimal, based on the proposed method of application and monitoring data that was collected in association with ALB eradication efforts in other States. Groundwater sampling between 2003 and 2006 in Suffolk County, New York, demonstrated that approximately half of the samples had no detectable levels of imidacloprid and, of those where detections occurred, the average concentration was 3.2 parts per billion (ppb) which is below levels of concern for human health (USDA–APHIS, 2007). Samples with detectable levels of imidacloprid do not suggest a contribution from the ALB eradication program because other uses of imidacloprid occurred in these areas, and there did not appear to be a significant correlation between ALB-related treatment activities and increased residues (USDA–APHIS, 2007).

B. Terrestrial Nontarget Organisms

Exposure and risk to terrestrial vertebrates (e.g., birds and mammals) is expected to be minimal, based on the proposed method of application and available effects data. Exposure from drift is not expected, nor is any significant runoff, because applications are made as direct tree injections or soil applications. There is the possibility of imidacloprid exposure to mammals and birds that may feed on insects or vegetation from treated trees. Imidacloprid leaf and twig residue values measured from previous monitoring studies demonstrate that most birds and mammals would have to consume several times their daily intake to reach an acute or chronic toxicity threshold value. Residues in insects that may be consumed from contaminated trees are currently unknown; however, they are expected to be low as insects would not forage exclusively on treated trees without mortality occurring and being unavailable as a prey item. Imidacloprid is also specific to certain groups of insects, and would not be expected to have broad spectrum effects on all insects that may be present on treated trees.

Applications are made to individual trees so insects on other surrounding vegetation would not be impacted and would be available for consumption by insectivores.

Imidacloprid exposure to terrestrial invertebrates, especially honey bees, is also not expected to result in significant risk to pollinators. Pollinator exposure to imidacloprid will be reduced since only treated trees and their associated flowers and pollen could have residues, while other flowering plants that have not been treated will not contain residues. Exposure and risk would increase in cases where large numbers of trees, as proposed in one of the alternatives in this EA, are treated over large areas prior to flowering.

Concentrations of imidacloprid in pollen from trees that were treated for ALB is unknown; however, based on data for crops levels are expected to be below effect levels. Previous studies have shown that imidacloprid levels in pollen and flowers are low compared to other parts of the plant. Schmuck (2004) found that levels of imidacloprid and associated metabolites were below the level of detection (0.001 mg/kg) in sunflowers. Laurent and Rathahao (2005) found average imidacloprid residues from sunflower pollen of 13 micrograms (µg)/kg, while Bonmatin et al. (2005) found average imidacloprid levels of 6.6 and 2.1 µg/kg in flowers and pollen, respectively, from treated maize seed. These reported sunflower and corn pollen residues are within the range of values from other studies, and are similar to imidacloprid residue levels found in the nectar and pollen for rape (Maus et al., 2003). Chauzat et al. (2006) found that approximately 50 percent of the pollen samples collected from pollen traps in apiaries contained measurable levels of imidacloprid with an average concentration of 1.2 µg/kg.

As part of its environmental monitoring program, APHIS analyzed imidacloprid residues in flowers collected from imidacloprid-treated willow, horse chestnut, and maple trees from New York during and after ALB eradication efforts (USDA–APHIS, 2002b; USDA–APHIS, 2003). With the exception of one maple flower sample (0.13 mg/kg), all residues were below the level of quantification or detection (level of detection = 0.03 mg/kg) over a 2-year sampling period. Residues in flowers were lower than in twig and leaf residues, similar to observations in other plant species, such as corn and sunflowers. Due to the uncertainty in the characterization of risk to honey bees from the proposed treatments in this program, APHIS is funding a multi-year study that will provide more use specific information for imidacloprid exposure and effects to honey bees. APHIS is working cooperatively with the University of Maryland–Baltimore and the USDA–Agricultural Research Service (a research branch of USDA) to determine the potential for exposure to honey bees from the types of applications proposed in the ALB program as a means to supplement the available data regarding honey bee impacts and potential imidacloprid exposure. Preliminary results suggest that these types of applications do not adversely impact honey bees and their hives, and that imidacloprid residue data collected from maple trees is below levels where adverse impacts would be expected to occur. APHIS recognizes the importance of honey bees and the myriad of threats posed to their general health, and will continue to collect data to evaluate the potential for individual, or cumulative impacts, to honey bee health from ALB eradication activities.

Exposure of imidacloprid to soil invertebrates, in cases of soil injection, is possible. Soil-dwelling invertebrates that are sensitive to imidacloprid would be impacted; however, the effects would be localized to the areas of treated soil and would be transient, based on available data (USFS, 2005). In cases where imidacloprid is tree-injected, there would be reduced exposure and risk to soil-dwelling terrestrial invertebrates; exposure would occur primarily from leaves that drop in the fall from trees that have been treated in the spring. These risks would be proportional to the number of trees treated in a given area.

