2023 WEST VIRGINIA
HUNTING OUTLOOK
AND
MAST SURVEY

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WEST VIRGINIA DIVISION
OF NATURAL RESOURCES
WILDLIFE RESOURCES SECTION

HUNTING OUTLOOK

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Black Bear

Fall 2023 will continue to feature more conservative bear seasons than hunters have experienced prior to 2021. As in 2022, the bear archery season for 2023 is set to open concurrently with the deer archery season (September 30). Archers will have 13 weeks to hunt bears in 2023.

There will be 2 discrete early bear firearms seasons open for a total of 16 days in 9 different counties where hunters may use dogs. Four counties will be open for 9 days of firearms bear hunting from September 2 – September 10 with or without hounds. Five counties will be open for 7 days of firearms bear hunting from October 7 – October 13 with or without hounds. For the first time, youth, senior and handicapped hunters will have the opportunity to harvest a bear during a 2 – day bear season with or without the use of dogs in all counties or parts of counties open to bear hunting with dogs. Youth, senior and handicapped hunters will also have the opportunity to harvest a bear during a 2 – day antlerless deer season in mid – October. In addition, all or parts of 42 counties will be open for concurrent bear hunting for 4 days in late October during an antlerless firearms season.

All or parts of 42 counties will be open for bear hunting during the deer firearms season. All or parts of 26 counties will be open for 4 weeks of firearms bear hunting in December with or without hounds. Finally, all or parts of 35 counties will be open to 4 weeks of firearms bear hunting without hounds in December. Bear hunting seasons will be open for 104 days from September – December in West Virginia in 2023. Hunters will also have the opportunity to harvest a bear from January 11 – 14, 2024 during the Mountaineer Heritage Season. Sunday hunting is permitted on both private and public land. **We are predicting a higher overall bear harvest in 2023.**

Archery hunting success rates depend greatly on mast conditions. Harvests decrease in years of mast abundance and increase in years of mast scarcity. **The archery harvest should be slightly higher in 2023.** Red, black and scarlet oak were the producers in 2023. However, the "hit and miss" nature of acorn production this year should make it easier for hunters to pattern bruins.

The firearms bear harvest will be higher than the harvest of 2022. The addition of a new youth season will bolster the firearms harvest, but the amount of red oak, black oak, scarlet oak and hickory on the landscape will determine how many bears are still available for the traditional December firearms season.

White – tailed Deer

The total white – tailed deer harvest in 2023 should be similar to that of 2022. Average red, black, and scarlet oak production will mean that deer will not have to move as much to find food, especially early in the season. However, many mast survey participants commented on the "hit and miss" nature of oak production in 2023. This means that when you find a group of oak trees that have produced, you should be able to find deer. Deer populations throughout the state remain strong, so hunters should be pleased with the number and health of the animals they see.

We are predicting a higher archery harvest in 2023. The spotty nature of the red oak group's acorn production will make patterning deer activity easier than last year, when white oak acorns blanketed the landscape. As always, pre – season and in – season scouting will be essential to stay in bow range of feeding white – tails.

We are predicting a lower buck firearms season harvest in 2023. The 2022 buck firearms harvest was the highest of the previous 5 years, so it is unlikely to increase again in 2023. The two biggest factors that always influence the buck firearms harvest are weather and participation (especially during the first 3 days of the season). The amount of mast remaining on the ground throughout the state by Thanksgiving week will influence the ability of hunters to see deer out in fields.

The antlerless harvest in 2023 should be similar to the harvest in 2022. Antlerless harvest levels are influenced by the same factors that influence the buck firearms harvest. Antlerless season structures are very similar in 2023 to what was offered in 2022. Opportunities to harvest antlerless deer are available throughout the fall and we encourage hunters to harvest antlerless deer early in the season.

The muzzleloader harvest should also be similar to the harvest in 2022. Like the buck firearms and antlerless seasons, the muzzleloader harvest is influenced by weather and participation. The muzzleloader harvest declined when the opening date of the season was changed. The harvest never rebounded after the season opening date was changed back to where it used to be.

The Mountaineer Heritage Season harvest should be similar to the past season (January 2023). The Mountaineer Heritage season gives hunters a chance to bring out their traditional muzzleloading rifles and pursue deer that haven't been pressured in several weeks. In addition, hunters are unlikely to experience interference from other hunters during this season.

Gray and Fox Squirrels

Mast from the previous year is the primary influence on squirrel populations the following year. White and chestnut oak were above average in 2022 but below this year. Hunters should find plenty of squirrels in beech and walnut before looking in other areas and **harvest should be up.** In addition, hickory is up this year and above the long-term average. Hickory is higher in both carbohydrates and fat and are really preferred by West Virginia squirrels. If hunters can find a hickory patch look at it for great squirrel hunting. Black, red and scarlet oak are much higher than last year so that should supply a good source of long-term food for squirrels. Squirrel hunting is a lot of fun for kids and a great source of enjoyment for adults. Have some fun and go out squirrel hunting.

