2.7 WILDFIRE

Each year in Ohio, an average of 800 wildfires burn 4,000 to 5,000 acres of forest and grassland within ODNR Division of Forestry's forest fire protection district. The protection district includes all 185,000 acres of Ohio's 20 State Forests, as well as all privately owned lands within the district boundaries. The forest fire protection district corresponds mostly to the state's unglaciated hill country (southern and eastern Ohio), and also encompasses a section of northwest Ohio (Maumee SF area). Ohio's wildfire seasons occur primarily in the spring (March, April and May) before vegetation has "greened-up", and the fall (October and November) when leaf drop occurs. During these times, and especially when weather conditions are warm, windy and with low humidity, cured vegetation is particularly susceptible to burning. Fuel (vegetation, woody debris), weather (wind, temperature, humidity) and topography (hills and valleys) when combined present an unpredictable danger to unwary citizens and firefighters in the path of a wildfire.

While Ohio government agencies and local fire departments are accustomed to handling seasonal wildfires, occasional extreme events can make conditions dangerous and disruptive. Heavy fuel accumulations oftentimes make wildfire suppression extremely difficult due to more intense blazes. Occasionally, heavy fuel loadings and topography create problems in limiting access to fires, and lead to the need for heavy equipment use in suppression. Prolonged drought may cause an exceptionally long or active wildfire season, as well as contribute to extreme wildfire behavior or burning conditions. Multiple concurrent fires can tax resources and quickly create a lack of manpower and other resources and retard the ability to suppress fires rapidly and safely.

Wildland Urban Interface (WUI) conditions may create a serious issue of concern in Ohio, as well. WUI is defined as the situation where homes, residences, and structures are in close proximity to forested lands and grasslands prone to wildfire. This creates a situation where, in the event of a wildfire, personal and property safety are put in jeopardy. Additionally, WUI situations force fire departments to shift focus from fire suppression to structure protection, consequently increasing exposure time and risk. WUI situations are most effectively addressed prior to wildfire occurrence by individual homeowners. Mitigation strategies include reducing flammable vegetation and debris within 30 feet of the structure, choosing less flammable landscape species, using fire resistant building materials, and practicing safe open burning techniques. Currently in Ohio, there are no building codes that require wildfire safety considerations in construction, nor do insurance companies offer premium breaks for homeowners who do include wildfire safety measures around their homes.

In Fall 2003, ODNR Division of Forestry implemented Firewise Ohio, a statewide WUI safety initiative, in response to the growing WUI situation in Ohio. Firewise Ohio is focused on cooperating with local fire departments to create effective WUI and wildfire prevention and safety programs at the community level. To this point, Firewise Ohio has been very successful, and many fire departments from high-hazard areas are taking advantage of proactive Firewise Ohio opportunities including grants, prevention materials, and pre-planning efforts. Additionally, two