C. Aquatic Nontarget Organisms

Imidacloprid exposure in aquatic environments is also expected to be minimal and to not pose a significant risk to aquatic biota. The method of application eliminates the potential for drift and, in the case of tree injections, eliminates the probability of off-site transport via runoff.

Another potential pathway of exposure to aquatic organisms is imidacloprid residues in leaf litter in the fall from treated trees that can be transported to aquatic environments. Sublethal impacts to some aquatic invertebrates that feed on leaf litter containing imidacloprid have been observed, as well as impacts on decomposition rates (Kreutzweiser et al., 2009; Kreutzweiser et al., 2008; Kreutzweiser et al., 2007). Mortality to leaf-shredding insects occurred at higher rates that were intentionally overdosed; however, significant mortality did not occur to shredding insects such as *Pternarcys dorsata* and *Tipula sp*. Kreutzweiser et al., 2009; Kreutzweiser et al., 2007) at typical field applications.

Sublethal impacts (e.g., reduced feeding and decomposition rates) were observed at residues that could occur in field applications. These types of sublethal impacts would be reduced in field applications as other plant material that has not been treated with imidacloprid would be available to aquatic decomposers. Exposure and risk to aquatic organisms will increase in situations where large numbers of trees may be treated within a watershed; however, the number of trees treated relative to the total available is low. The risk to aquatic organisms from this type of exposure can be reduced by not treating trees or treating a small number of trees, and avoiding treatments in proximity to surface water. There is a potential for subsurface transport of imidacloprid to aquatic habitats for applications made directly into soil. This type of exposure will be minimized by only making applications where the groundwater table is not in proximity to the zone of injection, and avoiding soils that have a high leaching potential. Conservative estimates of potential aquatic residues in static, shallow bodies of water from soil injections, based on maximum label rates, demonstrate values that are not expected to have indirect or direct impacts to aquatic biota. Actual aquatic residues would be expected to be below effect levels for aquatic biota due to the low probability of off-site transport because of the method of application and environmental fate of imidacloprid.

III. Summary

Imidacloprid risks to human health are expected to be low regardless of the extent of use as toxicity is low and exposure to the general public is low due to the methods of application. Exposure is greatest for applicators, and would increase in cases of large scale treatment because trees are treated individually. Risk to applicators will be reduced by following label directions regarding personal protective equipment. Risks to most nontarget organisms is expected to be low under a range of use scenarios; however, there is the potential for increased risk to some aquatic invertebrates, as well as pollinators, if large numbers of trees are treated.

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Appendix E. Triclopyr/Imazapyr/Metsulfuron

APHIS proposes the use of two triclopyr formulations in the treatment of stumps and their associated sprouts from host trees that were removed as part of the ALB Eradication Program. As part of the ALB eradication effort host trees may be physically removed along with the stumps to prevent re-infestation; however, under certain circumstances physical removal of the stumps may not be possible. Areas where trees were removed but the stumps cannot be physically destroyed may require herbicide applications to ensure that stumps and associated sprouts do not allow for ALB re-infestation. APHIS proposes the use of two triclopyr formulations for the treatment of stumps, Garlon® 3A, that contains the active ingredient triclopyr triethylamine salt (TEA), and Pathfinder® II, that contains the active ingredient triclopyr butoxyethyl ester (BEE). Pathfinder® II allows more flexibility in being able to treat the bark instead of direct application to cut areas of the stem.

In addition, APHIS is proposing some foliar applications of Garlon® 3A that will be mixed with two other herbicides, Arsenal® and Escort® XP, to treat sprouting foliage from stumps that that have been removed as part of the eradication efforts. This use is considered minor compared to physical removal and treatment of stumps, and would only occur in areas where older stumps have not been removed or treated and have began to resprout. All applications will be made by hand either by painting undiluted material on the stump or directly spraying stumps and/or sprouting foliage using a backpack sprayer.

The purpose of this assessment is to summarize the available response data for each triclopyr formulation, as well as other herbicides that may be used, and discuss the potential for exposure and risk to human health and the environment under the proposed use in the ALB program.

A. Herbicide Response Data

Garlon® 3A contains the active ingredient, TEA, which is a pyridine systemic herbicide commonly used for control of woody and broadleaf plants. This formulation can cause significant eye irritation but has low acute inhalation and dermal toxicity. Acute oral median lethal concentrations range from approximately 600 to 1000 mg/kg suggesting low to moderate toxicity (USFS, 2003). Long-term toxicity studies have shown that triclopyr TEA is not a carcinogen or mutagen, and that toxicity in developmental and reproductive studies primarily occurs at high doses and at levels that are also maternally toxic (EPA, 1998).