Wild Turkey

Fall turkey harvests are heavily influenced by brood production in that year and available mast. Based on brood surveys this summer, brood production is slightly lower than last year. Hard mast production this year is average; however, turkey hunters should note which species did exceptionally well in their area. Black/red oak, scarlet oak, and hickory mast production are up from last year, and also up when compared to long term data. In contrast to last year, white oak and chestnut oak are scarce. Understanding the species on the property you anticipate hunting is essential to your success. Turkeys will seek out the pockets of hickories, red/black oak, and scarlet oak. In areas where these species are minimal, turkeys may become more visible as they are searching for mast with these hit-or-miss conditions. **The wild turkey harvest should be higher than last year.**

Every county will again have some length of fall turkey season in 2023. 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 2023-2024 Hunting Regulations on page 42 to find out the fall turkey hunting regulations specific to their county. The Mountaineer Heritage Season in January 2024 permits participants to harvest one either-sex turkey. See page 34 of the 2023-2024 Hunting Regulations for more details on legal weapons.

Wild Boar

Wild Boar harvests have been on an upward trend since the introduction of the winter season. Excellent white oak and chestnut oak production in 2022 should have resulted in good reproduction. Harvests during those seasons have carried the bulk of the numbers. We expect the winter season harvests to be similar to year's past, but archery harvests should be elevated due to current mast conditions. Hit and miss mast conditions should have pigs concentrated around the available foods resulting in **higher harvests in 2023-2024.**

Raccoon

Raccoon reproductive rates are directly reflected upon the mast conditions of the previous year. White and Chestnut Oak production was exceptionally good in 2022. The lack of distemper outbreaks statewide and good reproduction should result in greater numbers of available raccoons. **Hunters should expect higher harvests in 2023-2024.**

Cottontail Rabbits

Precipitation has a major factor on rabbit populations come hunting season. Rainfall has been very variable across the state. Depending on where you located populations should be up in other places that had a drought may have harder hunting. Therefore, **statewide harvest predications are similar.** Hunters that are lucky enough to have beagles should hunt their favorite spots first but then expand into other areas. The DNR encourages landowners to make early successional habitat that will support more game and non-game species. Rabbit is a load of fun for families and friends.

Ruffed Grouse

Ruffed grouse populations this year continue a similar trend. Based on participation in the DNR Grouse Cooperator Survey, flush rates per hour have remained relatively unchanged for the past 3 years (average 0.5 birds/hour). The 2022-2023 survey was comprised of 21 cooperators with a total of 208 hunts and 24 birds bagged. We encourage any and all grouse hunters to participate in the Grouse Cooperator Survey, as this provides valuable hunter effort and trend data to monitor populations. Participation in the suvey also enables the DNR to participate in research projects, including most recently partnership in a genetic analysis of grouse in WV. To participate, contact the Game Management Services Office at (304) 637-0245. High quality habitat on both public and private lands is the best tool to combat declining populations.

The average, yet spotty mast conditions will make finding grouse difficult this year. Scouting is highly encouraged to ensure your favorite cover will lead to successful hunting. Focus for the early parts of the season should be on producing pockets of beech, black cherry, hawthorn, and crab apple. Late season efforts should focus on remaining soft mast such as grapes and the less preferred scarlet and red/black oaks. **Hunters should expect similar flushing rates and harvests this year.**

Table 1. 2023 quick check chart of predicted statewide wildlife harvests.

Species	Higher	Similar	Lower
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		
Quail	X		

Table 2. 2023 quick check chart of deer harvest forecast by region.

Region	Total Kill
1	Similar
2	Similar
3	Increase
4	Similar
5	Lower
6	Lower
Statewide	**Similar**

2023 West Virginia Mast Survey

Colin Carpenter, Holly Morris, Eric Richmond, Chris Ryan,
and Ethan Barton

The Division of Natural Resources (DNR), in conjunction with the Division of Forestry, annually surveys the state to determine relative abundance of soft and hard mast produced by trees and shrubs of importance to wildlife populations. Information on the quantity of wildlife food is provided to our cooperators, hunters, and various media outlets.

Mast surveys were completed at 245 locations covering all regions of West Virginia in 2023. Professionals and volunteers -- including wildlife managers, foresters, wildlife biologists, Natural Resources Police Officers, Natural Resources Commissioners, and retired personnel from a multitude of natural resources related disciplines -- devoted their time and effort to collect data for this survey. Without the participation of these individuals, completion of the statewide mast survey would not be possible. We would like to extend our sincerest gratitude to everyone who assisted with data collection in this year's survey.

