



Ozone and Foliar Injury Summary, 2015

Overview

Ozone is a gas that occurs naturally in the lower levels of the earth's atmosphere. However, human-produced pollution can become an unnatural source of additional ozone that results in injury to humans and plants. The Cumberland Piedmont Network (CUPN) has been monitoring ozone and its injury to plants since 2008 to fulfill the National Park Service (NPS) mandate to protect its resources and preserve the enjoyment of these resources.

The CUPN Ozone and Foliar Injury Program is designed to provide a network-wide assessment of status and trends in ozone concentration and foliar injury levels. All 14 CUPN park units are sampled on a rotational schedule (which is outlined in CUPN's ozone concentration and foliar injury protocol).

This brief summarizes foliar injury data collected in July 2015 at Abraham Lincoln Birthplace National Historical Park (ABLI). 2015 sampling at ABLI was conducted outside CUPN's normal rotational schedule. This additional sampling was completed because one of the sites could not be located during scheduled sampling in 2014. That site (the Knob Creek High Field site) was located in 2015 and sampled then (along with the other two ABLI foliar injury sites since it was convenient for the sampling crew to do so). Ozone and foliar injury reports are available upon request or at <http://go.nps.gov/cupn>.

Foliar injury surveys were conducted at the Visitor Center (site elevation 764 feet [ft] or 233 meters [m]), Knob Creek High Field (site elevation 790 ft [241 m]) and Knob Creek Low Field (site elevation 587 ft [179 m]). Site map and photographs are shown in Figures 1 2, 3, and 4 respectively.

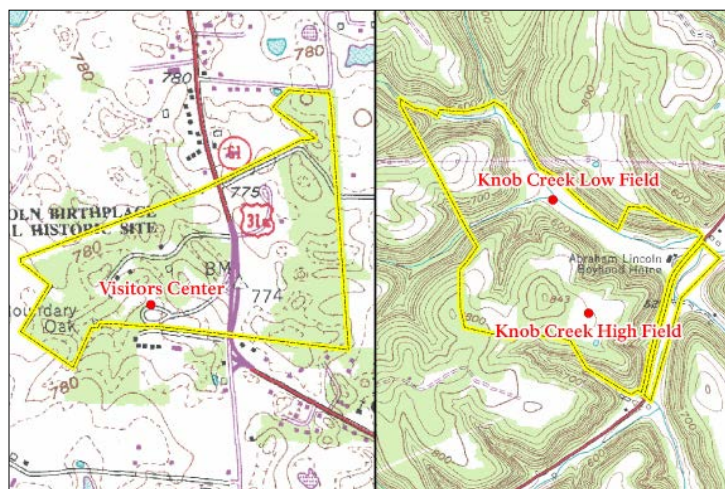


Figure 1. Map of ozone and foliar injury sites at Abraham Lincoln Birthplace National Historical Park. NPS map by Lillian Scoggins.

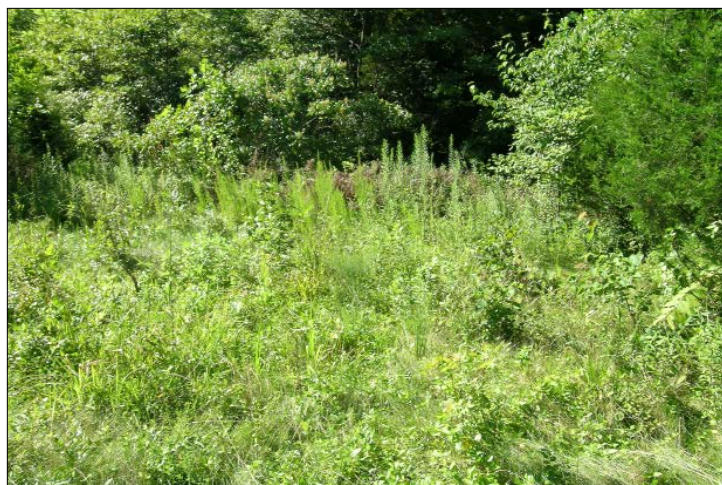


Figure 2. Foliar injury sampling sites at the Visitor Center. NPS photos by Ryan Hackbarth and Johnathan Jernigan.



