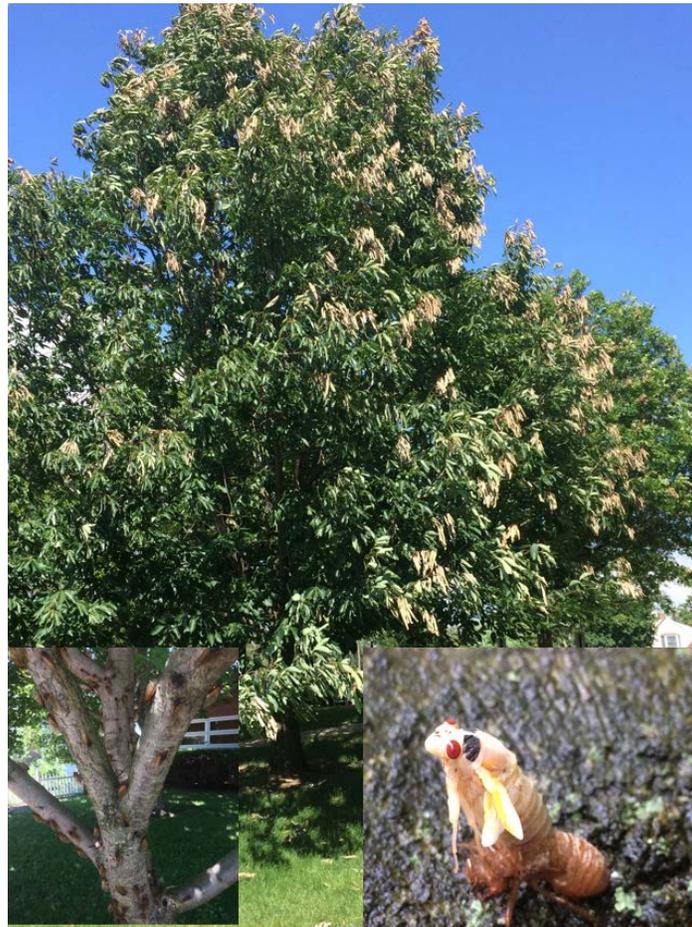


# 2016 WEST VIRGINIA MAST SURVEY AND HUNTING OUTLOOK



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**WEST VIRGINIA DIVISION  
OF NATURAL RESOURCES  
WILDLIFE RESOURCES SECTION**



## 2016 West Virginia Mast Survey

Colin Carpenter, Michael Peters, Eric Richmond, Randy Tucker and Chris Ryan

The Division of Natural Resources (DNR) in cooperation with the Division of Forestry annually surveys the State to determine relative abundance of soft and hard mast of important trees and shrubs. Information on the quantity of wildlife food is provided to our cooperators, our hunters and the news media.

Two hundred (200) locations covering all regions of West Virginia were surveyed in 2016. Observations were collected by professionals from a variety of disciplines, including wildlife managers, foresters, wildlife biologists, retired wildlife managers and biologists, several conservation officers, Natural Resources Commissioners and a few other cooperators devoted their time to collect data. Without the efforts from all of these individuals this survey would not be possible. We sincerely thank everyone and extend our special thanks to retired persons and sportsmen.

The mast survey is a relative estimation of mast produced by 18 different species. A sample of the mast survey form is included in the Appendix. To collect mast survey information, cooperators are assigned counties and areas familiar to them. Mast data is subjectively evaluated as abundant, common or scarce. The surveyor also documents species not seen. The mast index is calculated for each species by the following formula:

$$\text{Mast Index} = \left[ \frac{\text{abundant observations}}{\text{total observations}} \right] + \left[ \frac{\text{common observations} \times 0.5}{\text{total observations}} \right] \times 100$$

The mast index is calculated by species for each ecological region and elevation (high and low). The current year's index is compared to the previous year's index. It is also compared to a long-term average index spanning the life of the survey. Readers not familiar with our regions should refer to Figure 1 to determine the ecological region where they hunt.

Many wildlife species are highly dependent on mast produced by trees and shrubs. Energy available in mast is more important for survival of many wildlife species than energy available in forage from agriculture crops and herbaceous plants. Seeds and fruits from trees and shrubs are necessary for not only overwinter survival, but also to assure that wildlife is in good physical condition to reproduce. Because of the importance of mast conditions, biologists and wildlife managers are able to forecast black bear, squirrel, white-tailed deer, wild boar and wild turkey population changes and harvests.

Periodical cicadas were plentiful across much of the state this year as the 17 year hatch of Brood V emerged from the ground. This copious food source had a large impact on many of the State's wildlife as it supplied much needed nutrition. This factor should also be considered if hunters have a choice on where to go hunting this year.

Compared to the 2015 survey (Table 1), the mast index for all species combined was down. Last year hickory and walnut were abundant but this year they were much lower. Hickory produced less than half as many nuts in 2016. This year, white and chestnut oaks are up slightly but black/red, scarlet and scrub oaks are up significantly. Compared to last year, the index for all oak species increased. Statewide, scarlet oak had the largest increase at 168%.

