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A White Ash (Fraxinus americana) Status Assessment and Emerald Ash Borer (Agrilus planipennis) Management Plan for the Gordon Natural Area

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A White Ash (*Fraxinus americana*) Status Assessment and Emerald Ash Borer (*Agrilus planipennis*) Management Plan for the Gordon Natural Area

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Introduction

The Gordon Natural Area (GNA) is a 63 ha natural area found on the WCU campus that is facing many of the anthropogenic impacts commonly affecting suburban forests. Among these impacts are those from invasive exotic organisms, like insect pests. The imminent arrival of the invasive Emerald Ash Borer (EAB), *Agrilus planipennis,* is one example as this pest is predicted to eradicate White ash (WA), *Fraxinus americana*, in our region. This is unfortunate given that ash is one of few abundant and healthy native tree species found at the GNA. In order to respond to EAB arrival, an assessment of WA abundance, size, distribution, and health were made at the preserve in order to be incorporated into an EAB management plan, which will allow GNA stewards to maximize efforts to manage the expected loss of most WA trees after the EAB arrives.
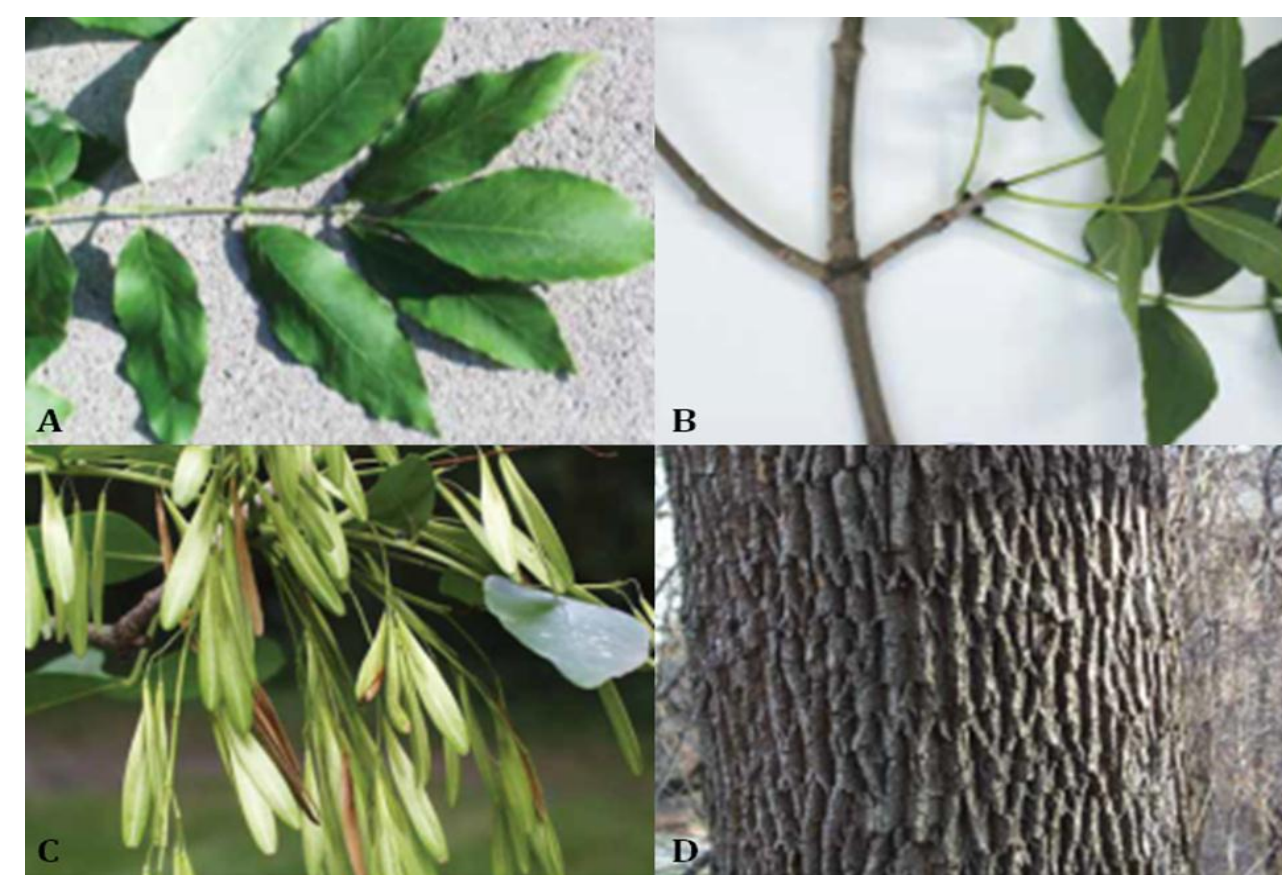
Ways to identify White ash: A) compound leaves, B) opposite branching, C) paddle shaped seeds, D) diamond-shaped ridges on bark.
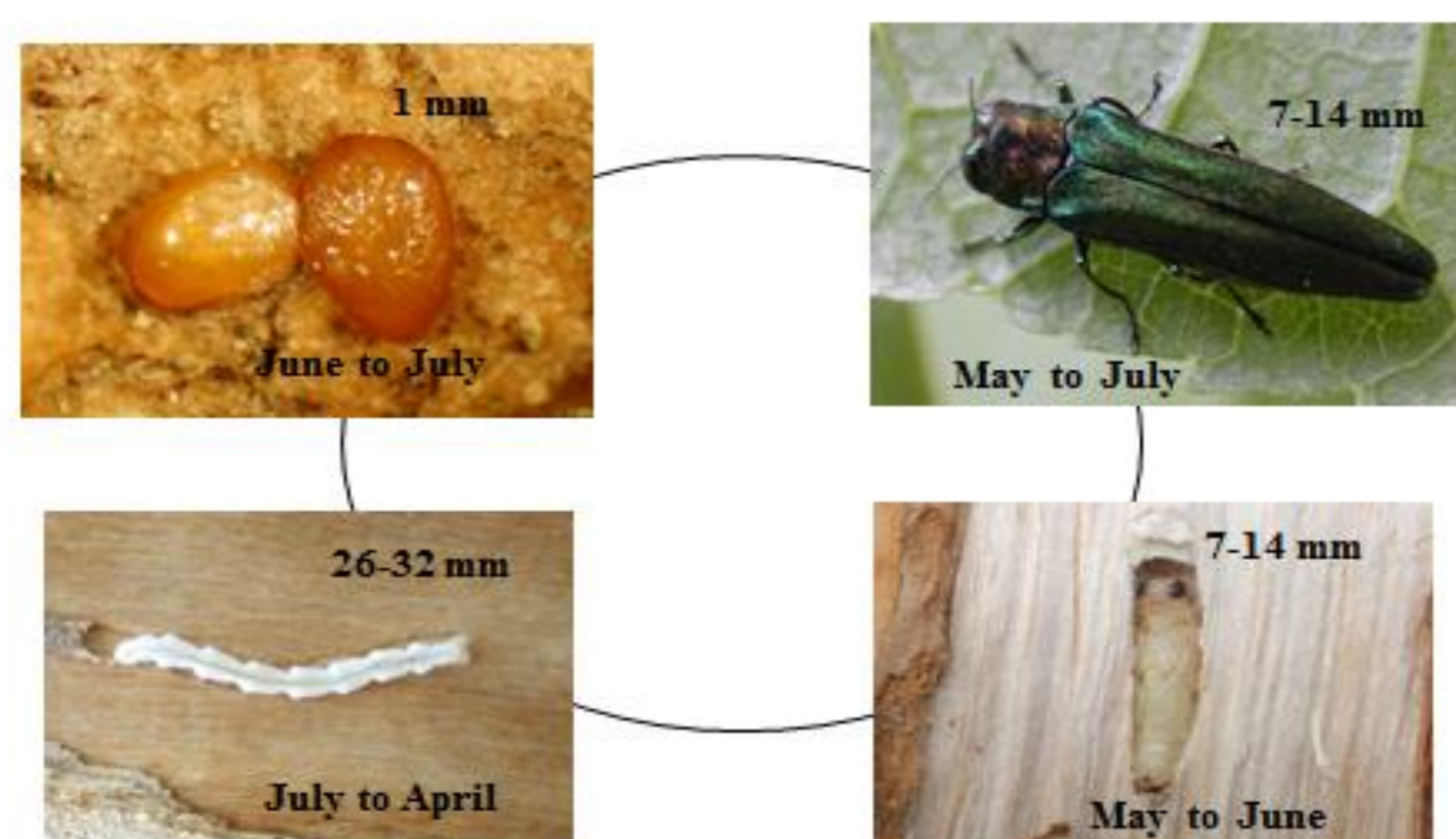
EAB Lifecycle