The other proposed triclopyr formulation, Pathfinder ® II, can cause slight temporary eye irritation during application, as well as some skin irritation in cases of prolonged exposure. Acute oral median lethal concentrations are 1,000 mg/kg with acute inhalation and dermal toxicity median lethality values greater than the highest test concentration, suggesting low acute mammalian toxicity under various exposure pathways. Triclopyr BEE is not considered carcinogenic or mutagenic and, in cases where developmental and reproductive studies demonstrate effects, doses were at levels considered to be maternally toxic.

The primary degradation product of triclopyr TEA and BEE is triclopyr acid, which was also evaluated and found to have a similar mammalian toxicity profile to the amine and ester.

Triclopyr TEA toxicity to terrestrial nontarget organisms is considered low, with the exception of terrestrial plants. Toxicity to avian species is low for triclopyr TEA with oral and dietary median lethal toxicity values greater than 2,000 mg/kg and 10,000 ppm, respectively (USFS, 2003; EPA, 2008). Chronic toxicity to birds is also expected to be low with reproductive toxicity No Observable Effect Levels (NOEL) of 100 and 500 ppm for the mallard and bobwhite quail, respectively, when exposed to triclopyr acid (EPA, 1998). Triclopyr TEA is considered practically nontoxic to honey bees based on acute contact studies (EPA, 1998). Triclopyr TEA does exhibit toxicity to terrestrial plants, as expected, based on results from seedling emergence, germination, and vegetative vigor studies. The primary degradation product of triclopyr TEA, triclopyr acid, is similar in toxicity to terrestrial nontarget organisms based on the available toxicity data. Available avian toxicity data for triclopyr BEE demonstrates slight toxicity, with median lethal dose values ranging from 735 to 849 mg/kg for the bobwhite quail (EPA, 1998).

TEA toxicity to aquatic organisms is low for fish and aquatic invertebrates. Available acute fish toxicity data demonstrates median lethal concentrations greater than 100 mg/L for Garlon® 3A and technical triclopyr TEA (EPA, 2008; Wan et al., 1987). Triclopyr TEA is considered practically nontoxic to aquatic invertebrates in freshwater and marine environments, with toxicity values exceeding 300 mg/L. Chronic toxicity to fish and aquatic invertebrates is also low with chronic toxicity NOEC ranging from approximately 80 mg/L to greater than 100 mg/L, depending on the test organism and endpoint. Triclopyr BEE is considered slightly to highly toxic to aquatic invertebrates and fish, with median lethal concentrations ranging from approximately 0.36 mg/L to 12.0 mg/L (USFS, 2003). The primary metabolite of triclopyr TEA and BEE, triclopyr acid, is considered practically nontoxic to aquatic organisms, based on available toxicity data (EPA, 1998; 2010).

For foliar treatments, Garlon® 3A is proposed for use as a mixture with the active ingredients imazapyr and metsulfuron-methyl. Imazapyr is an imidazolinone herbicide while metsulfuron-methyl is a sulfonylurea

Herbicide, with both products being a common mix partner with triclopyr in the control of woody vegetation. The toxicity of imazapyr and metsulfuron-methyl is considered low for mammals. The formulation containing metsulfuron-methyl, Escort® XP, is considered practically nontoxic to mammals via inhalation, dermal, and oral exposures. All toxicity values were reported as greater than the highest test concentration. In addition, metsulfuron-methyl is not considered to be carcinogenic nor has it been shown to be a reproductive, teratogenic, or developmental hazard (USFS, 2005). Escort® XP is considered a slight eye irritant, but is not considered a skin irritant or sensitizer. The other mix partner, Arsenal®, containing the active ingredient imazapyr, has a similar mammalian toxicity profile to metsulfuron-methyl and is considered practically nontoxic in acute inhalation, dermal, and oral exposures. Imazapyr is not considered to be a carcinogen or mutagen, and is not known to be a reproductive, teratogenic, or developmental hazard (USFS, 2004).

The toxicity of imazapyr and metsulfuron-methyl is low to all nontarget organisms, with the exception of some aquatic and terrestrial plants. Both products are considered practically nontoxic to wild mammals, birds, and terrestrial invertebrates, based on the available acute and chronic toxicity data (EPA, 2010; USFS, 2004; 2005). Toxicity to fish and aquatic invertebrates is very low, with median lethal acute concentrations typically exceeding 100 mg/L for both chemicals (EPA, 2010; USFS, 2004; 2005).

Chronic toxicity to fish and aquatic invertebrates is also considered low, based on the available No Observable Effect Concentrations (NOECs) that were reported from standardized toxicity studies.