All soft mast except black cherry was below the 2015 production. Apple, yellow poplar and grape, three of the more important fall soft mast foods showed a dramatic reduction in production. Dogwood, crabapple, and hawthorn also exhibited significant declines and will have an impact on hunting seasons and population dynamics this fall. Hunters, especially grouse and some other species, should take note of this information and look for areas of higher food abundance.

When comparing all species, the 2016 index was 27% below last year and slightly below the long-term trend (Fig. 2). Hickory, cherry and oaks (Fig.2) were below the average but up slightly from last year with all oaks being very close to the long-term average (Fig. 3). The lack of beech, hickory and walnut was offset by better oak mast. However, it should be noted that oak production was very bad in 2015. Hickory was very poor statewide in 2016 with an index of 20. All hard mast species were slightly below their long-term average (Fig. 5).

Because mast abundance can vary at different locations, caution should be exercised when comparing the abundance values of these indices especially at the regional level. Ecological Region 2 showed the largest variation from last year with a 33% reduction in total mast production (Table 3). There was a wild variance of species production in this region with black cherry being up 135% but hickory decreasing 87%. All other regions also decreased in production from 2015. Hunters should really pay attention to the production in their area (Table 3). Nevertheless, the presence or absence of acorn production can be an important predictor in harvest. Several factors can inflate or deflate the percent change in the index. Therefore, comparisons to the long-term average should give us a tempered result that is more representative to the true mast condition (Table 4).

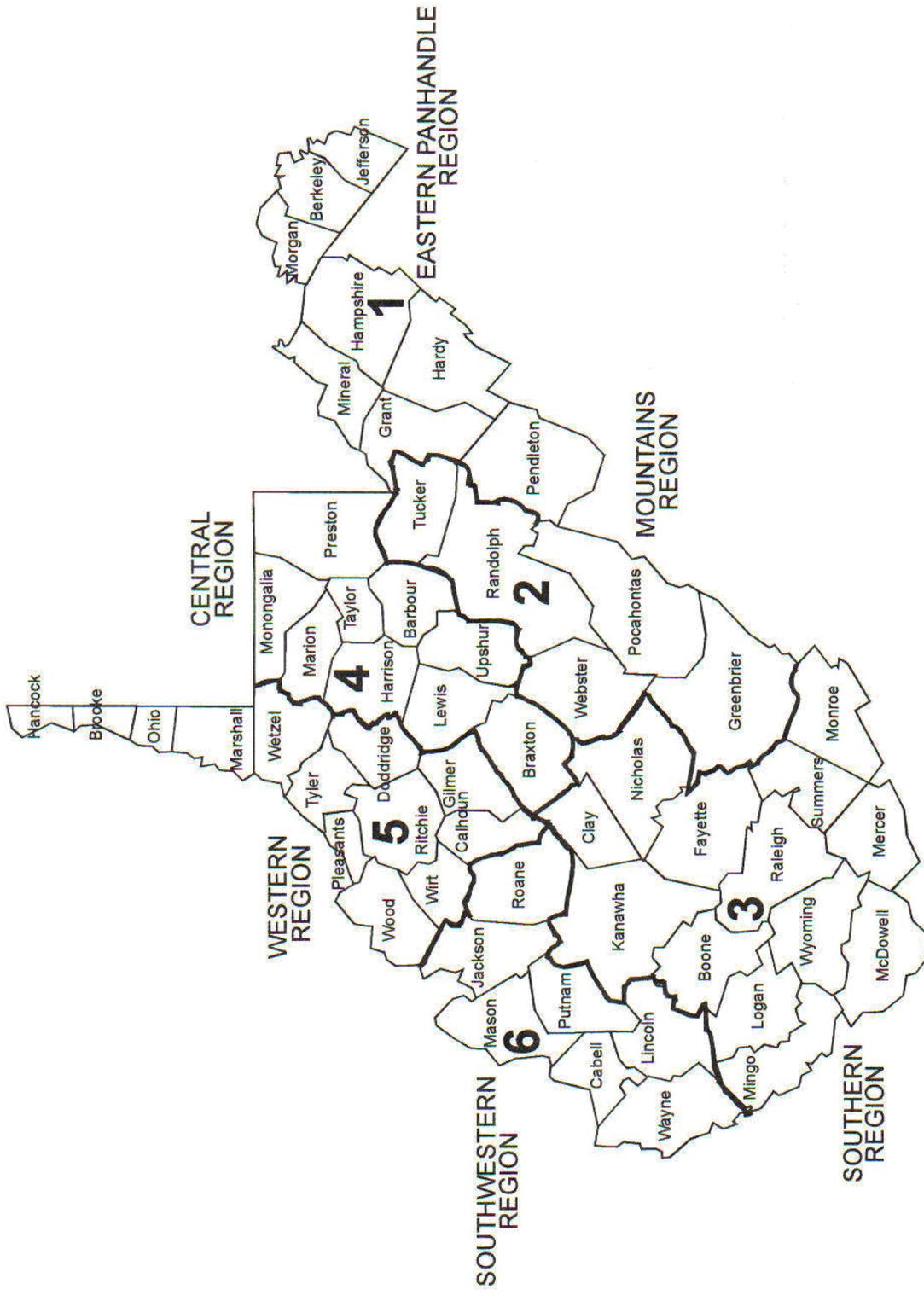
When the mast survey began in 1971, our main purpose was to use it to forecast squirrel populations and hunting outlook. Current mast conditions impact overwinter survival and reproductive success of many other wildlife species.

