Summary report on all harvested species on Patuxent Research Refuge from September 1 - January 31, 2017

Deer Harvest									
2016-2017	North Tract	Central Tract		South Tract	Total	Compound Bow	Cross-bow	Muzzle-loader	Shotgun
		Lottery	Schafer Farm						
Total Harvest	127	28	11	41	207	42	31	37	96
Buck Total	62	21	3	17	103				
Doe Total	65	7	8	24	104				
Antlered Total	38	13	1	7	59				
Antlerless Total	89	15	10	34	148				

Deer Population Estimates						
Population Estimation Methods	**Area**	**Bucks**	**Does**	**Fawns**	**Total Pop**	**Density (Deer/sq. mi)**
1. Formula based on harvest doe:buck ratio	North Tract	124	124	62	310	24.68
	Central Tract	48	48	24	120	40.96
	South Tract	34	34	17	85	21.09
	Refuge Wide	**206**	**206**	**103**	**515**	**26.38**
2. Formula based on 2:1 doe:buck ratio	North Tract	124	248	124	496	39.49
	Central Tract	48	96	48	192	65.53
	South Tract	34	68	34	136	33.75
	Refuge Wide	**206**	**412**	**206**	**824**	**42.21**
3. Formula based on camera trapping doe:buck ratio	Refuge Wide					
4. Pop'n est from density extrapolation method (deer/sq mile * # sq miles)	North Tract					331.33
	Central Tract					77.29
	South Tract					106.31
	Refuge Wide					514.94

<< 1:1 doe:buck ratio based

<< 2:1

2016-2017 deer population estimate = 515. Density is 26.38 deer/sq mi (515/19.5) for entire refuge. Based on doe:buck ratio from harvest. (1.01). See formulas below.
State recommends density of 20 deer/square mile.

Pop'n Estimation Formula:
(Buck harvest x 2) + [(Buck harvest x 2) x (doe:buck ratio)] + ([(Buck harvest x 2) x (doe:buck ratio)] x 0.5)

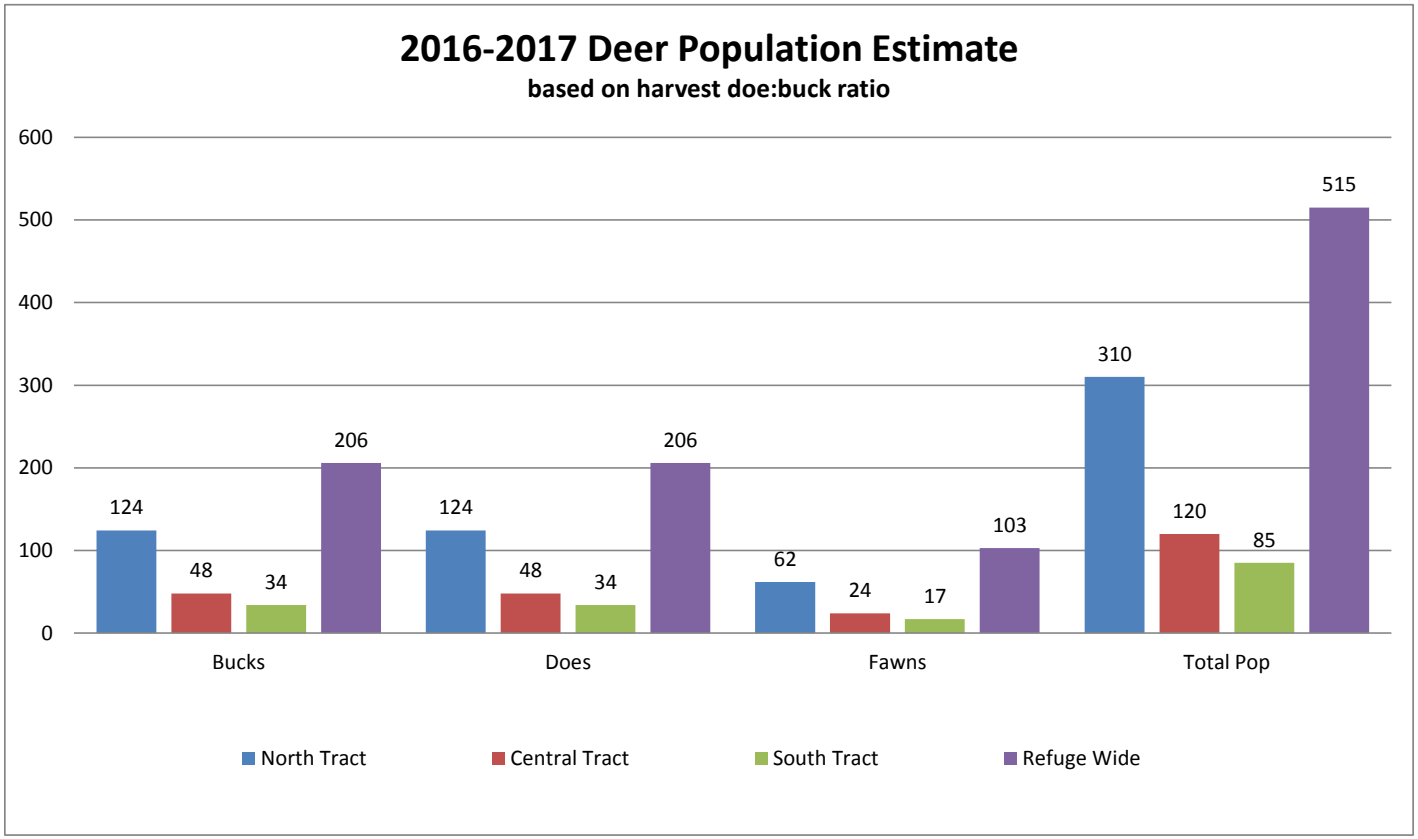
Density (Deer/Sq Mile) formula: Estimated Pop'n / square miles of refuge or tract .