Figure 3. Foliar injury sampling sites at Knob Creek High Field. NPS photos by Ryan Hackbarth and Johnathan Jernigan.



Figure 4. Foliar injury sampling sites at Knob Creek Low Field. NPS photos by Ryan Hackbarth and Johnathan Jernigan.

Significant Findings

Foliar injury

In 2015, 905 plants at four CUPN park units were inspected for foliar injury. Of the 338 plants examined at ABLI, no plants were suspected of having ozone-caused foliar injury. Foliar injury surveys were conducted at ABLI on 30 July 2015. The results are summarized in the table below.

Future Monitoring

Ozone concentration and ozone-induced foliar injury will be monitored by CUPN per its one year on/five year off panel design.

Table 1. Results of foliar injury surveys at Abraham Lincoln Birthplace National Historical Park in 2015

Site Name	Species	Inspected	Injured	Ozone-Caused?
Visitor Center	Black Cherry	1	0	N/A
Visitor Center	Blackberry	13	0	N/A
Visitor Center	Eastern Redbud	30	0	N/A
Visitor Center	Flameleaf Sumac	30	0	N/A
Visitor Center	Sassafras	10	0	N/A
Visitor Center	Sweetgum	1	0	N/A
Visitor Center	White Ash	22	0	N/A
Visitor Center	Yellow Poplar	19	0	N/A
Knob Creek High Field	Blackberry	30	0	N/A
Knob Creek High Field	Eastern Redbud	30	0	N/A
Knob Creek High Field	Flameleaf Sumac	30	0	N/A
Knob Creek High Field	Milkweed	3	0	N/A
Knob Creek High Field	Sassafras	1	0	N/A
Knob Creek High Field	Spreading Dogbane	1	0	N/A
Knob Creek High Field	Sweetgum	1	0	N/A
Knob Creek High Field	White Ash	30	0	N/A
Knob Creek High Field	Yellow Poplar	11	0	N/A
Knob Creek Low Field	Blackberry	30	0	N/A
Knob Creek Low Field	Eastern Redbud	30	0	N/A
Knob Creek Low Field	Flameleaf Sumac	13	0	N/A
Knob Creek Low Field	New York Ironweed	1	0	N/A
Knob Creek Low Field	Yellow Poplar	1	0	N/A

About the Cumberland Piedmont Network

In 1999, the National Park Service initiated a long-term ecological monitoring program, known as “Vital Signs Monitoring,” to provide the minimum infrastructure to allow more than 270 national park system units to identify and implement long-term monitoring of their highest-priority measurements of resource condition. The overarching purpose of natural resource monitoring in parks is to develop scientifically sound information on the current status and long-term trends in the composition, structure, and function of park ecosystems, and to determine how well current management practices are sustaining those ecosystems.

The NPS Vital Signs Monitoring Program addresses five goals for all parks with significant natural resources:

- Determine the status and trends in selected indicators of the condition of park ecosystem,
- Provide early warning of abnormal conditions,
- Provide data to better understand the dynamic nature and condition of park ecosystems,
- Provide data to meet certain legal and Congressional mandates, and
- Provide a means of measuring progress towards performance goals.

Effective long-term management and stewardship of natural resources in the Cumberland Piedmont Network begins with baseline knowledge of these resources. To acquire this knowledge, an inventory program was established by the National Park Service with the goals of acquiring baseline information for a variety of resources, from bibliographic information to species occurrence and distribution.

For More Information

CUPN Home Page:

<http://science.nature.nps.gov/im/units/cupn/index.cfm>

CUPN Reports & Publications:

<http://science.nature.nps.gov/im/units/CUPN/publications.cfm>

About the NPS Inventory & Monitoring Division:

<http://science.nature.nps.gov/im/index.cfm>

Data Downloads via the Natural Resource Information Portal:

<http://irma.nps.gov>