B. Herbicide Exposure and Risk

Exposure to humans and the environment from the triclopyr amine or ester is expected to be minimal, based on the environmental fate and use pattern proposed in this program. Triclopyr TEA is considered mobile, based on the available information regarding water solubility and soil adsorption; however, it breaks down in soil (~12 days) and water (< 1 hr) to triclopyr acid, and to a lesser extent triethanolamine. Triclopyr BEE has low water solubility, and adsorbs more strongly to soil when compared to the amine. Triclopyr BEE also breaks down quickly to triclopyr acid in soil and water, with hydrolysis half-lives of less than1 day (CA DPR, 1997). Triclopyr acid is considered slightly mobile, based on soil adsorption values; however, the mobility appears to decrease with time (CA DPR, 1997). Half-lives of the acid in water are short, ranging from 0.5 to 2.5 days, while in soil half-lives range from 8 to 18 days (EPA, 1998). The other minor metabolite, triethanolamine, also has a short half-life in the environment under most conditions, with soil and water half-lives ranging from 5.6 to 13.7 days in soil, and 14 to 18 days in water under aerobic conditions (EPA

1998). The acid can break down to 3,5,6-trichloro-2-pyridinol (TCP) in soil and water, and available toxicity data suggests TCP is more toxic to aquatic nontarget organisms than either triclopyr TEA, BEE, or the acid. Although this metabolite is more toxic than the parent, its rate of development is such that environmental concentrations will not reach levels that would pose a risk to nontarget organisms. Triethanolamine is less toxic than the parent or acid to aquatic organisms, based on limited toxicity data. Volatilization is not expected to be a significant exposure pathway due to the low vapor pressure that has been measured for triclopyr TEA, BEE, and the associated acid (CA DPR, 1997).

Imazapyr and metsulfuron-methyl, which are proposed for use as a mixture with Garlon® 3A to treat some foliage from sprouting host plant stumps, will also result in minimal exposure in the environment. Imazapyr is water soluble and does not appear to bind readily to soil, based on soil adsorption coefficient values that range from 30 to 100 (USFS, 2004). Imazapyr degradation and dissipation half-lives are variable, ranging from approximately 25 days to greater than 300 days. Metsulfuron-methyl half-lives in soil range from 17 to 180 days. Reported soil adsorption and water solubility values suggest that metsulfuron-methyl has some mobility. Off-site transport of these two herbicides, as well as Garlon® 3A, is not expected because the products are being directed by hand specifically to small sprouts originating from the host plant stumps. Material is applied using a large droplet size under low volume to minimize drift, and ensure application and uptake directly to the sprouting plants. In addition, this use is minor and will generally only be used in larger wooded areas where physical removal of the stump is not possible. Based on the proposed use pattern and rate for these products and their favorable toxicity profile, no significant risk to surface water or groundwater resources is expected.

Significant risk to human health from applications of Garlon® 3A alone, or as a mixture, as well as Pathfinder® II is not expected based on the available use pattern and mammalian toxicity data. Exposure will be limited to applicators because treatments are made directly to stumps or sprouting foliage. Adherence to required personal protective equipment and other label directions will minimize exposure and risk to workers, as well as the environment. Risk is not expected to be significantly greater from the proposed foliar applications that may be made using the mixture of Garlon® 3A with formulations containing the active ingredients imazapyr and metsulfuron-methyl. This use pattern is minor compared to physical removal of the stumps or the treatment of stumps as they are the preferred method of stump treatment. This application will occur to those stumps that have re-sprouted in areas where physical removal was not possible or a previous stump treatment with an herbicide did not occur.

Exposure to humans is limited to applicators; however, adherence to label requirements regarding personal protective equipment will minimize exposure and risk. The low potential for exposure and favorable mammalian toxicity profile for each active ingredient suggests that significant risk to applicators is not expected.

Exposure to terrestrial and aquatic nontarget organisms is also expected to be minimal from each proposed formulation and mix. Significant drift or runoff is not expected as applications are not broadcast applied, but are made using either a backpack sprayer to deliver a coarse droplet size or by painting the material on individual stumps and associated sprouting vegetation. The low probability of offsite transport for any of the products is expected to result in very low exposure to nontarget organisms. The low probability of exposure and the favorable available effects data demonstrate that all products have a very low risk of causing adverse ecological risk. Risk to nontarget organisms is greatest for plants as they are the most sensitive group to each application; however, impacts to terrestrial plants is expected to be minimal, and will only potentially occur for those plants that are immediately adjacent to treated stumps or sprouts. Impacts to terrestrial plants immediately adjacent to treated stumps will be minimized by following label directions for each herbicide treatment. Significant exposure to aquatic plants is not expected, based on the method of application and adherence to label restrictions regarding applications near aquatic areas. Exposure in aquatic systems is not expected to occur at levels that could result in any direct impacts to aquatic plants, or at levels that would suggest indirect impacts to aquatic organisms that depend on aquatic plants as a food source or as habitat.