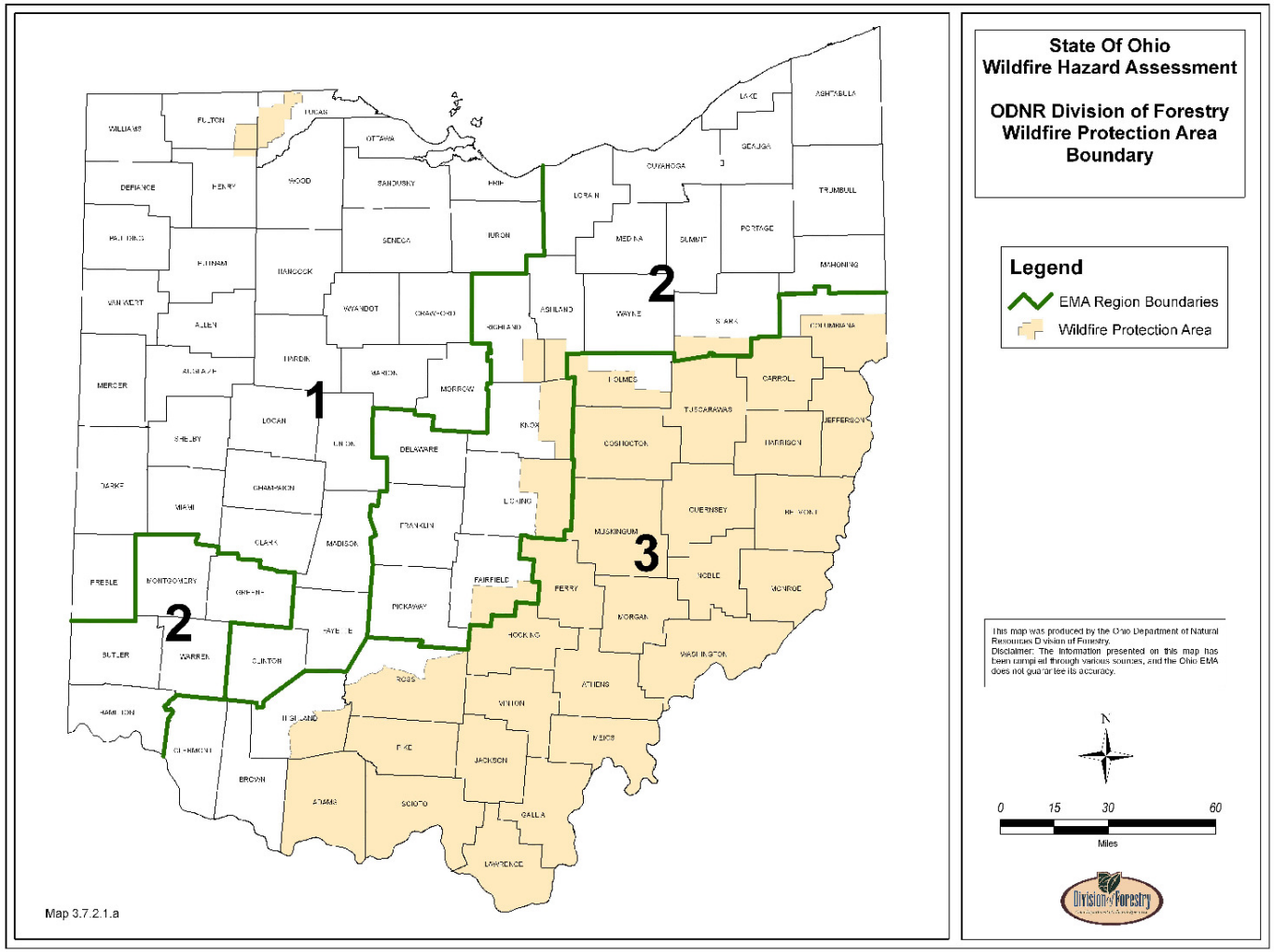
communities at risk to wildfire in Ohio (Maynard, Belmont County and Washington Township, Scioto County) have attained national Firewise Communities USA status in recognition of their outstanding work in community wildfire prevention and safety.

Open burning (burning of yard waste or debris) is regulated by state laws and local burning ordinances, which may vary from one jurisdiction to another. ORC 1503.18 addresses kindled fires regulations, and states that outside municipal limits, open burning is prohibited from 6 am to 6 pm during the months of March, April, May, October and November. It is during these times of the year and days that wildfires are most likely to occur and are the most difficult to control. Additionally, the Ohio EPA enforces OAC 3745-19, which regulates materials that may or may not be incinerated through open burning. Prohibited substances include petroleum based materials, food waste, and animal carcasses. For a complete list of materials and regulations, contact the Ohio EPA Division of Air Pollution Control. To ensure compliance with all regulations, residents should contact their local fire official with jurisdiction for the applicable laws.

RISK ASSESSMENT

Location

Wildfires in Ohio occur most frequently in the southern, southeastern, and eastern parts of the state. This area is predominantly unglaciated, hilly country, and varies in land cover type, including abundant forests and grasslands. The Ohio Department of Natural Resources (ODNR) Division of Forestry is responsible for wildland fire protection on all state and private lands within this area. Additionally, ODNR Division of Forestry has wildfire protection responsibility in a disjunct area in northwest Ohio surrounding Maumee State Forest (*See Map 2.7.2.1.a*). Local and volunteer fire departments across these parts of Ohio typically provide initial response wildfire suppression service within their respective jurisdictions. Following response to a wildfire event, local fire departments within the ODNR Division of Forestry wildfire protection area are encouraged to file a wildfire report to ODNR Division of Forestry. Wildfire reports contain information such as date, time, location, size, etc. Filing wildfire reports to ODNR Division of Forestry is not mandatory, only encouraged.