The mast survey is a relative estimation of mast produced by 18 different tree and shrub species that are widespread and locally common throughout the state and are of nutritional value to wildlife. A sample of the survey form is appended at the end of the report. Cooperators are assigned counties and areas familiar to them to collect mast production information, and the same areas are generally surveyed each year to ensure consistency in the survey across years. Mast crop production is subjectively evaluated as abundant, common, or scarce for each species encountered by the observer in the surveyed area. The surveyor also documents species that are not encountered, along with additional mast-producing species of local importance (e.g., Pawpaw, Persimmon, Cucumber-tree, Blueberry, Huckleberry, etc.) that do not appear on the statewide survey form. The mast index is calculated for each species, and in some cases guilds of species (e.g., hard mast producers, all oaks, oak-cherry-hickory, etc.), via the following formula:

$$\text{Mast Index} = [(\text{Abundant Observations/Total Observations}) + ((\text{Common Observations} \times 0.5)/\text{Total Observations})] \times 100$$

The mast index is calculated by species for each ecological region and elevation (high or low, relative to the local terrain of the surveyed county). The current year's index is compared to the previous year's index and the running long-term average spanning the life of the survey, which was first conducted in 1971. Readers unfamiliar with West Virginia ecoregions should refer to Figure 1 to determine the region(s) in which they hunt.

Many wildlife species are highly dependent upon mast crops produced by trees and shrubs, and dynamic factors -- including survival and reproduction or fecundity -- are affected by mast availability. Caloric value available in mast is much more important to the survival of many wildlife species than the caloric value in agricultural crops, herbaceous plants, and supplemental feed. Seeds and fruits from trees and shrubs are necessary not only for overwinter survival, but also for ensuring animals are in good physical condition for reproduction in following months. Generally, animals that enter the winter months with abundant fat reserves will be more likely to survive the lean months

of the year and will produce and successfully rear more offspring during the subsequent spring and summer months. Wildlife biologists and managers are able to predict hunting prospects and forecast population dynamics of black bears, squirrels, white-tailed deer, wild boars, wild turkeys, and other game species by using mast quantity and quality information gathered during the annual mast survey.

Compared to the 2022 survey year (Table 1), the statewide combined index for all monitored species was up approximately 15% for survey year 2023. While the statewide crops of White Oak and Chestnut Oak acorns were down substantially from 2022 levels (-61% and -52%, respectively), production of mast by most other monitored species increased. Red and Black Oak (+138%) and Scarlet Oak (+108%) performed measurably better than in 2022, and both were above the long-term survey average by 15% or more. Among other hard mast producing species, Beech (+99%), Walnut (+192%), Hickory (+37%), and Scrub Oak (+33%) performed better than last year. Relative to the 52-year long-term survey average, all hard mast producers except for White Oak (-44%), Chestnut Oak (-34%), and Beech (-10%) exceeded mean production levels. Oak production across the landscape in 2023 was a bit heterogeneous, so this should allow diligent hunters to have success pursuing game animals such as squirrels, raccoons, bears, boars, and deer in successful fashion provided they scout the areas they plan to hunt and find good pockets of available hard mast. Areas with overstory Red Oak, Black Oak, and Scarlet Oak probably offer the best prospects in general in the 2023 Fall hunting seasons. In areas where Beech occurs, bear and turkey hunters especially should take note of the uptick in the Beech crop and focus their efforts on these areas, especially in counties where seasons open earlier.

Most soft mast producers performed above -- in some cases considerably -- the levels seen in survey year 2022. Black Cherry (+25%), Apple (+20%), Hawthorn (+36%), and Crabapple (+43%) fruit production increased measurably as most areas of the state avoided late frost and excessively wet conditions that can cause tree disease issues. Comparison to the long-term soft mast average revealed Black Cherry (+13%), Crabapple (+7%), and Hawthorn (+11%) performed better than average statewide, while Apple (-7%) was scarcer than in a typical year. Relative to the long-term average, most surveyed soft mast producing species were off from 10% (Grape) to a remarkable 32% (Yellow Poplar). Blackberry (-1%) and Dogwood (-4%) were close to the long-term average statewide. Soft mast provides significant and calorie-rich food resources for wild turkeys, ruffed grouse, black bears, and raccoons, all of which use soft mast extensively when and where it is available. Hunters should take note of regional mast survey information (Table 3) and scout accordingly -- species that heavily use soft mast may be concentrated in pockets of available food early in the season, and knowing where these pockets exist should make the likelihood of a successful harvest higher. These species may have to roam more to find soft mast as the autumn wears on and available fruit begins to disappear.

Hunters should always pay attention to mast crop production in their area (Table 3; Table 4). Survey year 2023 revealed a crop that was generally better than that of 2022 across all ecoregions of West Virginia except Region 3, but production among some key regional species like White Oak and Chestnut Oak were generally down. Red/Black Oak and Scarlet Oak acorn production were up tremendously in all regions except Region 4, where it was up by 35% and 9%. Comparisons to the long-term average provide a more tempered index to mast crop than do annual comparisons, wherein relatively small variations in production of a particular species can dramatically influence percent change

as indicated by the comparison and therefore may not provide a representative index to true abundance. The overall mast crop across half of the state was up over the historic average statewide, while Regions 2 and 4 were approximately on average and Region 3 was down 29%.