C. Summary

The selective use of herbicides that are proposed for this program will have minimal human health and environmental risks. Applications are directed specifically at stumps or sprouting vegetation from cut stumps using methods that minimize offsite transport of the proposed formulations. The low potential for offsite transport and favorable toxicity profile for each herbicide to most nontarget organisms minimizes risk to human health and the environment.

D. References

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Appendix F. Response to Comments on the Asian Longhorned Beetle Cooperative Eradication Program in Clermont County, Ohio, Environmental Assessment, May 2012

This appendix provides a response to those comments on the May 2012 EA that were not incorporated into this revised EA, but APHIS needed to address to provide clarification regarding the program.

Comment 1

Several commenters indicated that ALB has not killed a tree in the United States and is not a significant threat. The ALB program has done more damage in a few months than ALB has done in the approximately 7 or more years it is believed to have been present in Tate Township. In addition, the beetle spreads very slowly; it has only spread two to three miles in such time. There is no need to make a rapid or rash decision regarding its control in Ohio.

The ALB is one of the most destructive and costly invasive species ever to enter the United States. It threatens urban and suburban shade trees and recreational and forest resources valued at hundreds of billions of dollars. Potentially, it can impact such industries as maple syrup production, hardwood lumber processing, nurseries, and tourism. If it were to become widely established, its impact would be felt in urban, suburban, and forested parts of the country. Over the longterm, the removal of infested trees and select treatment/removal of high risk host trees as part of the ALB eradication program will kill far fewer trees than if ALB is allowed to become established in Ohio. If left unchecked, ALB will continue to spread and infest additional healthy and stressed trees, whereas ALB eradication efforts utilizing a combination of tactics increases the probability of stopping the pest's spread.

In late summer or fall, when the beetle is in its larval (immature) stage, it bores deep into the heartwood of its host tree where larvae feed and develop. The following summer they emerge as adults and then mate, starting the cycle again. As stated in the EA, the larval tunneling weakens and eventually kills infested host trees making the ALB a destructive and costly invasive species. Tree mortality occurs over a period of time similar to other serious forest pests, such as gypsy moth and the balsam woolly adelgid; however, the infestation does result in mortality either directly from ALB, or by weakening the host tree and allowing impact from secondary pests. Some infested trees may respond to oviposition and exit hole wounds by compartmentalizing the affected areas; however, repeated attacks continue to weaken the tree, resulting in eventual mortality.

Partial dieback of trees over time, as well as mortality, have been noted where ALB is endemic and in countries where it has been introduced (Haack et al., 2010). In the United States, ALB-related tree mortality was observed in the New York, New Jersey, Massachusetts, and Illinois infestations by inspections from foresters working at the city, State and/or Federal level. Symptoms of infestation can occur in 3 to 4 years with eventual death occurring within 10 to

15 years, depending on site conditions. The fact that mortality is not immediate does not diminish the potential impact of ALB if it were to become established and spread beyond the current area of infestation.

Reference to a paper by Dodds and Orwig (2011) by a commenter was used to suggest that ALB does not result in tree mortality and that no mortality has occurred in the United States. The paper in question and the statement regarding no observed mortality is in relation to a study conducted in two small plots in natural areas that are adjacent to an infestation in Massachusetts. No tree mortality was observed in the two plots; however, the duration of the infestation in those plots is unknown, therefore, infestations were recent enough that mortality had not yet occurred. The authors did not imply that ALB mortality does not occur, but that it was not observed in plots adjacent to a known infestation. It should be noted, however, that the authors conclude that ALB is a serious forest pest and, if allowed to spread, will result in significant economic and environmental impacts, which is consistent with other published literature (Dodds and Orwig, 2011).

Delimitation of the size of the infestation is only approximately 20 percent complete. Thus, it is unknown exactly how far the ALB infestation in Clermont County extends, particularly because of the movement of firewood that has resulted in human-assisted spread of ALB. Early detection of infestations and rapid treatment response are crucial to successful eradication of invasive species. When an invasive species first invades, there is a period of time before the population expands rapidly at a local level, and during that time the pest often goes unnoticed. Once the population begins to expand rapidly, it becomes more difficult to eradicate. Although ALB does not naturally spread quickly over large areas, it has been present in Tate Township since at least 2004, gradually increasing its population and remaining unnoticed. All of the initial outbreaks of ALB in the United States prior to Clermont County were likely present for at least 10 years before discovery, with the exceptions of a small infestation in Jersey City, New Jersey, which was detected within 5 years (USDA–APHIS, 2009) and the infestation in Boston, Massachusetts that was detected within 2 years. The years between arrival and discovery give ALB time to become established in the local environment; it is imperative that rapid response be taken immediately to eradicate it before the founder colony explodes, then becoming extremely difficult or impossible to eradicate. Detection of ALB relatively early after establishment increases the likelihood of eradication (Haack et al., 2010).