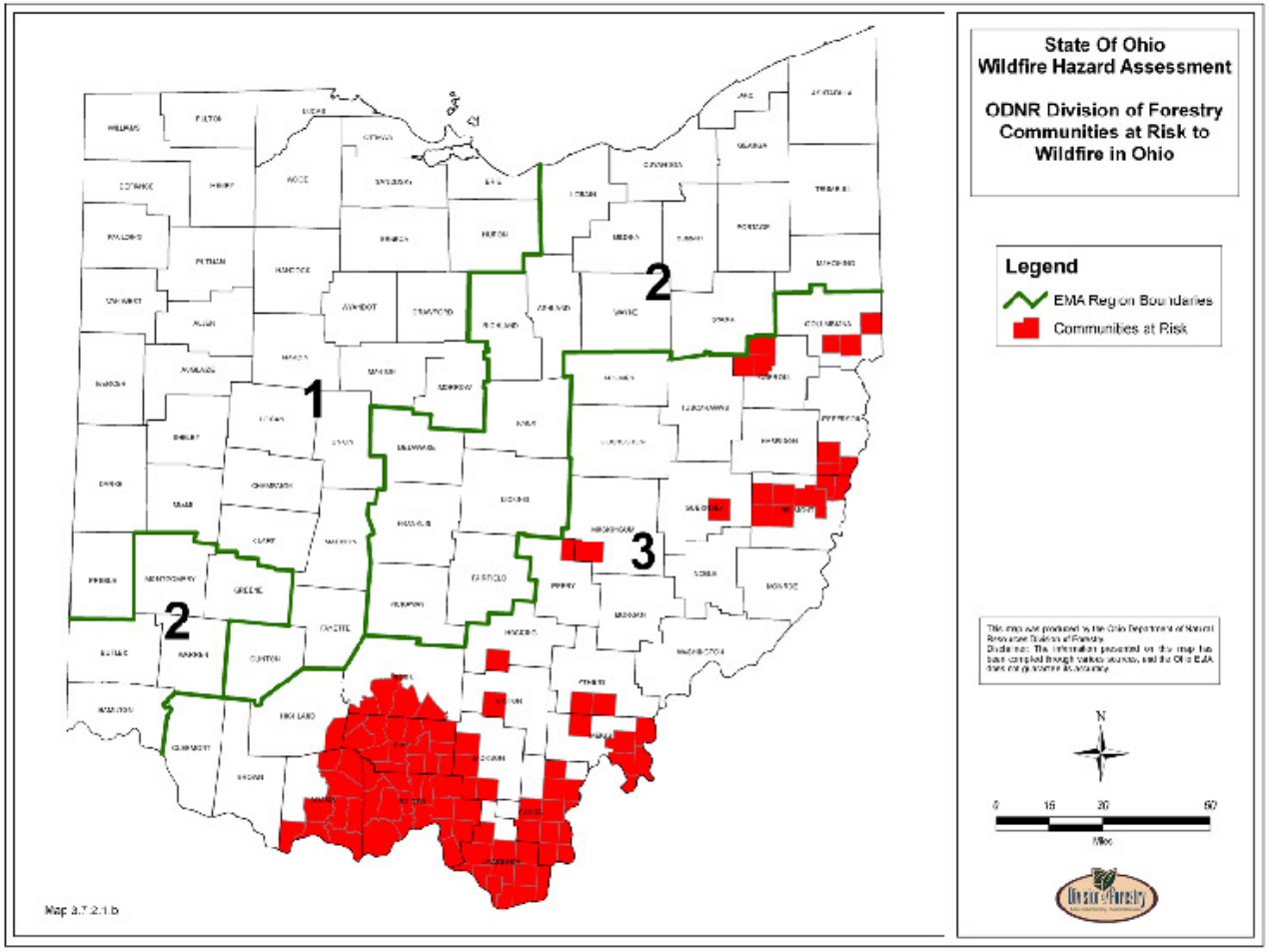

State Of Ohio
Wildfire Hazard Assessment
ODNR Division of Forestry
Wildfire Protection Area
Boundary
Legend
EMA Region Boundaries
Wildfire Protection Area
This map was produced by the Ohio Department of Natural Resources Division of Forestry.
Disclaimer: The information presented on this map has been compiled through various sources, and the Ohio EMA does not guarantee its accuracy.
N
0 15 30 60
Miles
Division of Forestry
1
2
3
2
WILLIAMS
FULTON
LUCAS
OTTAWA
DEFIANCE
HENRY
WOOD
SANDUSKY
ERIE
LORAIN
CUYAHOGA
LAKE
GEAUGA
ASHTABULA
TRUMBULL
PUTNAM
HANCOCK
SENECA
HURON
MEDINA
SUMMIT
PORTAGE
MAHONING
VAN WERT
ALLEN
WYANDOT
CRAWFORD
RICHLAND
ASHLAND
WAYNE
STARK
COLUMBIANA
MERCER
AUGLAIZE
HARDIN
MARION
MORROW
HOLMES
CARROLL
LOGAN
SHELBY
UNION
DELAWARE
KNOX
TUSCARAWAS
JEFFERSON
COSHOCTON
HARRISON
DARKE
MIAMI
CHAMPAIGN
LICKING
GUERNSEY
BELMONT
CLARK
MADISON
FRANKLIN
MUSKINGUM
FREBLE
MONTGOMERY
GREENE
FAIRFIELD
PERRY
NOBLE
MONROE
PICKAWAY
MORGAN
FAYETTE
HOCKING
BUTLER
WARREN
CLINTON
WASHINGTON
ROSS
ATHENS
HAMILTON
HIGHLAND
VINTON
MEIGS
CLERMONT
PIKE
JACKSON
BROWN
ADAMS
SCIOTO
GALLIA
LAWRENCE
Map 3.7.2.1.a