Considering the long-term comparisons, the total mast crop of survey year 2023 is about 3% below average driven primarily by substantial departures in White Oak, Chestnut Oak, Yellow Poplar, Greenbrier, and Sassafras production. However, production among Red/Black Oak, Scarlet Oak, and Scrub Oak was above average, so species that rely heavily upon acorns to build their fat reserves for winter will find resources, but competition for limited resources may be locally high. Hunters should reap the rewards, in terms of game harvest, of increased game animal movement brought on by competitive food availability on the landscape.

We recommend hunters review regional trends in mast production as reflected in Tables 3 and 4 to learn the wildlife food conditions in the regions of the state they intend to hunt. While this information should prove to be a valuable asset to all readers, local and regional differences are always at play when it comes to mast production. The West Virginia Mast Survey is intended to provide a representative regional and state-wide picture of wildlife food conditions "on the ground," but it is not a substitute for diligent scouting!

2023 Mast Survey Highlights

- All Species Combined mast index is near (-3%) the long-term average statewide, and 15% above 2022.

- While White and Chestnut Oak acorn production was down significantly from 2022 across much of the state, production of Red/Black and Scarlet Oak is generally well above 2022 levels and above the long-term average. Red/Black and Scarlet Oak acorns, and in some regions Scrub Oak acorns, should be most available statewide and should supply good nutrition to the species that rely upon them.

- Beech, Walnut, and Hickory production was up markedly from 2022 levels and generally well above average across all ecoregions.

- Soft mast production was mixed although many species were near or above the long-term average statewide. However, soft mast production varied markedly by ecoregion.

Table 1. 2023 statewide index compared to 2022 mast index.

Species	2022	2023	Percent Difference
Beech	18	35	99
Walnut	20	58	192
Hickory	42	58	37
White Oak	52	21	-61
Chestnut Oak	45	21	-52
Black/Red Oak	20	48	138
Scarlet Oak	19	39	108
Black Cherry	42	52	25
Grape	38	37	-3
Scrub Oak	33	44	33
Yellow Poplar	32	31	-2
Hawthorn	40	54	36
CrabApple	40	58	43
Dogwood	49	47	-4
Blackberry	53	50	-6
Greenbrier	35	27	-21
Sassafras	24	24	-3
Apple	44	53	20
All Species	**36**	**41**	**15**

Table 2. 2023 statewide index compared to 52-year average mast index.

Species	Avg Index	2023	Percent Difference
Beech	39	35	-10
Walnut	39	58	49
Hickory	48	58	20
White Oak	37	21	-44
Chestnut Oak	32	21	-34
Black/Red Oak	41	48	15
Scarlet Oak	33	39	19
Black Cherry	46	52	13
Grape	41	37	-10
Scrub Oak	36	44	23
Yellow Poplar	45	31	-32
Hawthorn	48	54	11
CrabApple	54	58	7
Dogwood	49	47	-4
Blackberry	51	50	-1
Greenbrier	39	27	-30
Sassafras	34	24	-30
Apple	57	53	-7
All Species	**43**	**41**	**-3**

Table 3. Percent difference in mast index by species between 2022 and 2023 by ecological region.

Species	Ecological Region					
	1	2	3	4	5	6
Beech	140	96	184	52	5	N/A
Walnut	250	405	233	158	103	289
Hickory	33	44	6	62	63	71
White Oak	-56	-81	-89	-44	-37	6
Chestnut Oak	-26	-88	-86	-27	19	0
Black/Red Oak	111	178	215	35	193	200
Scarlet Oak	129	55	222	9	87	264
Black Cherry	-34	156	17	41	41	5
Grape	-2	-32	-39	11	6	89
Scrub Oak	114	-100	100	-100	-100	N/A
Yellow Poplar	-3	-23	-9	54	-28	-2
Hawthorn	21	13	36	33	127	-17
CrabApple	-70	75	6	45	217	13
Dogwood	-2	8	-33	8	16	18
Blackberry	-58	3	-16	17	5	7
Greenbrier	-9	14	-62	-22	11	-27
Sassafras	0	-14	-38	52	24	26
Apple	-26	38	-30	43	68	-35
All Species	**13**	**14**	**-11**	**22**	**34**	**46**

Table 4. Percent Change in 2023 mast index by species from average of years (1971-2022) by ecological region.