Comment 2

Many commenters reported problems with removal and restoration activities of the contractor that is currently conducting this work for the ALB eradication program. One commenter stated that the EA failed to address the negligent actions of contractors.

APHIS reviews all complaints received from property owners regarding contractor activity and uses the complaints as a means to determine appropriate contractors for removal and restoration activities. It is important that ALB program activities are conducted properly. APHIS is working to improve the performance of contractors conducting program activities to ensure the efficacy of the eradication program, and also the satisfaction of property owners in the affected area. All complaints will be addressed through contact with the affected landowner and potential site inspections by APHIS and its cooperators to determine the nature *and extent of any problems. Additionally, the initial removal contract ended on September 30. To avoid a lapse in infested tree removals occurring, the eradication program utilized U.S. General Services Administration (GSA) schedules to secure a month-to-month contract with Davey Tree Expert Company, of Kent, Ohio until a new contractor can be secured. Property owners are asked to communicate any concerns with Davey Tree Expert Company by calling (513) 226–9138 in advance of tree removal work being conducted on their property. The public solicitation for tree removal services in and around Bethel, Ohio (Clermont County) was posted online on Tuesday, October 30, and asked interested parties to submit proposals by close of business on Wednesday, November 28, 2012.*

Comment 3

A few commenters stated that chemical injections of imidacloprid are 99.9 percent effective at killing ALB and suggested that this should be an option for infested trees, as well as uninfested trees.

Available data demonstrates that efficacy of ALB control using insecticide injections alone does not reach 99 percent for the different life stages of this pest (Poland et al., 2006a; Wang et al., 2005; Ugine et al., 2011). Variability in the life stage of the insect during application, variability in sensitivity within a population of ALB, as well as factors regarding the dispersal of the chemical in a tree influence the efficacy of treatment. In addition, imidacloprid treatments at certain concentrations have shown antifeedant properties which could facilitate further dispersal of ALB (Poland et al., 2006b). However, chemical control can be effective when used with other methods. The use of an integrated eradication strategy, including chemical treatment and other control measures, has been shown to be effective based on successful eradication efforts in other parts of the United States. Sawyer (2006) reported high efficacy (99 percent) in the use of chemical treatment for ALB after implementation of an eradication strategy in New York that used a combination of tactics including survey, removal of infested trees, and either selective removal or chemical injection of uninfested, high risk host trees.

Chemical treatment of known infested trees is not a viable control method for eradicating ALB, and is not supported by available information regarding the efficacy of chemical treatments and label statements from the registrants that the product can be used as a preventative, but is not intended for use as a curative for infested trees. Limitations in the use of chemical treatments preclude its use as the sole control method in the eradication of ALB. The proposed use pattern for chemical injections is based on available efficacy data and labeled requirements for use for these types of pesticides. Federal regulations regarding pesticide use require that all products must be applied according to label directions. Comments received regarding the efficacy of three applications within a 30-day period are not supported by the label, and are a violation of Federal regulations, with current labels stating one application should be made per year, and that the product <u>may</u> control ALB when used as a preventative treatment.

Comment 4

Some commenters believe that contractors and others are financially benefitting at the expense of Tate Township. This includes the sale of wood chips from chipped infested trees and use of non-local contractors to conduct tree removals.

The chips generated from infested trees are made available to property owners residing within the quarantined area for free, and then it is up to the marshalling yard contractor to handle or dispose of the chips that remain. Chips may be picked up by homeowners on Fridays and the first Saturday of each month. On the first Saturday of every month, the marshalling yard contractor will be available to load chips for affected homeowners from 9:00 a.m. until 1:00 p.m. The marshalling yard is located at 2896 State Route 232 in Bethel, Ohio.

As for contractor selection, any company may submit a bid proposal. The government uses a process for selection which permits tradeoffs among cost and non-cost factors; the process allows the government to accept other than the lowest priced proposal. Proposals are evaluated and selected based on several criteria including: price, past performance, technical capability, detailed example work plans, key personnel, experience, a quality assurance plan, and other bonding and license requirements. Location of the company is not part of the evaluation process.

Comment 5

Some commenters suggested the use of biological control (biocontrol), such as predators and parasites, from the native habitat of ALB in China should be pursued. There may also be native controls for ALB that have not been studied yet. An integration of cultural methods, including resistant hosts, silvicultural practices, bait trees, and so on should be part of the eradication program.