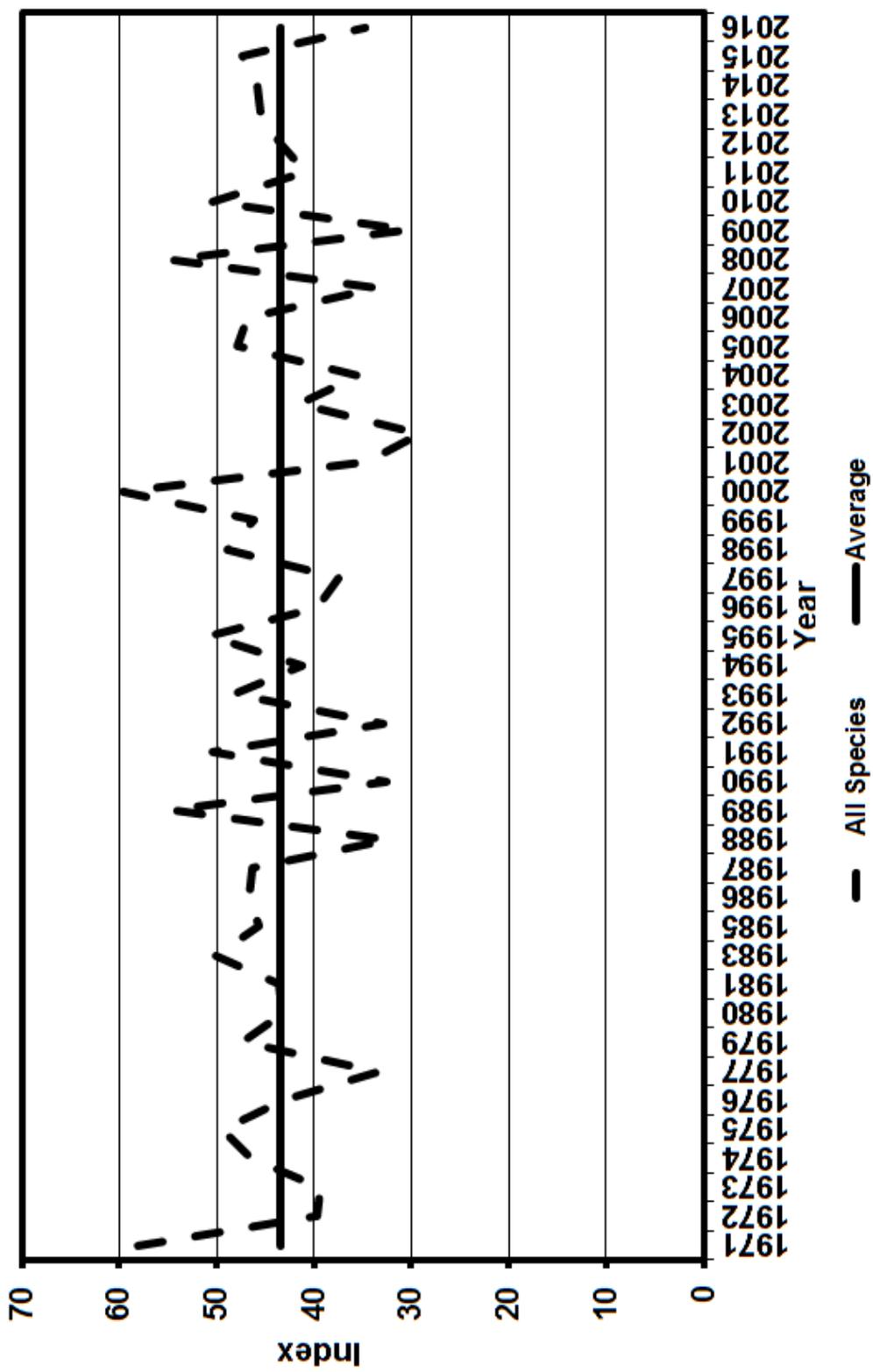
It is recommended that hunters review the regional trends in mast as shown in Tables 3 and 4 to learn of food conditions in their region of the State. There are always some regional differences.