Counties that lie outside of the ODNR Division of Forestry wildfire protection area typically do not experience many wildfire events due to land use and land cover type (agricultural, developed urban/suburban). Fire departments from these counties do not file any wildfire reports; therefore ODNR Division of Forestry does not have a dataset for wildfire occurrence in these areas.

Region 1 ODNR Division of Forestry collects wildfire data from fire departments in Lucas, Henry, and Fulton Counties in Region 1, as these counties contain parts of Maumee State Forest. ODNR Division of Forestry does not collect wildfire report data in the remainder of Region 1 counties. Land cover type in Region 1 is predominantly agricultural land, or generally not forested; therefore, wildfire occurrence and risk are not as great. From 1/1/1997 – 11/20/2007, 227 wildfires burning 679 acres were reported in the three mentioned counties of Region 1.

Region 2 The majority of Region 2 lies outside of the ODNR Division of Forestry wildfire protection area – 6 counties straddle the wildfire protection area boundary. Ashland County contains Mohican State Forest, which is located completely within Region 2. Ashland and neighboring Richland counties reported 57 wildfires burning 172 acres from 1/1/1997 – 11/20/2007. Additional portions of Region 2 counties that report wildfires to ODNR Division of Forestry include SE Fairfield, W Licking, W Knox, and S Stark. Region 2 contains Ohio's most developed metropolitan hubs, as well as centers of highest population density. Wildland fuel types (woodland, grasslands) are not as abundant; accordingly, wildfire risk and occurrence is not as great. One notable location for potential large scale and damaging wildfire in Region 2 is the Mentor Marsh in Lake County, east of Cleveland. Mentor Marsh is a 691-acre nature preserve that has converted to nearly a monoculture of eight-12 foot high non-native Phragmites grass. This area is highly flammable, especially in spring with high winds coming off Lake Erie. Mentor Marsh has experienced 10 wildfire events since 1979, four of these being extremely noteworthy: May 1982 – 200 acres, May 1987 – 120 acres, May 1992 – 400 acres, April 2003 – 375 acres. All of these large-scale events were determined to be arson caused. Many homes, businesses, and high valued property are endangered by wildfire events in Mentor Marsh.

Region 3 Counties within Region 3 represent areas of highest wildfire risk and hazard in the State of Ohio. The vast majority of wildfires in Ohio occur in Region 3 due in part to abundant forested lands and grasslands. Population distribution and regional socio-cultural aspects contribute to higher wildfire occurrence, as well. Topography in Region 3 has more variety with numerous ridges and hollows, as opposed to flatter areas in western and central Ohio, which contributes to more complex wildfire behavior. ODNR Division of Forestry has identified 101 communities at risk (CAR) to wildfire in Ohio through GIS analysis, and all 101 CAR lie within Region 3 (s*ee Map 2.7.2.1.b*). ODNR Division of Forestry collects wildfire data from fire departments in all counties of Region 3, with the exception of Brown and Clermont Counties.


State Of Ohio
Wildfire Hazard Assessment
ODNR Division of Forestry
Communities at Risk to
Wildfire in Ohio
Legend
EMA Region Boundaries
Communities at Risk
1
2
2
3
N
0
15
30
60
Miles
Map 3.7.2.1.b

Past Occurrences

Ohio has experienced 8,235 wildfires that burned 42,622 acres between 1/1/1997 and 11/20/2007. These statistics were taken from wildfire reports filed by local and volunteer fire departments in southern, southeastern, eastern, as well as the disjunct northwest Ohio section within the ODNR Division of Forestry fire protection area. Wildfires that have occurred on federal lands in Ohio are not included in this data. It can be safely assumed that less than 100% of all wildfires on state and public land are reported; consequently, actual total occurrence and acres burned are suspected to be higher than data indicates.