EAB signs and symptoms: A) dead branches B) epicormic growth, C) D-shaped holes, D) serpentine galleries.

Study Sites & Methods

❖ White ash (WA) assessment was carried out on WCU's campus 2013-14.

❖ Walking surveys were conducted on campus streets and in six subsites at the GNA in which all encountered WA trees were identified and counted (to determine abundances and densities), measured for size (DBH), examined for health status (crown vigor), and geolocated (lat/long) to create a distribution map using ArcGIS.

❖ A landscape appraisal was quantified and used to establish the monetary value to validate the loss of WA across the GNA and WCU's campus. Additionally, i-Tree was used to calculate expected ecosystem service losses due to future EAB-related ash mortality.

❖ A Pearson Chi-square test was conducted to test for differences in WA frequencies per size class among the six subsites.
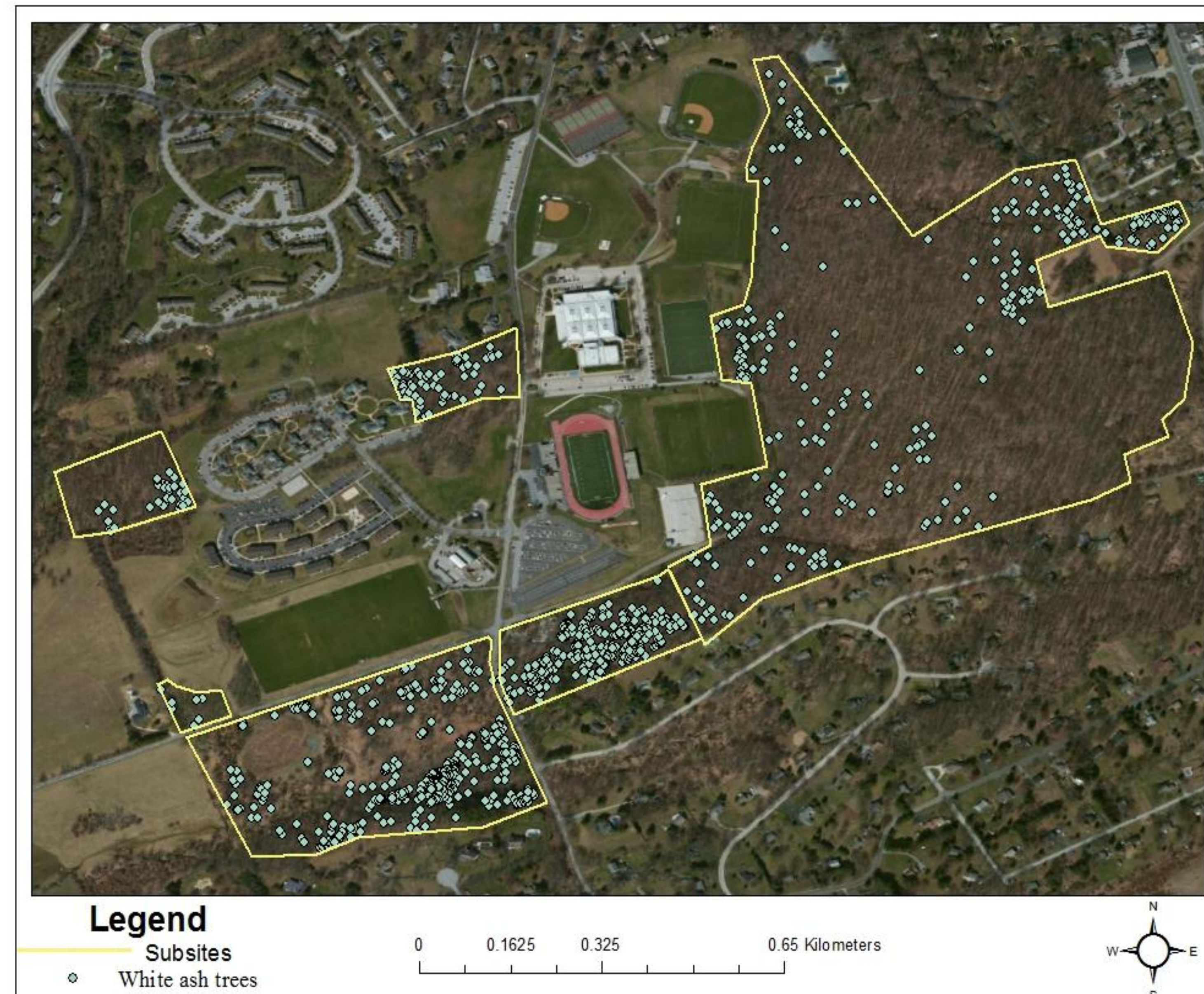
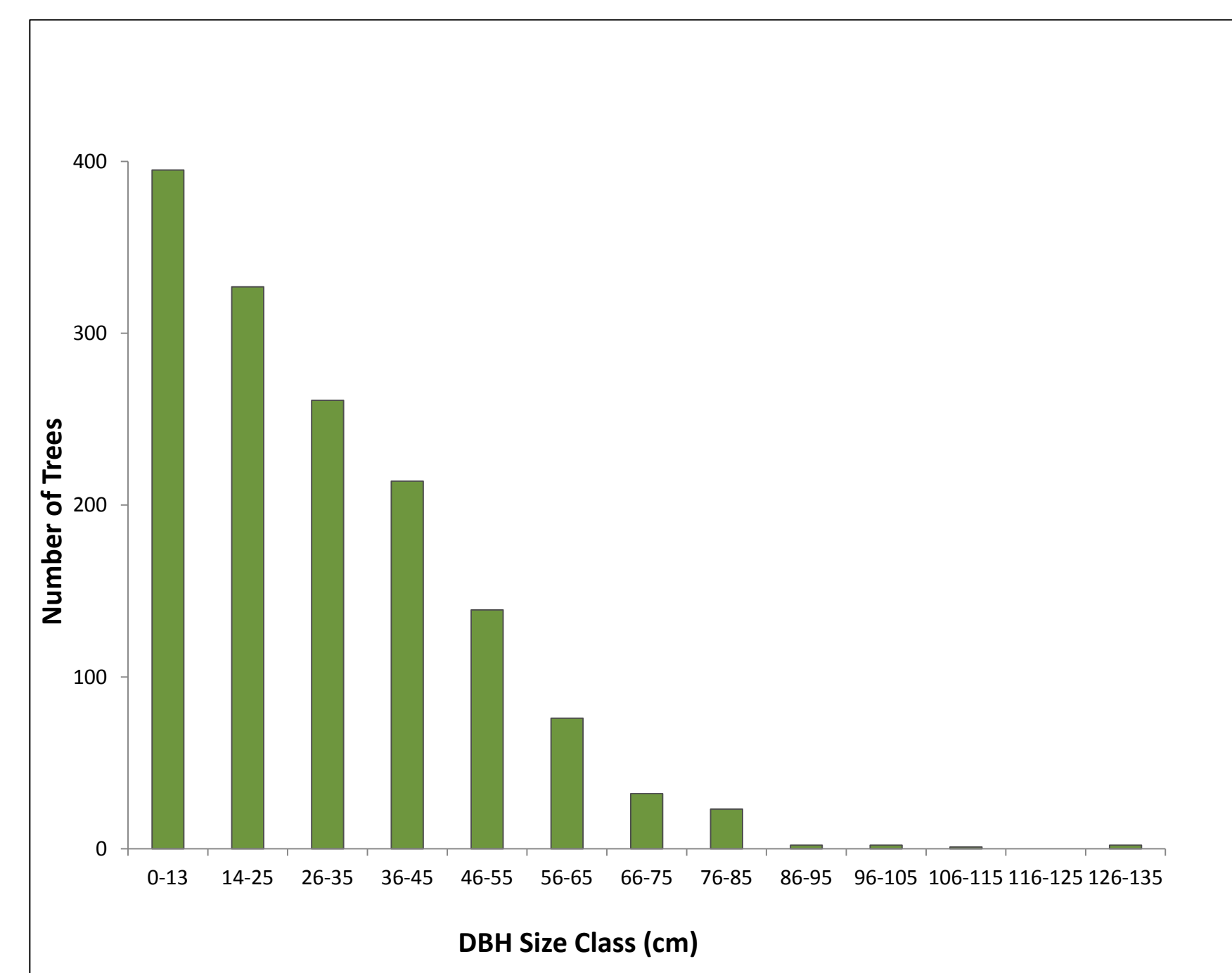**Figure 1:** *Distribution map of White ash among subsites (1-6) within the GNA.*