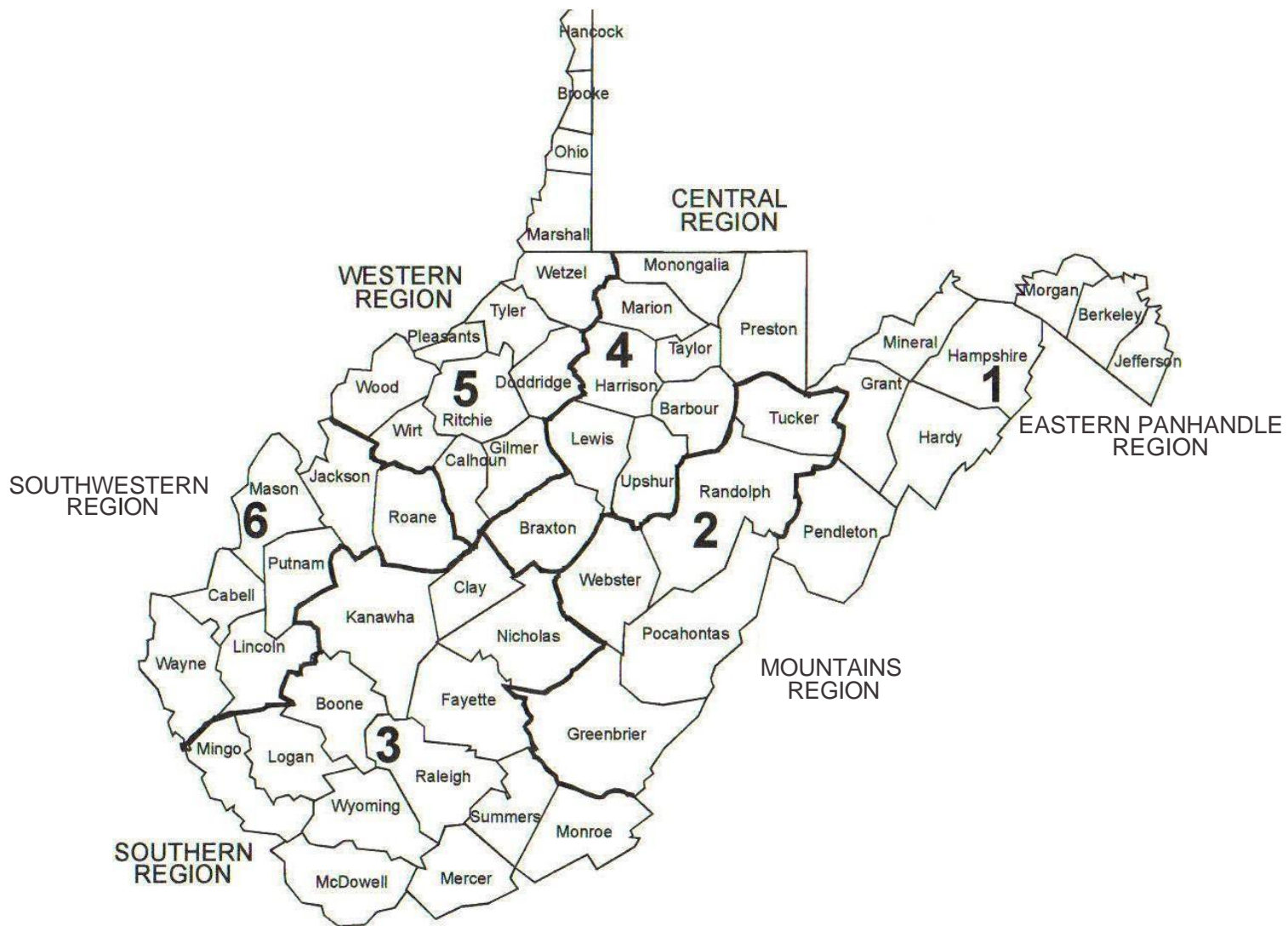| Species	Ecological Region					
	1	2	3	4	5	6
Beech	59	-34	0	-15	-15	6
Walnut	54	55	53	50	38	73
Hickory	32	54	-10	17	26	44
White Oak	-63	-67	-82	-25	-5	13
Chestnut Oak	-54	-75	-75	-8	22	27
Black/Red Oak	29	36	-6	-4	16	66
Scarlet Oak	39	53	-6	-5	27	59
Black Cherry	-3	28	-18	14	36	28
Grape	2	-43	-56	21	16	40
Scrub Oak	23	-100	55	-100	-100	N/A
Yellow Poplar	-22	-41	-53	-16	-27	-12
Hawthorn	-34	11	10	0	13	78
CrabApple	-50	12	-1	3	9	41
Dogwood	11	2	-33	-12	12	30
Blackberry	-66	22	-8	-2	24	11
Greenbrier	-19	-12	-70	-12	-9	-36
Sassafras	-23	-36	-59	-38	24	-10
Apple	-49	22	-46	7	9	-42
All Species	**-7**	**0**	**-29**	**1**	**15**	**24**