Weather is the primary factor that determines the severity of fall and spring wildfire seasons in Ohio. Drought condition, combined with windy days create red flag, or extremely high fire danger. Consequently, the past fire occurrence record can be closely linked to historical weather data. Weather conditions leading up to and in 1930 resulted in the worst year to date for wildfires in Ohio in history, as 15,400 acres were recorded as burned over the course of the year. Extreme drought in 1950 and continuing for the next several years provided for very active wildfire seasons. March 27, 1950 considered the worst day in Ohio fire control history – 65 fires burned a total of 5,900 acres. In 1952, continued summer drought spurred a record fall fire season in Ohio and neighboring states. ODNR Division of Parks and Division of Wildlife employees assisted in suppression efforts, and the Ohio National Guard was also called out to help. A total of 680 wildfires burned 22,445 acres in the fall of 1952. Drought conditions in 1963 required placing on alert the ODNR Division of Forestry's pilots, 2000 fire wardens, 150 ODNR Division of Forestry employees, as well as several thousand volunteer firefighters and the Ohio National Guard. One or more fires were reported everyday from September 17 through November 29, and October showed a record number of fires for that month. 1988 was another severe wildfire year, as drought conditions required that CCC crews be mobilized, as well as all trained Division employees. More recently, 1999 proved to be a busy year for wildfire in Ohio, as an above average 7,836 acres were burned by nearly 1,500 wildfires.

Table 2.7.a: Wildfire occurrence and acres burned for selected counties in Ohio – top ten counties in terms of acres burned (1/1/1997 – 11/20/2007)

County	# of fires	Total acres burned	County	# of fires	Total acres
Lawrence	*1,649*	*11,865*	**Jackson**	*294*	*1,181*
Scioto	*564*	*6,945*	**Ross**	*284*	*975*
Gallia	*565*	*5,609*	**Belmont**	*232*	*970*
Pike	*427*	*2,316*	**Athens**	*183*	*800*
Adams	*353*	*1,203*	**Tuscarawas**	*244*	*680*

**Note: All counties in this table are located in Ohio EMA Region 3*

Over the past ten years, average fire size in Ohio calculated from wildfire report data is 5.17 acres. The smallest reported wildfire was >.10 acre (multiple counties and dates), while the largest reported fire was 1,016 acres (Scioto County, 4/14/2003).

Table 2.7.b: Wildfire occurrence by class size (1/1/1997 – 11/20/2007)

Class	Description	# of fires	Total acres burned
N/A	Not calculated	119	126.02
A	> .25 acres	1703	271.62
B	.26 acres – 9.9 acres	5477	11,098.88
C	10 acres – 99.9 acres	887	20,824.51
D	100 acres – 299.9 acres	41	6,075
E	300 acres – 999.9 acres	7	3,210
F	1000 acres – 4999.9 acres	1	1016

Over 99.9% of wildfires in Ohio are caused by human action or accident. Due to the nature of these ignitions, many wildfires in Ohio burn into close proximity of homes and structures. Since human behavior is to blame for the vast majority of wildfire starts in Ohio, an opportunity exists to influence behavior change and subsequently decrease wildfire occurrence. Many proactive steps have been taken by ODNR Division of Forestry and local fire departments to educate Ohio citizens about wildfire and home safety, and efforts will continue in the future.

Table 2.7.c: Causes of wildfires in Ohio (1/1/1997 – 11/20/2007)

Cause	# of fires	Total acres burned
Debris burning	3,395	13,754.3
Incendiary (arson)	1,174	9,217.02
Equipment	224	694.13
Smoking	177	691.83
Campfires	128	572.93
Children (playing with matches etc.)	87	188.96
Lightning	56	76.52
Railroad	22	35.16
Other/Unknown	2,972	17,391.22

**Note: Other/Unknown indicates wildfire was not investigated to the point of confidently determining cause of ignition*

Probability of Future Events

According to research and historical record, wildfires have occurred every spring and fall in the hardwood forests and grasslands of southern, southeastern, and eastern Ohio for hundreds of years, and will continue to do so in the future. The number of occurrences, size of wildfires, and severity of burn fluctuate annually in response to a variety of factors including:

- Weather – daily, monthly, seasonal, annual, and long-term trends in:
  - Precipitation
  - Relative Humidity
  - Temperature
  - Wind

- Fuels – condition of 1, 10, 100, 1000 hour fuels in terms of:
    - Moisture content
    - Arrangement
    - Accumulation level
    - Availability
- Ignitions – presence or absence of wildfire starts:
    - Human caused
        - Debris burning – compliance with ORC 1503.18, and safe debris burning techniques
        - Incendiary – arsonists at large
        - Wildfire prevention and awareness efforts
- Suppression Response – Capability and timeliness of initial attack:
    - Quickness of response to the incident
    - Local / Volunteer FD capability
    - Availability of state and local resources
        - Number of concurrent wildfires

Environmental Impacts

Wildfires can have a beneficial environmental impact. Heat is required by certain plants and trees to germinate seeds, and a fire clears out the dead underbrush. The smoke from the fire increases air pollution, not only in the vicinity of the fire, but also hundreds of miles away. Wildfires destroy fragile habitats and ecosystems. They threaten endangered and protected species. Wildfires also effect and can be the cause of changes in the water quality, damaging aquatic ecosystems.