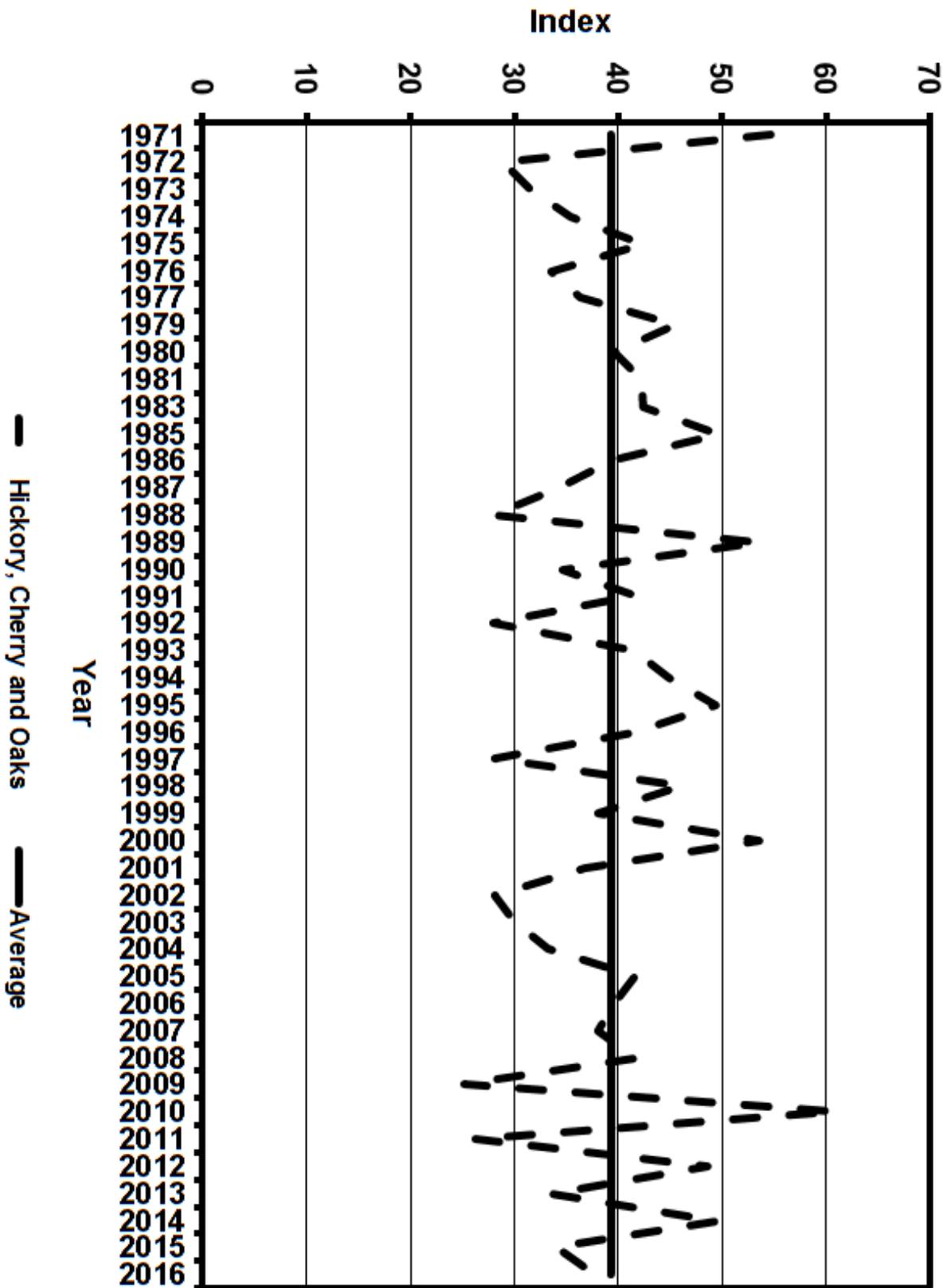
### **2016 Mast Survey Highlights**

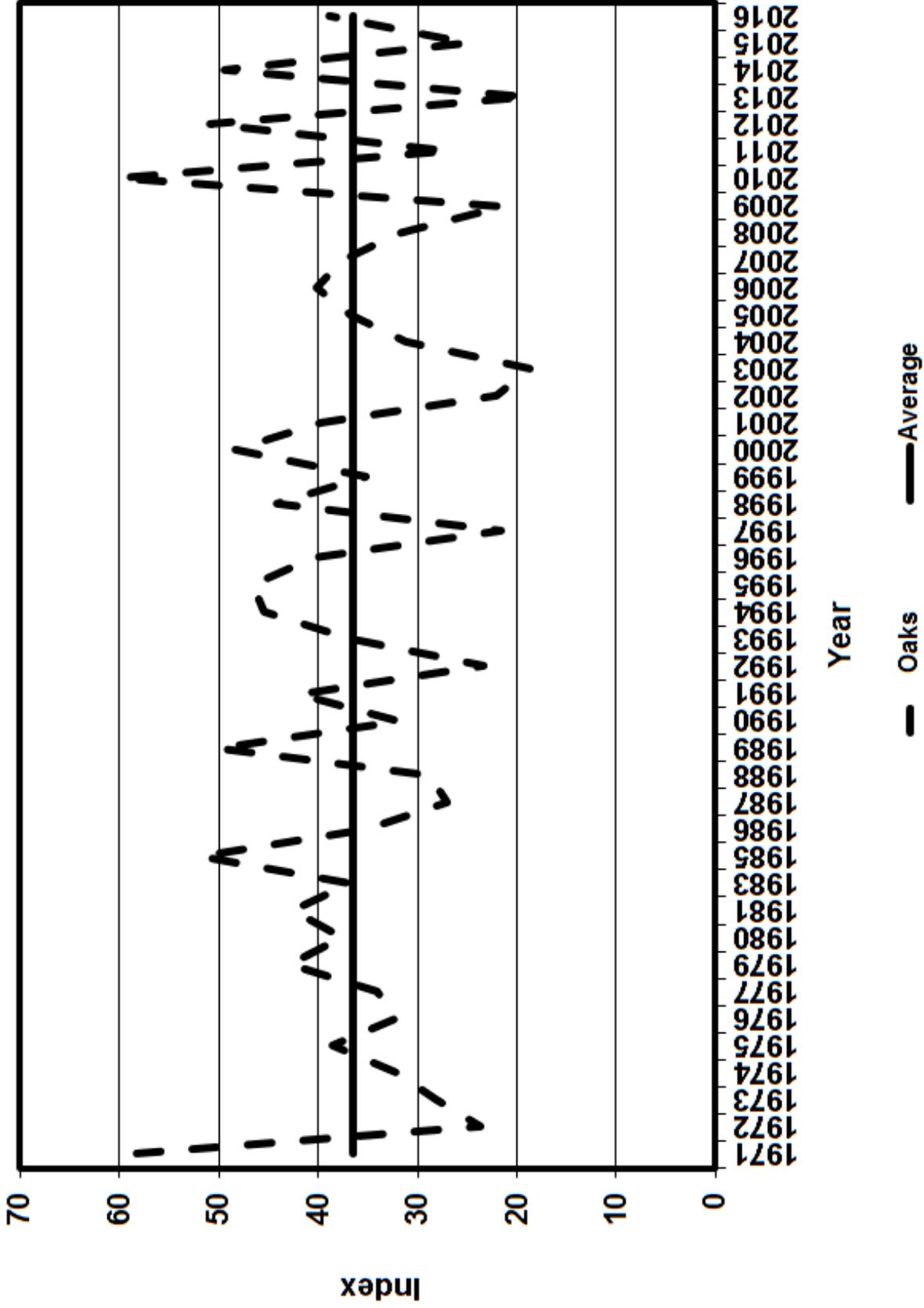
- All Species combined the mast index is 25% below the long-term average