Figure 2: *Size classes of White ash across GNA subplots (saplings 0-13 cm, canopy trees ≥ 14 cm)*
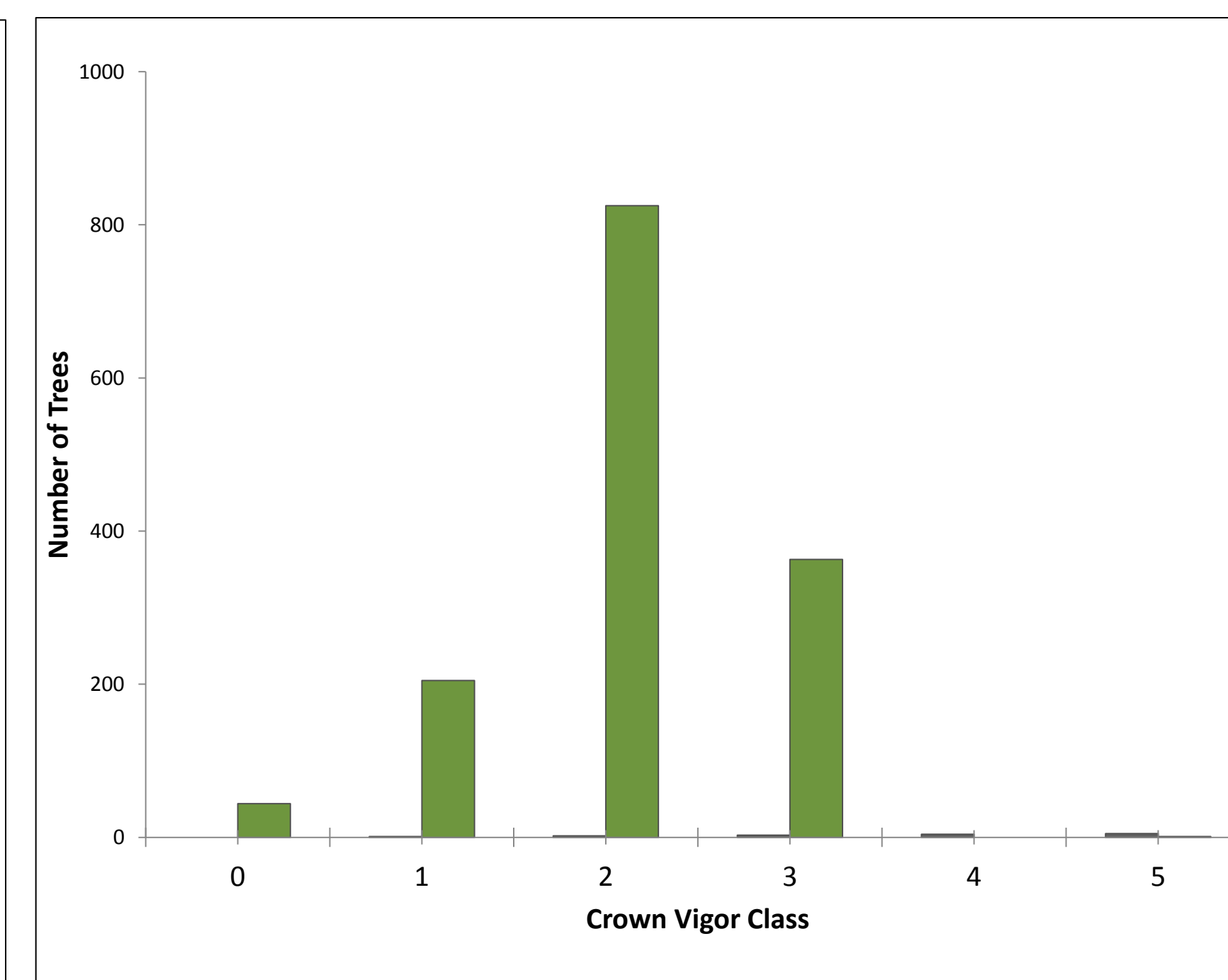
Figure 3: *Crown vigor classes of White ash across GNA subplots (0 = 0, 1 = 20, 2 = 40, 3 = 60, 4 = 80, and 5 = 100% presence of healthy branches.*