In addition to the destruction of wildlife habitats, wildfires have a number of secondary impacts. With the loss of the vegetation, there is an increase risk of landslides or mudslides following a heavy rain. These then have an effect on the environment. Invasive weeds and grasses take root and prohibit the growth and spread of native species altering the ecosystem.

VULNERABILITY ANALYSIS & LOSS ESTIMATION

Methodology

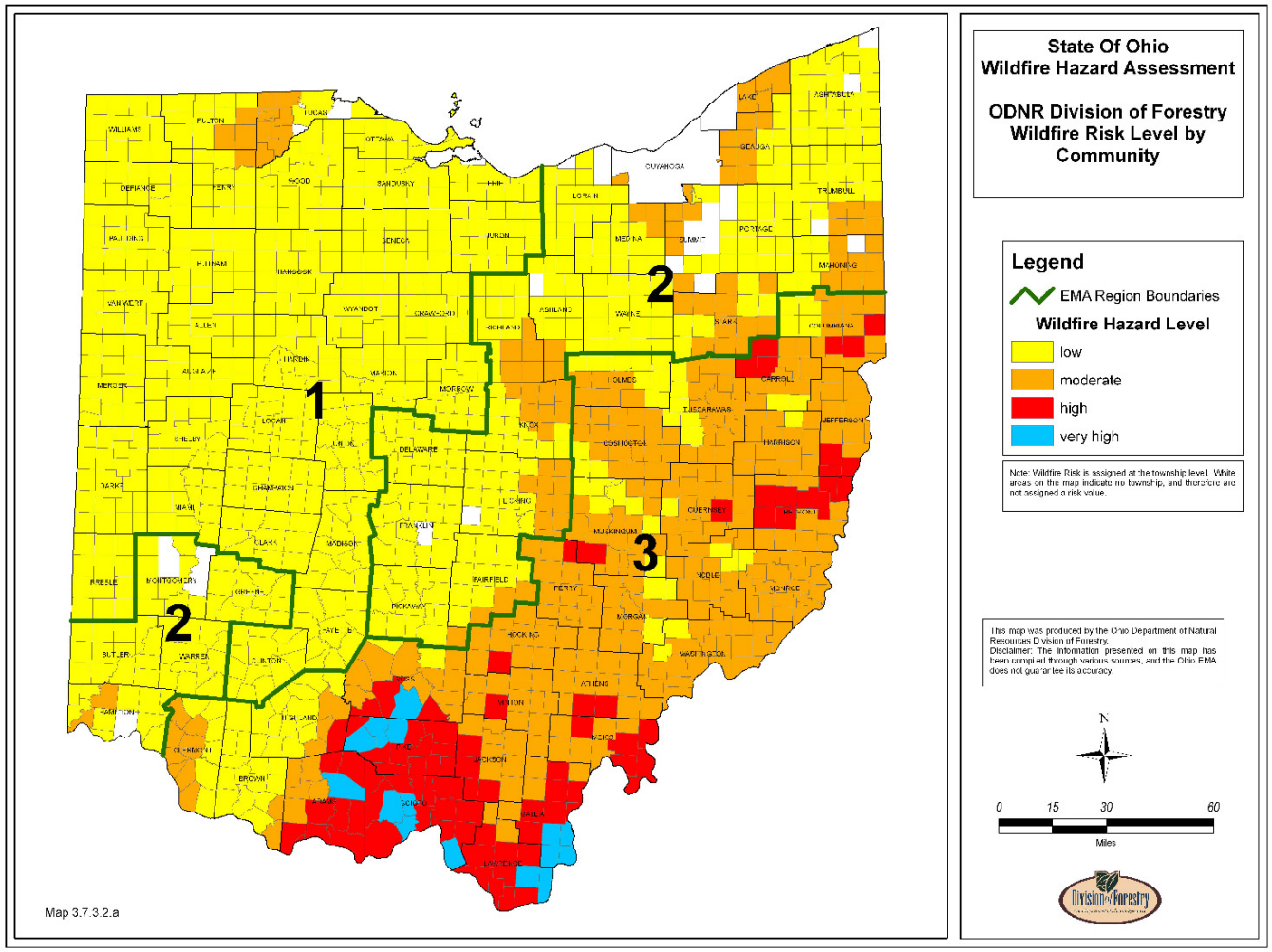
In order to accurately and quantitatively determine statewide wildfire risk, ODNR Division of Forestry combined several available datasets, using GIS tools and extensions, to complete a wildfire hazard assessment. Datasets integrated in the wildfire assessment include historic wildfire occurrence (all available wildfire reports submitted to ODNR Division of Forestry from Ohio fire departments), land use / land cover (LULC) data (1994 Landsat TM coverage data), and statewide population density. These three datasets were chosen to represent a risk (wildfire occurrence), hazard (land cover/fuel type), and value (population/homes). The township level was chosen to assign wildfire risk because rural fire departments in Ohio are typically organized at the township level. Evaluating wildfire hazard at the township level better illustrates the areas that need to increase wildfire prevention and

awareness programs. It also indicates the local fire departments that are responsible for particular high-risk jurisdictions.