- All Hard Mast Species mast index is slightly lower to the long-term average
- Black/red and scarlet oak mast is much better than last year
- Scouting will be important because of spotty oak conditions. White oak may be very abundant in one location but scarce across the ridge
- Beech and Hickory are considerably lower than last year and the 45-year average
- Soft mast production is much lower than 2015
- Food supplied by cicadas may have a large influence on reproductive cycles









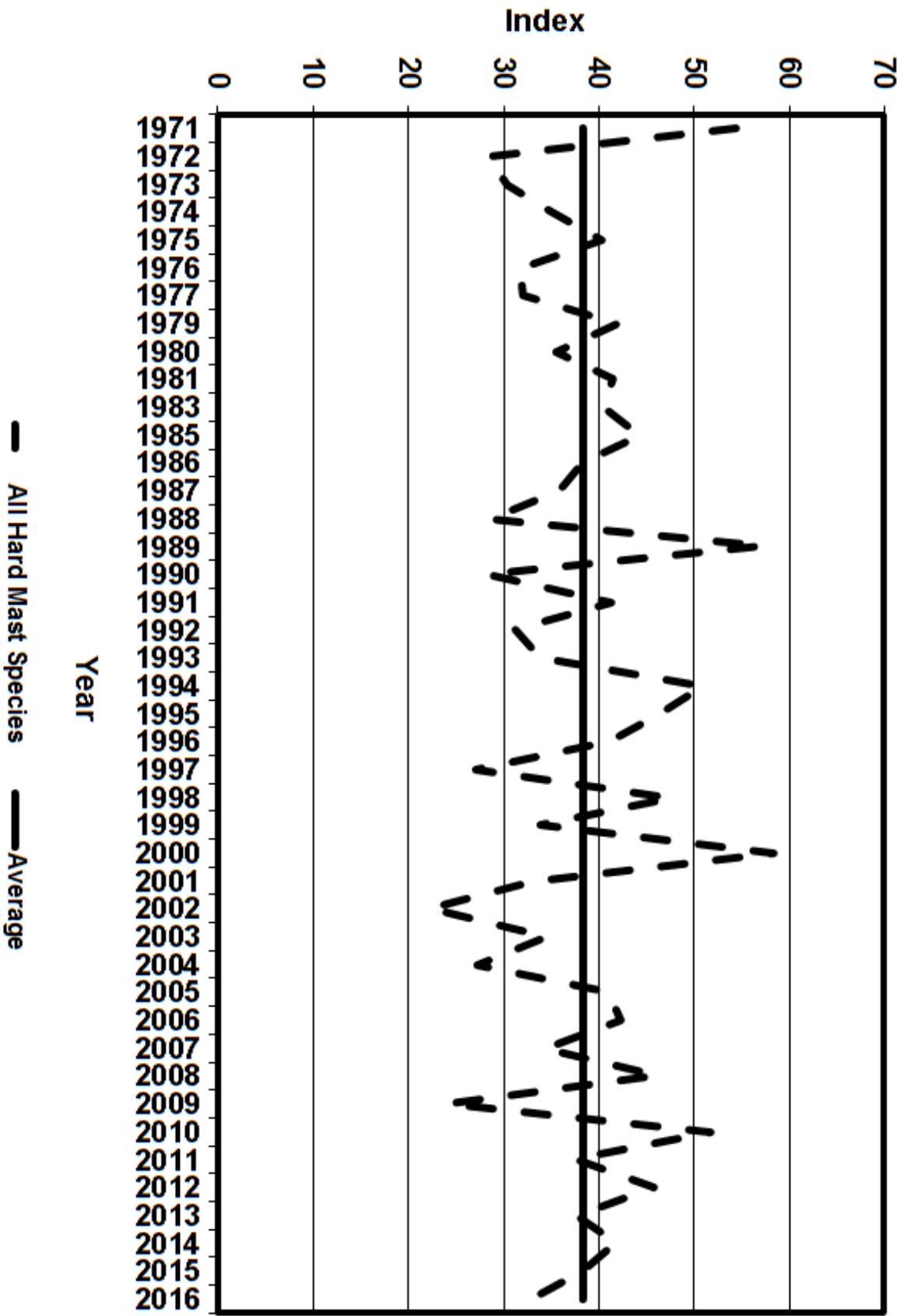


Table 1. 2016 statewide index compared to 2015 mast index.

<b>Species</b>	<b>2015</b>	<b>2016</b>	<b>Percent Difference</b>
Beech	57	26	-54
Walnut	51	23	-55
Hickory	73	20	-73
White Oak	24	34	39
Chestnut Oak	24	25	5
Black/Red Oak	19	46	143
Scarlet Oak	13	35	168
Black Cherry	40	50	25
Grape	61	29	-52
Scrub Oak	44	54	22
Yellow Poplar	39	20	-50
Hawthorn	64	41	-36
CrabApple	71	39	-45
Dogwood	59	49	-17
Blackberry	56	49	-12
Greenbrier	38	28	-27
Sassafras	38	20	-48
Apple	78	38	-51
<b>All Species</b>	<b>46</b>	<b>34</b>	<b>-27</b>

Table 2. 2016 statewide index compared to 45-year average mast index.

<b>Species</b>	<b>Avg Index</b>	<b>2016</b>	<b>Percent Difference</b>
Beech	39	26	-33
Walnut	38	23	-38
Hickory	48	20	-58
White Oak	38	34	-10
Chestnut Oak	33	25	-23
Black/Red Oak	42	46	10
Scarlet Oak	33	35	5
Black Cherry	46	50	9
Grape	41	29	-30
Scrub Oak	36	54	50
Yellow Poplar	47	20	-58
Hawthorn	48	41	-15
CrabApple	54	39	-27
Dogwood	49	49	1
Blackberry	51	49	-3
Greenbrier	40	28	-30
Sassafras	36	20	-45
Apple	57	38	-32
Other	68	34	-51
<b>All Species</b>	<b>44</b>	<b>34</b>	<b>-23</b>