Findings

❖White ash (WA) is widely distributed across the GNA, but exhibits clustered (denser) and more random distribution patterns in different subsites (Fig. 1).

❖Most trees were classed as saplings or smaller canopy trees, though many were large canopy trees (Fig. 2), suggesting that there is a healthy age distribution for the species at the preserve.

❖Most trees were healthy based on crown vigor evaluations (Fig. 3).

❖WA was relatively dense in most subsites (Fig. 4), especially in comparison to other mid-late successional species (data not shown).

❖GNA (i.e. native open space) trees are more valuable than campus trees based on total appraisal and ecosystem service values (Table 1).

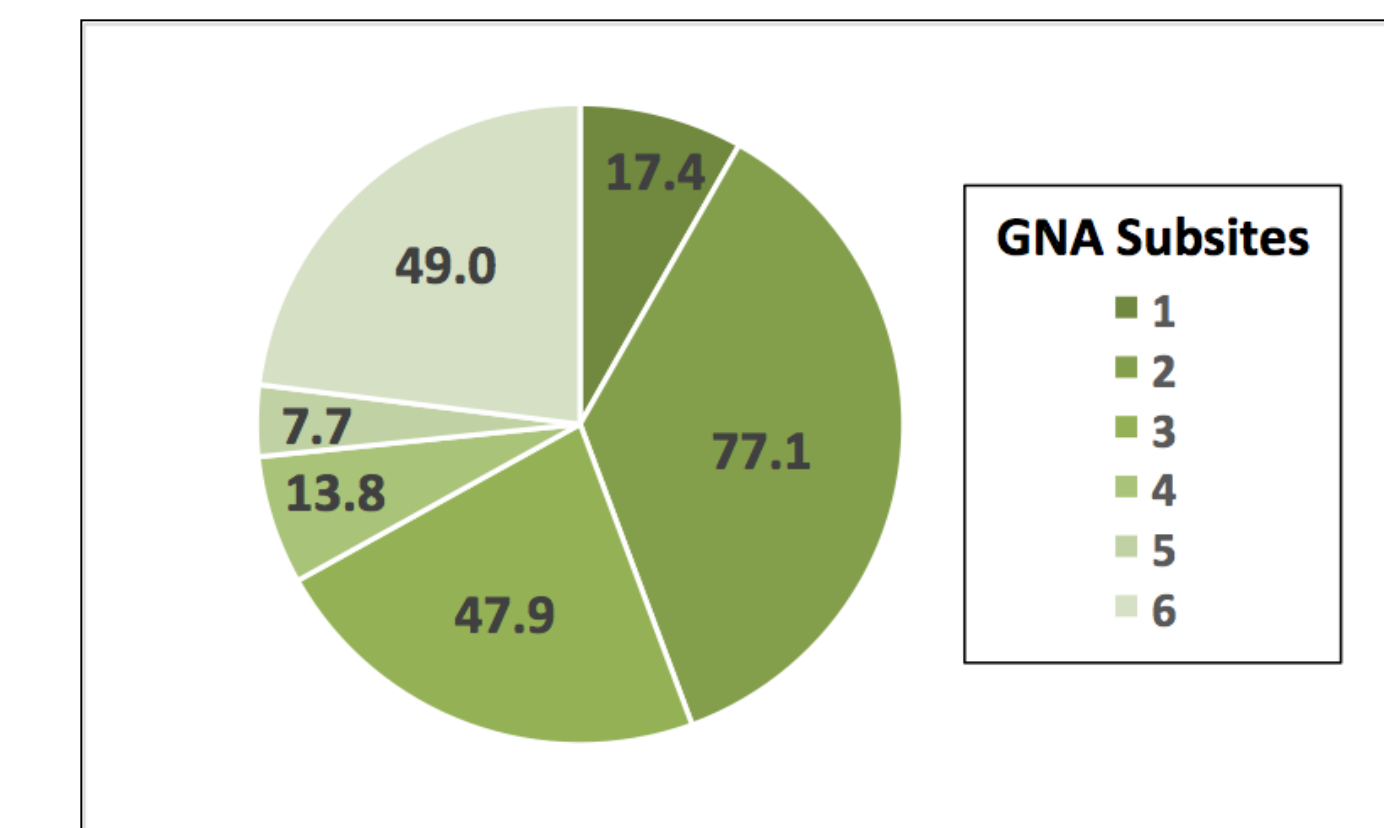❖There was a significant difference in WA frequencies per size class among subsites ($p < 0.05$).

Table 1: *Ecosystem service values for White ash from WCU's campus streets and GNA preserve.*

	Total # of Trees	Total Landscape Appraisal	Ecosystem Services	Treatment cost
Street Trees	46	$761.00	$9,432.30	$1,127.54
Native Open Space	1473	$11,211.52	$91,355.46	-

Figure 4: *White ash density per subsite (total trees per ha)*

EAB Management Plan

The status assessment was necessary to develop an EAB management plan for WCU given the predicted imminent arrival of EAB on campus and at the GNA. Knowing the value of White ash (WA) trees and treatment costs of some select individuals was also necessary in order to devise a cost effective plan to be used to best manage WA loss due to EAB. Management of WA has to begin with careful planning based on the assessment which was based on the following:

❖ Calculating and comparing costs for WA treatments or removals.

❖ Finding and targeting healthier trees for more careful monitoring since some could potentially evade or survive EAB.

❖ Considering an array of treatment options for WA that vary.