Each of these respective datasets were converted to a raster format, and categorical values were reclassified accordingly: for example, hardwood LULC type was given a value of 8 while urban cover type was given a value of 0 (to indicate flammability), zero – 10 wildfires was valued at 1 while 500 – 650 wildfires was valued at 10 (to indicate occurrence risk), etc. A weighted calculation was then performed using the ArcGIS raster calculator function, whereby a total wildfire hazard value was computed from the reclassified values as such: historic reported wildfire occurrence 50%, LULC 37.50%, population density 12.50%. The calculation resulted in a new raster. The calculated wildfire hazard value was broken into four categories and labeled low, moderate, high, and very high. Factors pertinent to overall wildfire hazard level not incorporated into the calculation include fire department capability and water availability. The ODNR Division of Forestry wildfire hazard assessment was most recently update on 12/15/2006.

Results

The product of this project, the Ohio wildfire hazard assessment map, accurately indicates wildfire hazard level for all townships in Ohio (see map 2.7.3.2.a). Communities at risk to wildfire in Ohio are those townships that were attributed with a calculated wildfire hazard value equal to high or very high.


State Of Ohio
Wildfire Hazard Assessment
ODNR Division of Forestry
Wildfire Risk Level by
Community
Legend
EMA Region Boundaries
Wildfire Hazard Level
low
moderate
high
very high
Note: Wildfire Risk is assigned at the township level. White areas on the map indicate no township, and therefore are not assigned a risk value.
This map was produced by the Ohio Department of Natural Resources Division of Forestry.
Disclaimer: The information presented on this map has been compiled through various sources, and the Ohio EMA does not guarantee its accuracy.
N
0 15 30 60
Miles
Division of Forestry
1
2
2
3
Map 3.7.3.2.a

Region 1 and Region 2 are assessed as having generally low wildfire hazard, with several pockets of moderate risk of wildfire. Region 3 is assessed as having generally moderate risk of wildfire, with a sizeable section of southern Ohio having high or very high wildfire risk (Gallia, Lawrence, Scioto, Adams, Pike, southern Ross Counties). Southeastern and eastern Ohio were assessed as having an additional 29 communities rated as having high wildfire hazard. Particular high-risk groups in southeastern and eastern Ohio occur in southern Athens and Meigs Counties, as well as in Belmont and southern Jefferson Counties.

High valued personal property, including homes, machinery, agricultural crops, and tree plantations in areas of high or very high wildfire hazard are more vulnerable to damage by wildfire. Fire engines belonging to local fire departments are occasionally damaged while suppressing wildfires. A great amount of personal property has been saved by fire departments through effective and safe wildfire suppression

Table 2.7.d

Estimate of Potential Losses to Wildfire by Region - 1/1/1997 - 11/20/2007

Region 1

County	Events	Acres	Damage	Loss Avoided
Allen	0	0.00	$0	$0.00
Auglaize	0	0.00	$0	$0.00
Champaign	0	0.00	$0	$0.00
Clark	0	0.00	$0	$0.00
Clinton	0	0.00	$0	$0.00
Crawford	0	0.00	$0	$0.00
Darke	0	0.00	$0	$0.00
Defiance	0	0.00	$0	$0.00
Erie	0	0.00	$0	$0.00
Fayette	0	0.00	$0	$0.00
Fulton	53	72.97	$29,702	$1,853.00
Hancock	0	0.00	$0	$0.00
Hardin	0	0.00	$0	$0.00
Henry	9	32.61	$0	$0.00
Huron	0	0.00	$0	$0.00
Logan	0	0.00	$0	$0.00
Lucas	165	727.71	$40,100	$222,000.00
Madison	0	0.00	$0	$0.00
Marion	0	0.00	$0	$0.00
Mercer	0	0.00	$0	$0.00
Miami	0	0.00	$0	$0.00
Morrow	0	0.00	$0	$0.00
Ottawa	0	0.00	$0	$0.00
Paulding	0	0.00	$0	$0.00
Preble	0	0.00	$0	$0.00
Putnam	0	0.00	$0	$0.00
Sandusky	0	0.00	$0	$0.00
Seneca	0	0.00	$0	$0.00
Shelby	0	0.00	$0	$0.00
Van Wert	0	0.00	$0	$0.00
Williams	0	0.00	$0	$0.00
Wood	0	0.00	$0	$0.00
Wyandot	0	0.00	$0	$0.00
TOTAL	**227**	**833.29**	**$69,802**	**$223,853**