Table 3. Percent difference in mast index by species between 2015 and 2016 by ecological region.

Species	Ecological Region					
	1	2	3	4	5	6
Beech	-67	-96	-78	-64	47	-41
Walnut	13	-64	-48	-76	-60	-38
Hickory	-93	-87	-62	-74	-68	-34
White Oak	93	-25	133	17	144	3
Chestnut Oak	-7	-67	144	7	86	-17
Black/Red Oak	225	75	455	49	95	157
Scarlet Oak	858	75	303	20	164	145
Black Cherry	-12	135	-29	383	30	-22
Grape	-69	-36	-69	-25	-43	-58
Scrub Oak	14	67	N/A	N/A	N/A	N/A
Yellow Poplar	-42	-65	-54	-65	-3	-37
Hawthorn	-33	-42	-45	-21	-40	-37
CrabApple	-33	-60	-50	-44	-37	-14
Dogwood	-2	6	-15	-23	-17	-14
Blackberry	-35	-17	-13	17	8	-31
Greenbrier	68	-55	39	3	-44	-46
Sassafras	-14	-25	-44	-50	-58	-41
Apple	-69	-46	-52	-38	-68	-8
<b>All Species</b>	<b>-17</b>	<b>-33</b>	<b>-26</b>	<b>-26</b>	<b>-16</b>	<b>-26</b>

Table 4. Percent Change in 2016 mast index by species from average of years (1971-2015) by ecological region.

Species	Ecological Region					
	1	2	3	4	5	6
Beech	-18	-94	-61	-59	61	-7
Walnut	-14	-15	-45	-67	-49	-4
Hickory	-89	-76	-42	-64	-57	3
White Oak	-20	-40	-31	-17	62	-3
Chestnut Oak	-54	-71	-35	0	45	-17
Black/Red Oak	8	17	30	-21	22	-4
Scarlet Oak	-15	24	18	-32	29	12
Black Cherry	-10	91	-36	4	33	0
Grape	-71	-30	-55	0	11	-26
Scrub Oak	32	130	N/A	N/A	N/A	N/A
Yellow Poplar	-47	-67	-58	-75	-50	-37
Hawthorn	5	-23	7	-21	-23	-4
CrabApple	-20	-42	-27	-32	-27	-6
Dogwood	-20	41	-3	-4	6	10
Blackberry	-28	19	-19	-6	28	-15
Greenbrier	-55	-72	7	-1	-46	-32
Sassafras	-26	-62	-61	-40	-44	-22
Apple	-65	-14	-27	-19	-55	13
Other	-57	-53	-55	-52	-44	-32
<b>All Species</b>	<b>-33</b>	<b>-21</b>	<b>-29</b>	<b>-27</b>	<b>-6</b>	<b>-9</b>