❖ Continuing treatments for mature trees annually or biannually.
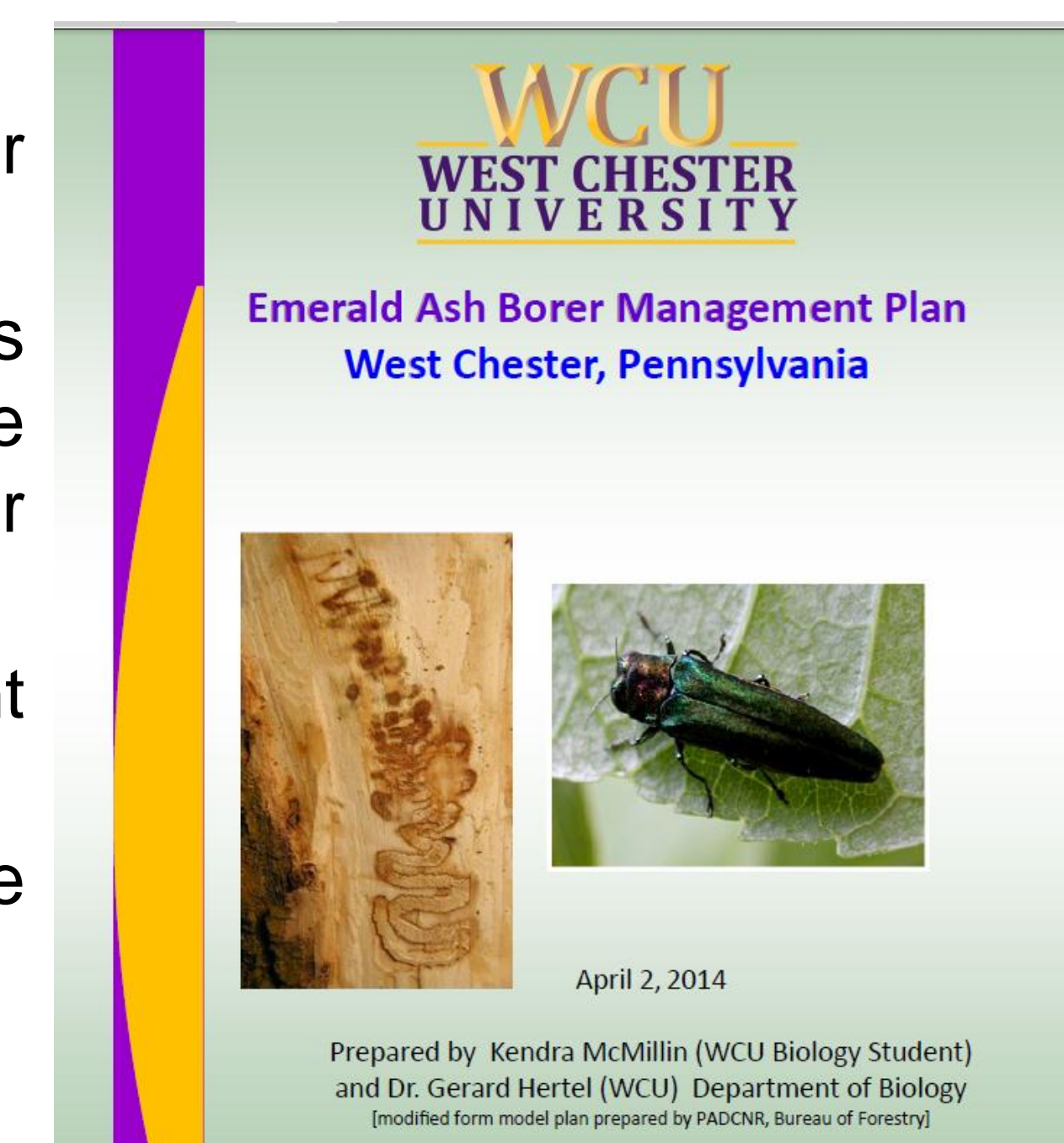
WCU EAB Management Plan

References
Photos by Kendra McMillin or from the PA DCNR Web site (http://www.dcnr.state.pa.us/forestry/insectsdisease/eab/index.htm)