Emerald Ash Borer Management Plan
High Cliff State Park

Background

Emerald ash borer (EAB, *Agrilus planipennis* Fairmaire) is an exotic beetle that is native to China, Mongolia, North Korea, South Korea, Japan, Taiwan, and the Russian Far East. Emerald ash borer probably arrived in the United States on solid wood packing material carried in cargo ships or airplanes originating in its native Asia. It was first identified in the Detroit, Michigan area, including Windsor, Ontario, in 2002. Emerald ash borer was also verified in Ohio in 2003, Indiana in 2004, Illinois and Maryland in 2006, Pennsylvania and West Virginia in 2007, Wisconsin, Missouri, and Virginia in 2008, Minnesota, New York, and Kentucky in 2009, Iowa and Tennessee in 2010, and Connecticut, Kansas, and Massachusetts in 2012, and New Hampshire, North Carolina, Georgia, and Colorado in 2013. By the end of 2013, Wisconsin has 21 counties quarantined for EAB, mostly in the southeastern and west-central parts of the state. As of September 2013, Calumet County is not a quarantined county. However, nearby Brown, Winnebago, Fond du Lac, and Sheboygan counties are under quarantine.

In North America, EAB has only been found in ash (*Fraxinus* spp) trees. Ash trees generally die within five years of being infested. There appears to be very little natural resistance of North American ash species to EAB.

Adult beetles nibble on ash leaves but cause little damage compared to the larvae which bore under the bark causing dieback and eventual mortality. The canopy of infested trees begins to thin above infested portions of the trunk and major branches because the borer destroys the water and nutrient conducting tissues under the bark. Heavily infested trees exhibit canopy die-back usually starting at the top of the tree. One-third to one-half of the branches may die in one year. Most of the canopy will be dead within 2 years of when symptoms are first observed. Sometimes ash trees push out sprouts from the trunk or the base of the tree after the upper portions of the tree dies. Although difficult to see, the adult beetles leave a "D"-shaped exit hole in the bark, roughly 1/8 inch in diameter, when they emerge from May thru September.

EAB can have a one- or two-year life cycle. Adults begin to emerge mid- to late May with peak emergence in late June. Females usually begin to lay eggs about 2 weeks after emerging. Eggs hatch in 1-2 weeks, and the tiny larvae bore through the bark and into the cambium - the area between the bark and wood where nutrient levels are high. The larvae feed under the bark, typically passing through four stages, eventually reaching a size of roughly 1 to 1.25 inches long. Most EAB larvae overwinter in a small chamber in the inner bark or in the outer inch of wood. Pupation occurs in spring and the new generation of adults will emerge in May or early June, to begin the cycle again.

EAB adults can fly at least 1/2 mile from the tree where they emerge. Many infestations, however, are started when people moved infested ash nursery trees, logs, or firewood into un-infested areas.

Key Concerns for High Cliff State Park

High Cliff State Park is one of the top five visited parks in the Wisconsin State Park system, having around 500,000 visitors annually. The property is located on the northeast shore of Lake Winnebago, in the heart of the Fox River Valley

The main concerns regarding EAB and ash tree mortality in High Cliff State Park are public safety, resource protection, and aesthetics. High Cliff State Park offers many recreational opportunities including a 112-site family campground, a group campground, numerous picnic areas and playgrounds, a swimming beach on Lake Winnebago, many miles of hiking, biking, and equestrian trails, and various winter activities. The values of older trees, such as shade, aesthetics, and mitigating storm runoff are difficult to replace when they die.

Stressed trees are more attractive to EAB females for depositing eggs. Trees in heavily used areas such campgrounds and picnic areas are typically under greater stress than forest trees due to soil compaction and bark and limb injuries. The values of older trees, such as shade, are difficult to replace when they die. Tree mortality resulting from EAB in the park may be aesthetically unappealing and potentially a hazard to park visitors. Ash that are killed by EAB tend to dry out rapidly and become brittle, causing them to break up easily. Areas of heavy use by the public will be the first sites assessed for hazard tree identification and removal and new tree plantings.

Current Situation

EAB is not known to occur at High Cliff State Park as of December 2013. However, many of the ash trees are suffering from ash yellows which is a disease that causes slow growth, branch dieback, and eventual mortality of ash. It is caused by a special type of bacteria - a bacterium without cell walls, called a phytoplasma. There is no known way to prevent or cure ash yellows. Ash yellows is a chronic, systemic disease that affects ash trees of all ages. Leafhoppers are thought to be the primary means by which this pathogen is moved from tree to tree.