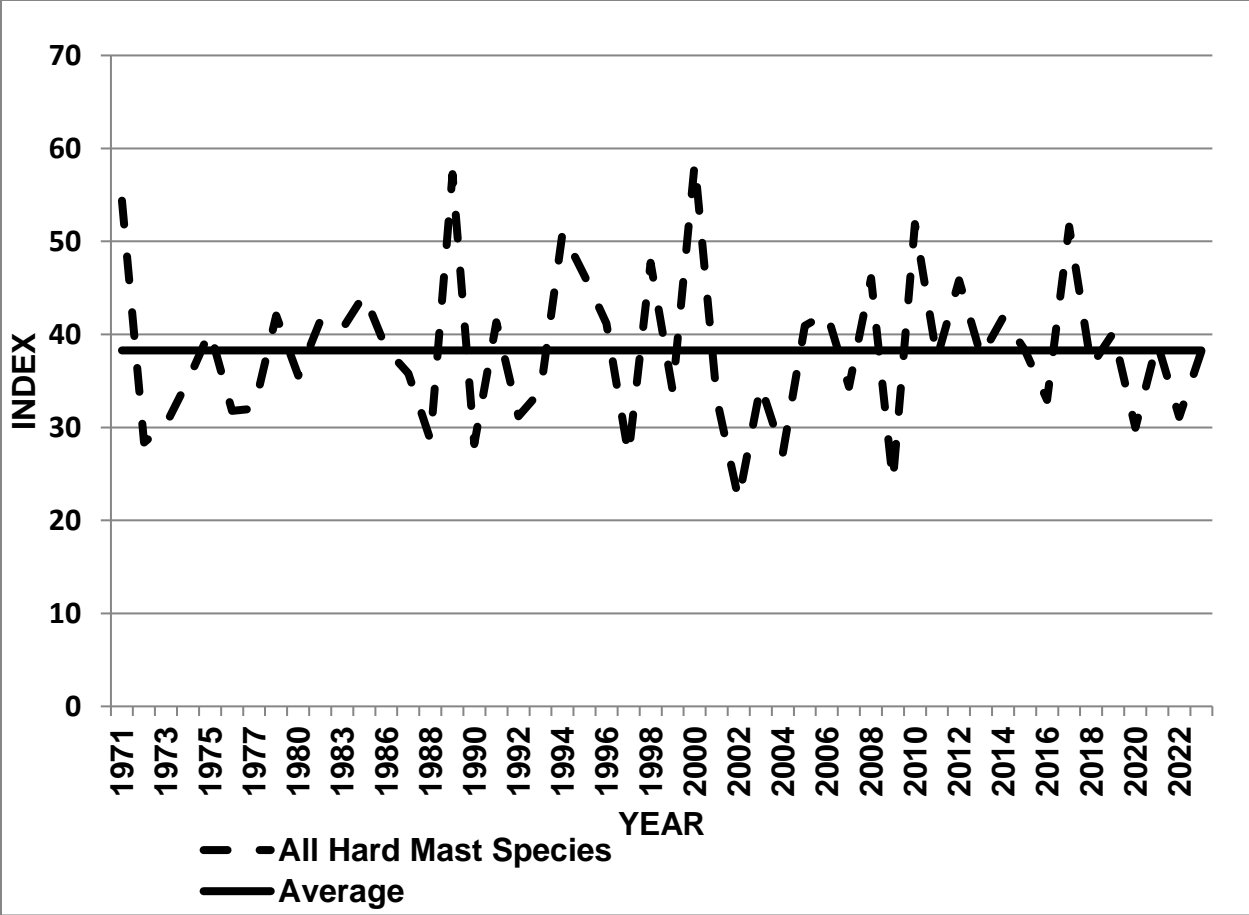Figure 1. Ecological regions of West Virginia for 2023 mast survey.