Currently, evaluation of various control options is ongoing including the use of biocontrol agents against ALB. There are no commercially available biocontrol agents registered for use against ALB in the United States at this time. Researchers must first conduct years of identification and host-specificity studies before release of nonindigenous biocontrol agents into the United States can be approved to ensure that new agents will not attack nontarget species. In addition, biological control agents are usually not components of an eradication program because they do not eradicate their host. However, if biocontrol products are developed for use in the United States, APHIS will evaluate their utility in future eradication efforts. Additionally, APHIS continues to work on methods development to improve eradication strategies. Current studies under development include regulatory treatments for wood, fall chemical treatment applications, and the use of detector dogs and traps to aid in early detection of ALB.

Comment 6

Five commenters compared the ALB infestation to the emerald ash borer (EAB) infestation, an insect pest from Asia that is attacking and killing ash trees in the United States. The commenters were concerned that many trees will be cut down as was done for EAB eradication, but the insect will not be eradicated.

EAB and ALB are two very different insects. The EAB is a smaller beetle that is harder to detect and spreads faster than ALB, making eradication of EAB markedly more difficult. Eradication is no longer part of the EAB program's mission, but remains the goal of the ALB program. As described in other areas of this document, ALB eradication has proven successful in several areas of the country where it has been found, including New York, New Jersey, and Illinois. The ALB eradication program has a proven record of success due to the effectiveness of program strategies and the natural characteristics of ALB compared to EAB.

Comment 7

Some commenters requested that APHIS ensure that port inspections are more thorough to ensure that ALB and other pests do not enter the United States from foreign countries. Also, all wooden pallets should be treated so that they are free of wood-boring insects. APHIS should also enforce quarantines to keep infested material from moving out to uninfested areas.

USDA works closely with the Department of Homeland Security to ensure that measures are in place to reduce risk of introduction and establishment of pests from imported commodities. International trade has increased markedly in recent history. As a result, risk of invasive pests has increased. Inspections at ports are subject to available resources and require prioritization of items for inspection. This invasive pest likely entered the United States from Asia in solid wood packing materials used to transport trade goods. The ALB infestation in Ohio dates back to at least 2004, before the adoption of the international regulations for solid wood packing materials in North America in 2006 (International Plant Protection Convention, International Standards for Phytosanitary Measures 15). These regulations mitigate the risk of further ALB introductions into the United States.

Both State and Federal law establish regulated areas around ALB infestations. Ohio State law can be found in Ohio Revised Code 927.70 (B) (1). The Federal regulation can be found in the Code of Federal Regulations (CFR), specifically in 7 CFR 301.51. Requirements for movement of regulated articles are outlined in those regulations. When an inspector has probable cause to believe a person is moving a regulated article interstate, the inspector is authorized to stop the person to determine whether a regulated article is present and to inspect it. Articles found to be infected by an inspector, and articles not in compliance with the quarantine regulations, may be seized, quarantined, treated, subjected to other remedial measures, destroyed, or otherwise disposed of. It is the responsibility of the citizens within the quarantined area to comply with the quarantine as they would any other law and not move firewood or woody debris outside of the regulated area. For answers to questions about regulated materials and permits, or to report wood movement or suspected ALB infested trees, residents are asked to call the ALB program office at (513) 381–7180.

Comment 8

Some commenters observed that the ALB New Pest Response Guidelines have not been followed. Trees have not been sprayed with an insecticide before they are cut down to make sure that any adults clinging to them are killed, tree cutting occurs year-round, and loads of logs are not tarped as they have been transported to the marshalling yard. Not following the guidelines will result in increased spread of ALB. What is the point of having guidelines if they are not used?

The ALB New Pest Response Guidelines (NPRG) provide recommendations and actions for the national eradication program. They are intended for use as a guide when an outbreak of ALB is known to exist and not to prescribe specific requirements for every program. It provides the technical and general information needed to implement any phase of an ALB eradication program; however, the specific emergency response is based on information available at the time the outbreak is detected. Responses to specific infestations can be unique based on levels of infestation, host tree density and distribution, potential environmental impacts, and available resources.

Barks sprays as included in the NPRG have never been used as part of an ALB eradication program in the United States, mainly because of environmental and human health impacts from such treatments. In addition, bark sprays are irritating to beetles and may prompt dispersal in adjacent trees; it adds costs to an already challenging program; and, could slow down removal and survey operations.

As for year-round removal of trees, in 2009, a technical working group (TWG) of national and international scientists and subject matter experts was convened to examine specific control practices of the ALB program. Two main conclusions of the TWG discussion were that 1) the TWG supported the practice of removing all infested trees to reduce ALB populations, and 2) infested trees should be removed as soon as possible upon detection rather than suspending cutting during part of the year or during ALB emergence season.

The NPRG document was last updated in 2008 and there has been a great deal of research and experience gained since that time that is not included in the document. The NPRG is currently being updated to better reflect what is currently known about ALB and its eradication, but will still remain as a guide for options in dealing with outbreaks.