## Black Bear

Abundant opportunities to hunt black bears in the Mountain State continue in 2016. Once again, hunters will have the opportunity to hunt bears during 3 different early firearms seasons with or without dogs in 23 counties spanning 22 days. Bear archery season is open for 3 months. There will be 33 counties open to concurrent deer and bear hunting during the buck firearms season, and every county in the state is open for a December firearms season (with or without dogs allowed depending on county). **In 2016, we are predicting a bear harvest that is similar to the record harvest of 2015.**

Hunters who use dogs have more opportunity than ever. Hunters in Logan, McDowell, Mingo and Wyoming counties will be able to hunt bears with or without dogs from September 3 – 10. Mountain county hunters will be able to hunt bears with or without dogs from September 17 – 24. Finally, hunters in Boone, Fayette, Kanawha and Raleigh counties will be able to hunt bears with or without dogs from October 1 – 7. Hunters who use dogs also have the traditional December season in all or parts of 25 counties. In addition, hunters will be allowed to harvest a second bear as long as one of the bears comes from Boone, Fayette, Kanawha, Logan, McDowell, Mingo, Nicholas, Raleigh, or Wyoming counties.

Firearms hunters who do not use dogs will also have many opportunities to harvest a bear. For the third time, hunters will be allowed to harvest a bear during the buck-firearms season by permit in 17 counties. In 16 counties, hunters will be allowed to harvest a bear during the buck-firearms season without applying for a permit prior to the season.

Archery hunting success rates depend greatly on mast conditions. Harvests decrease in years of mast abundance and increase in years of mast scarcity. The 2016 bear archery harvest will decrease over the record number of bears killed in 2015. Hunters who focus their efforts in red, black, or scarlet oak stands should increase their odds for success. If hunters can find the patches of white oak that hit in 2016, their chances of success should increase.

The bear harvest in the traditional December firearms season should be similar to slightly greater than the harvest of 2015. Hunters will most likely find December bruins cleaning up the remaining red oak group acorns.

## White-tailed Deer

**The total white-tailed deer harvest should be similar to slightly lower in 2016 than it was in 2015.** Antlerless seasons have been liberalized in several counties in 2016. However, oak mast will have deer spread out over the landscape and less visible in fields and less susceptible to bait.

We are predicting a **similar archery harvest** in 2016. Oak mast heavily influences deer movements and harvest rates. Abundant red oak group mast in 2016 will make deer harder to pattern and harder to harvest.

The **buck harvest should be lower** in 2016 than in 2015. There should be a strong yearling age class born in spring 2015 following the bumper oak crop of 2014. However, the percentage of yearlings in the harvest has remained low due to selectivity of hunters.

**Antlerless harvests should be higher in 2016.** Antlerless hunting opportunities have increased substantially in 2016, therefore antlerless harvest should increase. Deer (especially later in the season) will be more visible in fields as available mast is consumed. Deer that are more visible are usually more vulnerable to harvest.

The **muzzleloader harvest should be similar in 2016.** Muzzleloader harvest will be influenced by both participation and weather. Hunters who have already put a deer or two in the freezer may be less likely to participate if weather conditions are nasty.

### **Gray and Fox Squirrels**

The factor influencing squirrel numbers more than any other is mast conditions from the previous year. The reason is that food conditions from the previous year have a major impact on overwinter survival and the number of litters produced by squirrels. Squirrels normally produce a summer litter, but the spring litter is very dependent on overwinter food availability. In 2015, hard mast production did not lend itself toward great overwintering and litter production. Hunters will need to scout their hunting areas for concentrations of squirrels where hard mast can be found. **Hunters should expect lower harvests for the 2016-2017 season.**

### **Cottontail Rabbits**

Cover for rabbits is the most critical element to their survival during the fall and winter. A wet spring and early summer produced conditions for great cover and bunny numbers going into the late summer months. However, cover dried up and withered away in the hot, dry August of 2016. September rains enhanced some grassy cover in the east, but most forbs and other vegetation are through their growing periods. Dry conditions in the late summer during both 2015 and 2016 will have a cumulative effect on overall rabbit numbers. **Hunters should experience lower harvests again in 2016-2017.**

## Wild Boar

Wild boar numbers are a direct result of the previous year's mast conditions. Even though this year's hard mast conditions are above the long term average last year's hard mast was well below. Poor 2015 mast conditions probably resulted in fewer and smaller litters. Oak production was up in ecological region 3 this year, where hogs are found. This could disperse the boar throughout their range and more difficult to hunt. The 2015 boar harvest was up following the good 2014 mast year. **Hunters should expect a lower harvest than last year.**

## Ruffed Grouse

The significant snow fall at the end of last winter combined with the mediocre mast production of 2015 and a wet spring this year probably resulted in lower overwinter survival and poor poult production. Observed grouse broods for 2016 was 18% below 2015 and 7% below the five year average. All soft mast producers statewide and across all ecological regions, which grouse heavily rely on, did poorer than last year. All soft mast producers, but dogwood, were also below the 45-year average. **It is predicted that flushing rates and harvests should be similar or slightly lower than last year across the state.**

## Raccoon

**Hunters should expect lower harvests than last year.** Mast conditions determine overwinter survival and reproduction for 'coons. Good mast conditions in 2014 resulted in good carryover and reproduction in 2015 which resulted in higher harvests. Unfortunately, 2015 was a poor mast year for hickory, cherry, and oaks resulting in lower survival and reproduction. Hunters should focus their efforts in areas where the hard mast producers did well, especially oaks.