Region 2

County	Events	Acres	Damage	Loss Avoided
Ashland	19	12.28	$200	$325,000.00
Ashtabula	0	0.00	$0	$0.00
Butler	0	0.00	$0	$0.00
Cuyahoga	0	0.00	$0	$0.00
Delaware	0	0.00	$0	$0.00
Fairfield	33	70.31	$250	$155,000.00
Franklin	0	0.00	$0	$0.00
Geauga	2	0.30	$0	$0.00
Greene	0	0.00	$0	$0.00
Hamilton	0	0.00	$0	$0.00
Knox	122	230.11	$1,200	$1,530,000.00
Lake	2	775.00	$11,000	$50,000.00
Licking	126	302.77	$26,400	$120,000.00
Lorain	0	0.00	$0	$0.00
Mahoning	0	0.00	$0	$0.00
Medina	0	0.00	$0	$0.00
Montgomery	0	0.00	$0	$0.00
Pickaway	7	34.25	$0	$0.00
Portage	0	0.00	$0	$0.00
Richland	39	159.45	$16,450	$575,000.00
Stark	52	222.87	$100	$0.00
Summitt	0	0.00	$0	$0.00
Trumbull	0	0.00	$0	$0.00
Warren	0	0.00	$0	$0.00
Wayne	0	0.00	$0	$0.00
TOTAL	**402**	**1807.34**	**$55,600**	**$2,755,000**

Region 3

County	Events	Acres	Damage	Loss Avoided
Adams	354	1202.90	$36,278	$1,456,757.00
Athens	183	800.31	$26,550	$150.00
Belmont	232	969.09	$3,340	$846,800.00
Brown	0	0.00	$0	$0.00
Carroll	209	472.12	$19,485	$1,623,200.00
Clermont	0	0.00	$0	$0.00
Columbiana	239	748.40	$3,440	$846,800.00
Coshocton	226	553.45	$36,300	$873,060.00
Gallia	565	5608.52	$3,084	$191,129.00
Guernsey	240	663.18	$7,480	$700.00
Harrison	163	611.78	$1,909	$965,000.00
Highland	46	230.35	$0	$230.00
Hocking	135	621.69	$3,000	$1,271,225.00
Holmes	126	321.96	$1,800	$1,320,300.00
Jackson	295	1182.68	$8,210	$226,904.00
Jefferson	174	635.61	$4,320	$565,500.00
Lawrence	1,652	11876.50	$34,559	$1,118,920.00
Meigs	272	613.24	$32,560	$6,400.00
Monroe	120	341.94	$23,960	$48,800.00
Morgan	104	272.27	$0	$17,550.00
Muskingum	261	608.25	$35,540	$2,800.00
Noble	77	312.85	$30,300	$0.00
Perry	132	263.85	$435	$170.00
Pike	427	2316.09	$89,160	$675,000.00
Ross	284	974.81	$80,100	$697,551.00
Scioto	570	7072.85	$96,467	$5,671,868.00
Tuscarawas	245	679.50	$65,955	$2,734,000.00
Vinton	126	638.62	$60,000	$0.00
Washington	153	592.88	$78,250	$263,500.00
TOTAL	**7,610**	**41185.69**	**$782,482**	**$21,424,314**

VULNERABILITY ANALYSIS & LOSS ESTIMATION OF STATE-OWNED / CRITICAL FACILITIES

State-owned structures and property within areas of high and very high wildfire hazard are obviously more at risk to damage by wildfire than those in urban or low risk areas. **(**See Map 2.7.4.2.a)

High valued state-owned property has been damaged in the past by wildfire. Thousands of acres of merchantable timber and tree plantations have been lost or damaged by wildfire. In February 2002, a wildfire in Crown City Wildlife Area, Gallia County, burned approximately 709 acres through a hardwood plantation reclamation project. Damages were estimated at nearly $100,000. Machinery, such as bulldozers and trucks, belonging to state agencies are occasionally damaged while suppressing wildfires.

Exposure to wildfire, regardless of size, creates an inherently hazardous situation. In 1989, a state employee lost their life while battling a wildfire in southern Ohio, and a second was severely burned. Local firefighters have incurred numerous injuries, both severe and minor, while en route to and during suppression of wildfire in Ohio.