Comment 9

Some commenters questioned the value of not grinding or treating the stumps of uninfested trees to allow woodlots to resprout naturally. If ALB can reinfest sprouts, why cut down the uninfested tree if the stump will be left behind to become infested? Also, some commenters felt that allowing stumps to resprout would not result in rapid regrowth of woods.

The purpose of allowing stumps to resprout in certain cases, as described in alternatives B and D, is to allow a cut woodlot to regenerate more rapidly. This would also keep roots alive in the soil to help prevent erosion and reduce standing water. It would only be used in cases where high risk host trees are confirmed as uninfested. This method would only be used where infested hosts and high risk hosts have been cut down in the area, reducing the risk of reinfestation. This is because any high risk host trees that were infested but missed during survey would have been removed anyway and ALB would not be emerging from those trees to *reinfest stumps. This method would only be used in limited circumstances, such as an isolated ALB infestation location or along a streambank.*

Comment 10

A commenter stated that there was not enough notification of the availability of the EA and the comment deadline. Not everyone has a computer and the flyers distributed were not enough.

APHIS developed an aggressive public awareness campaign announcing the release of the EA, including legal notices and articles in local newspapers, post cards to residents, fact sheets, an opinion editorial and factsheet in the Clermont Sun, a television media tour with APHIS officials in May, website posts online, social media posts through Facebook and Twitter accounts, and an informational meeting on June 19, 2012. In addition, the comment period was extended to 60 days longer than the usual 30-day comment period for EAs to ensure that all interested parties had adequate opportunity to provide comments. APHIS considered all comments received, even those that came in after the 60-day comment period.

Comment 11

A comment was received stating that the infestation in Ohio is in a rural area, while other ALB-infested areas in the Unites States are more urban and cannot be compared to Ohio. Because it is unique, there is a need to characterize and understand the unique nature of the Clermont infestation before selecting an alternative.

Previous ALB infestations in the United States have been primarily in urban areas although infestations are also in more rural areas and natural forests in Massachusetts. Since the initial infestation in Clermont County was discovered, APHIS has been working cooperatively with Ohio Department of Natural Resources (ODNR) and other agencies to determine the nature and extent of the current ALB infestation. APHIS has also worked with ODNR to collect site-specific data regarding forest tree species composition within the quarantined area to better understand site conditions. APHIS concurs that the Clermont County ALB infestation is unique, as are all the infestations to date. However, information regarding the effectiveness of control measures in other infestations, along with the site-specific information obtained to date regarding this infestation, allow the ALB program to make recommendations that will lead to an effective eradication strategy of ALB. APHIS will continue to collect site-specific information and evaluate available science regarding the control of ALB, including targeting higher risk ALB hosts. However, implementation of the preferred alternative will prevent further spread of ALB, increasing the likelihood of eradication.

Comment 12

A commenter expressed that the EA should not have been written for all of Clermont County, but for a radius around the infested area. The commenter suggested that APHIS did this to receive responses from individuals that would be least impacted by extensive tree removal.

It is common for NEPA documents to evaluate the impact of a proposed action using boundaries such as counties or States. In this case where delimitation of the ALB infestation is

on-going, the actual boundary of the infested area is still unknown. Currently, there are three townships within Clermont County affected by ALB regulations and ALB eradication efforts. Using a county-level analysis allows for implementation of eradication strategies in the event of identification of additional infested areas in Clermont County without additional NEPA documentation because the entire county was included in the initial analysis. In the event that the infestation spreads to adjoining counties, APHIS would address program impacts in these counties with additional NEPA documentation and would ensure compliance with other applicable environmental regulations.
In contrast to the concern of this commenter, another commenter indicated that the scope and discussion of impacts in the EA was too small and should have considered the impact of this eradication in light of the consequences of establishment of ALB to all of North America rather than just focusing on Clermont County.

Comment 13

The EA indicates an additional ¼ mile is added to the radius for high risk host removal, but no clear evidence to support that the extra ¼ mile is necessary. The data from the Illinois infestation seem to indicate that ¼ mile is sufficient.

The radius for high risk host removalis recommended up to a radius of ½ mile. This radius is consistent with previous eradication efforts and can vary based on the availability of resources and site-specific conditions regarding the infestation. From data in Illinois, 80 percent of trees with oviposition sites only were within 330 feet (1/16 mile) of a tree with an exit hole; 94 percent were within 660 feet (1/8 mile); 99 percent were within 1,320 feet (1/4 mile); and, 99.7 percent were within 1,980 feet (3/8 mile) (USDA–APHIS, 2008). However, it is possible that some beetles move farther, particularly if host trees in the area are heavily infested. Extending the control radius to ½ mile is to ensure that as close to 100 percent as possible of ALB in an infested area are eliminated. For successful eradication, it is important to eliminate as close to 100 percent of the pest as possible to prevent further spread.