Commencing in the winter of 2013/2014, High Cliff will implement a phased approach to selectively cut ash trees in use areas.

High Priority Areas:

Area 1: Family Campground

Fell and process marked ash trees that have been identified as potential hazards, complete fall and winter 2013/2014; it is anticipated that natural regeneration of other native species will occur. Tree recruitment will be evaluated to determine if supplemental planting is needed

Area 2: Designated Use Areas

Fell marked ash trees. Plant other native, ecologically appropriate species as soon as possible

Area 3: Trails

Manage ash trees along trails using hazard tree standards.

Low Priority Areas

Low visitor use wooded areas, grasslands, and wetlands.

Wildlife Concerns

Ash species, especially white ash, can be important sources of habitat and browse for wildlife. The samaras are good forage for many other birds and small mammals. White ash's ability to readily form trunk cavities if the top is broken and its large size (24 to 48 inches) at maturity make it highly valuable for primary cavity nesters such as woodpeckers. Once the primary nest excavators have opened up the trunk of the tree, it is excellent habitat for secondary nesters such as wood ducks, owls, nuthatches, and gray squirrels. Dead standing ash trees that are not hazards should be left for wildlife.

Endangered Resources and State Natural Area Concerns

Continue with hazard tree management in the State Natural Area at High Cliff. Management of ash trees within the SNA or where there are known locations of rare plants and animals will follow the criteria delineated in the 2013 High Cliff State Park master plan.

Tools for Management of EAB

Monitoring

Park staff will monitor for EAB symptoms and hazard trees in the park.

Cultural Management

Tree planting will be needed to replace hazard trees that are removed from high use areas. Replacement trees will be a diverse mix of native, ecologically appropriate species, with a balance of fast-growing and slower species. More quickly growing trees will help replace shade trees sooner while allowing slower growing, longer living species to reach maturity. Proper maintenance after the trees have been planted, such as watering as needed and reducing competition from other vegetation, will be needed to increase the survival of the saplings.

Biological Controls

Several non-native parasitic wasp species have been identified and authorized for release by the U.S. Department of Agriculture as biological control agents. These stingless wasp species are highly specific to EAB and although they will not eliminate the population of EAB, they can help extend the life of trees, which gives the park more years to spread out removals of dead/dying trees once EAB arrives. High Cliff State Park should be assessed for suitability as a wasp release site once EAB is found in the area. The wasps are small, non-stinging insects that are harmless to humans.

Physical Controls

Hazard trees will be identified and removed from within the priority areas noted above. After EAB has been found within 15 miles of the property, ash trees on the property will be considered infested and, whenever possible, all infested trees will be chipped. Depending on the quantity, chips can be blown into wooded areas. If that is not feasible, collected chips will be retained on the park, away from the public. Wood from infested trees that cannot be chipped will be stockpiled on the park for two years, away from the public. It can then be used as firewood by the park. Stumps in mowed areas will be ground down so that they are not a tripping or maintenance equipment hazard. *Note*: firewood created from wood on the property could be used immediately on the property. Standing dead trees that have been dead for a year will not have any additional EAB emerging from them so are “safe” to use.

Pesticides

Insecticides can be used to protect any high value trees (for example, a large shade tree). Depending on the chemical used, pesticide treatments would need to be applied at one or two year intervals. Trees should be evaluated for their importance and identified in a document/map to track these trees each year and make sure they are treated and not cut down.

Stumps of ash trees that are felled should be treated with herbicide to prevent re-sprouting.

Public Education and Communication

EAB posters and other information will be posted in the campground bulletin boards. Flyers and information will be handed out in the park office. Notices about hazard tree removal will be placed on bulletin boards and in the park office. A public outreach campaign about EAB

management within High Cliff State Park should be developed and implemented with the Office of Communications.

Funding

Educational literature is available through the DNR at no charge. The park may be able to purchase any materials for physical controls and labor out of the operations budget. Regional sawyer crews may be used for felling hazard trees. Chipping and tree planting may be accomplished through a variety of labor such as a Department of Corrections crew. Tree planting may also be done by volunteers.

EAB management will be multiple year effort that will likely strain the operations fund of the park. Park staff will identify and pursue alternate funding sources, such as the Sustainable Forestry Fund, to augment the park operation budget.

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Revision Comments:

High Cliff State Park EAB High Priority Areas