## Wild Turkey

Turkey harvests are heavily influenced by brood production in that year. The seventeen year periodical cicadas of Brood V which stretched across much of the state had a large impact on brood survival in 2016. The statewide brood reports were up 46% over the 5-year average; however, it was localized to the counties having the Brood V hatch. Counties in the Eastern Panhandle dropped 40% but the western section of the state was up over 323%.

Every county will have some sort of fall turkey season in 2016. This is the first time in many years that hunters across the state will be able to enjoy some sort of fall season. The traditional counties will continue to have a 4-week season. Non-traditional counties will have either a one or two week season. Hunters should check the 2016-2017 Hunting Regulations on page 33 to find out the regulations on their specific county. **The Wild Turkey harvest should increase over last year because of better reproduction and a change in regulations.**

Table 1. 2016 quick check chart of predicted statewide wildlife harvests.

<b>Species</b>	<b>Higher</b>	<b>Similar</b>	<b>Lower</b>
Gray and Fox Squirrels			X
Cottontail Rabbits			X
Ruffed Grouse		X	
Raccoon			X
White-tailed Deer		X	
Wild Boar			X
Wild Turkey	X		
Bear		X	

Table 2. 2016 quick check chart of deer harvest forecast by region and season.

Region	Season				
	Bow	Buck	Antlerless	Muzzleloader	Total Kill
1	Similar	Down	Up	Similar	Similar
2	Similar	Down	Up	Similar	Similar
3	Down	Down	Similar	Similar	Similar
4	Similar	Down	Up	Similar	Similar
5	Down	Down	Up	Similar	Similar
6	Down	Down	Up	Similar	Similar
<b>Statewide</b>	<b>Similar</b>	<b>Down</b>	<b>Up</b>	<b>Similar</b>	<b>Similar</b>

## **APPENDIX**

**REPORT OF MAST CONDITIONS**

**2016**

(See opposite side for instructions)

LOCATION: \_\_\_\_\_ ELEVATION:  High  Low

COUNTY: \_\_\_\_\_ DATE: \_\_\_\_\_  
Month Day Year

ELEVATION: \_\_\_\_\_ ASPECT: \_\_\_\_\_

**AVAILABLE MAST, FRUIT, ETC.**

SPECIES	Abundant	Common	Scarce	Species Not Seen
BEECH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WALNUTS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HICKORIES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WHITE OAK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CHESTNUT OAK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BLACK/RED OAK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SCARLET OAK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BLACK CHERRY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GRAPES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SCRUB OAK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YELLOW-POPLAR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HAWTHORNE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRABAPPLE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOGWOOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BLACKBERRY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GREENBRIER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SASSAFRAS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
APPLE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REMARKS: \_\_\_\_\_

NAME OF PERSON REPORTING: \_\_\_\_\_

DIVISION: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

City

State

Zip

### INSTRUCTIONS FOR REPORTING MAST CONDITIONS

PLEASE PRINT CLEARLY USING A BLUE OR BLACK INK. USE CAPITAL LETTERS AS ILLUSTRATED BELOW

**LOCATION:** Give the nearest post office address or some other adequate description.  
Example: Alpena Post Office, or two miles south of Alpena near head of Roaring Creek. Do not give such descriptions as "on the ridge above George Walker's Store."

**COUNTY:** Name the county in which the survey was made.

**DATE:** Enter the date (month/day/year) on which the survey was made.

**ELEVATION:** Give the approximate elevation. Example: 2,500 feet, 800 feet, etc.

**AVAILABLE MAST, FRUIT, ETC.**

Please indicate the relative abundance of the mast, fruit, etc. this season by placing an X in the box under the proper column opposite the species concerned. Do not write in any wording such as poor, very poor, not so good, etc. Place a X in the box under the "species not seen" column if you did not see the tree or shrub species, or if the species does not occur in the area you conducted the survey.

Please return the forms by August 31, 2016 so that compilations can be made immediately thereafter.

Mail completed forms to:

WV Division of Natural Resources

Mast Survey

PO Box 67

Elkins, WV 26241

## RETURN BY AUGUST 31, 2016

*Important! The form should be completed IN CAPITAL LETTERS using a BLACK or DARK BLUE ballpoint/fountain pen. Characters and marks used should be similar in the style to the following:*

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 1 2 3 4 5 6 7 8 9 0 ☒ ☑









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# Mast Survey

**Wildlife Resources**  
*West Virginia Division of  
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**Bulletin 16-03**



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