Figure 2. All West Virginia hard mast average index from 1971 - 2023.
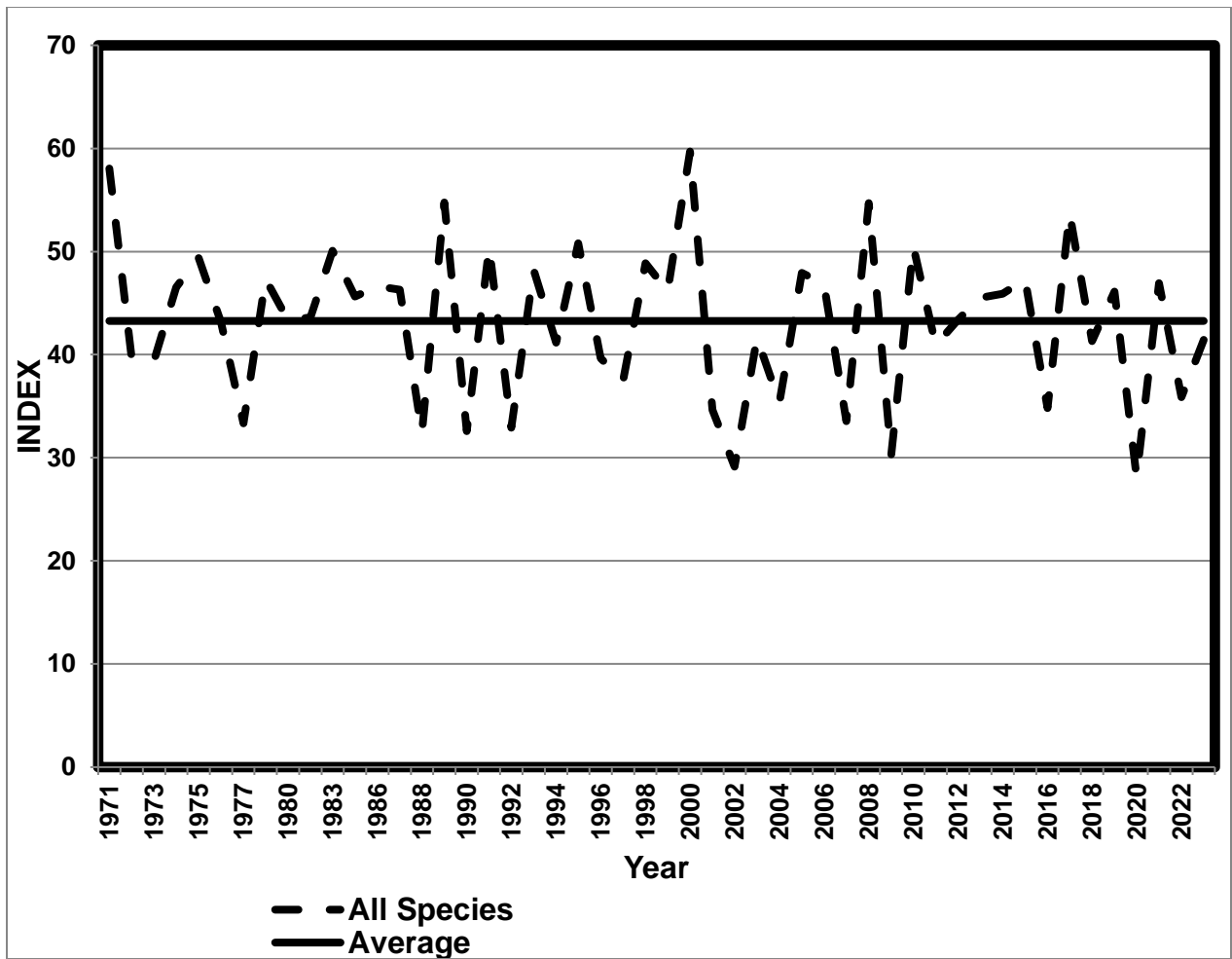
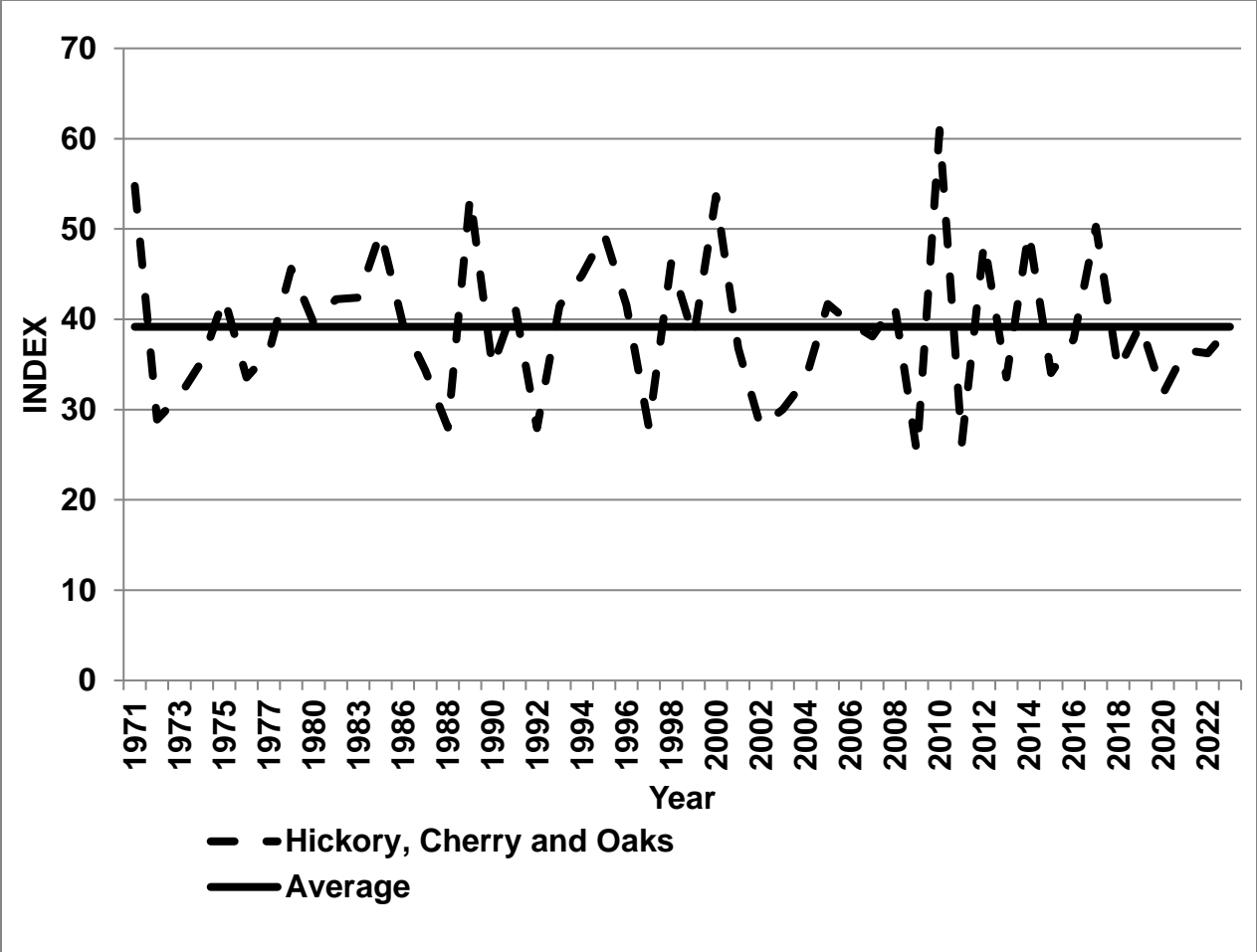Figure 3. All West Virginia mast species average index from 1971-2023.

Figure 4. West Virginia hickory, black cherry and oak index from 1971 - 2023.
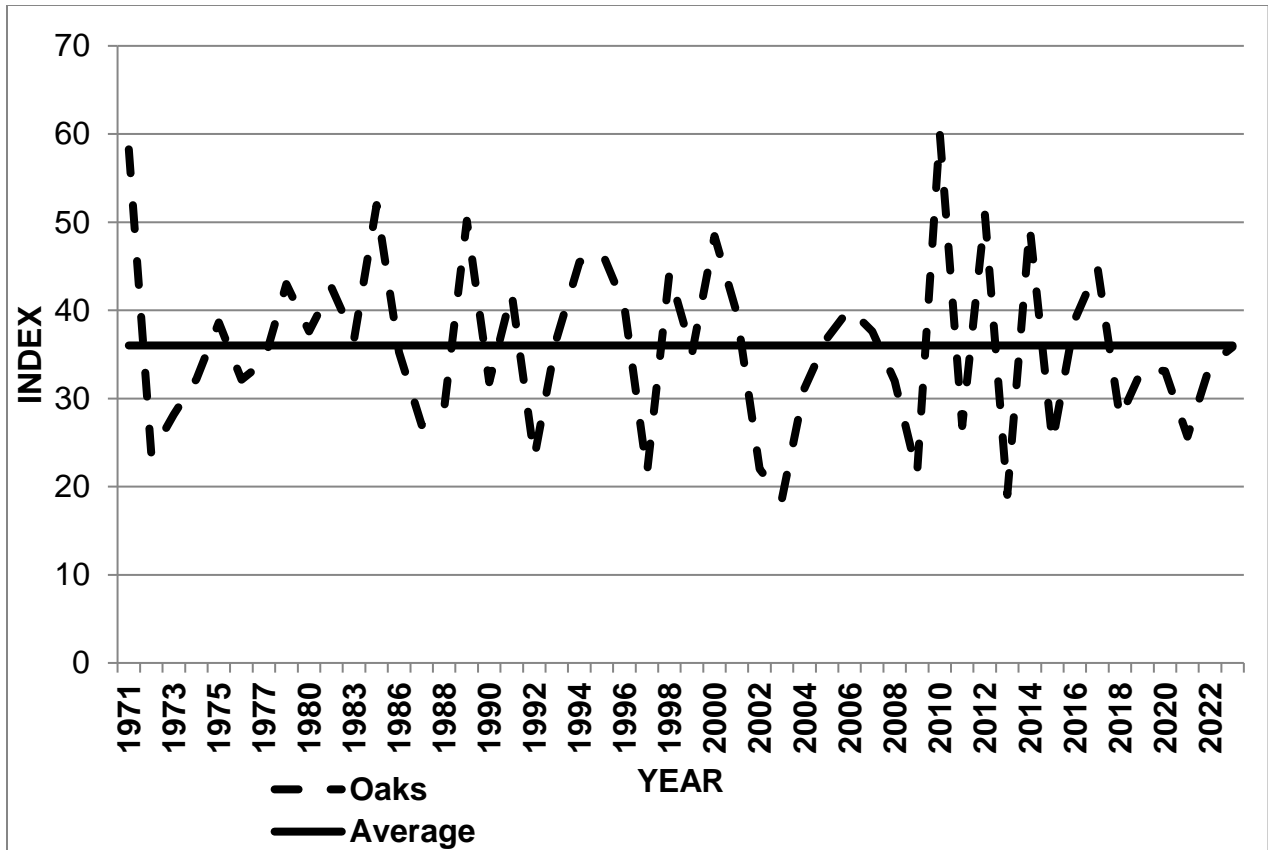
Figure 5. West Virginia average oak mast conditions from 1971 - 2023.

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Mast Survey

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