Because Central and South Tracts have low harvest numbers , population estimates or deer

Deer Habitat Acres & Sq Mi by Tract		
Tract	**Deer Habitat Acres**	**Square Miles (acres/640)**
North	8040	12.56
Central	1872	2.93
South	2579	4.03
Refuge	12491	19.52
Refuge-wide Doe:Buck Ratio		
Does	Bucks	

density for these 2 tracts unreliable.

104	103
1.010	

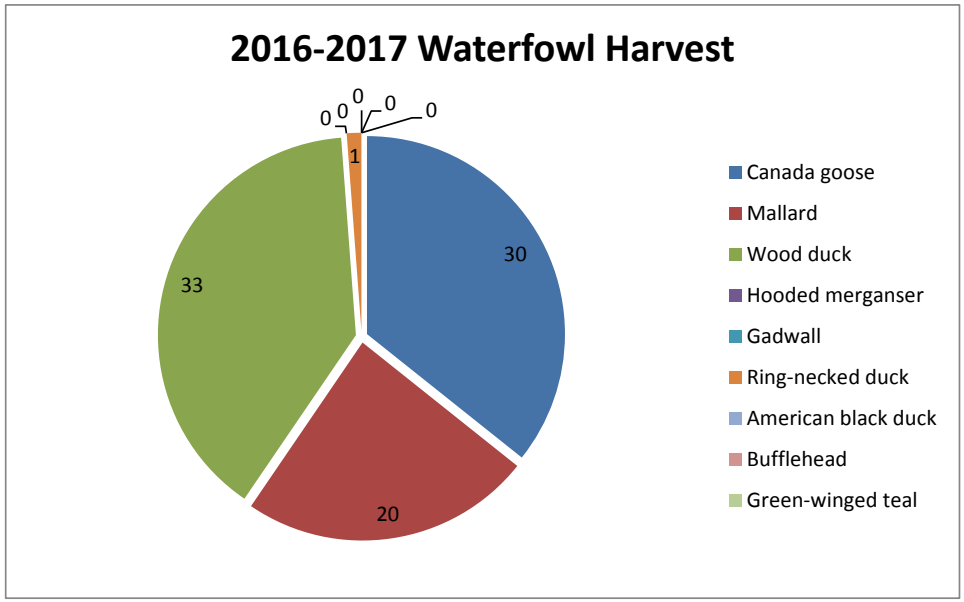


Waterfowl and Small Game Harvest	
Waterfowl	**Total Harvest**
Canada goose	30
Mallard	20
Wood duck	33
Hooded merganser	
Gadwall	
Ring-necked duck	1
American black duck	
Bufflehead	
Green-winged teal	

Small Game	
Gray Squirrel	63

Migratory Birds	
Mourning Dove	22

Forest Game Bird	
Wild Turkey	TBD



ANNUAL DEER POPULATION ESTIMATE AND DEER DENSITY FOR PATUXENT REFUGE.

Below is the step by step process for calculating the population size and density for the deer at Patuxent Refuge. This should be done annually and then compared with results of five consecutive years to observe trends. We only perform these calculations for deer. Harvest rates for other species are too low to produce reliable estimates.

A useful formula used by MD DNR for estimating population from harvest data is: bucks + does + fawns, however actual numbers harvested are not what is input in this formula.
1. To get bucks, multiply actual buck harvest x 2. This is called “calculated” bucks number.
2. To get does, multiply calculated bucks by your best doe:buck ratio (see choices below). The result will be the “calculated” does .
3. To get fawns, multiply the "calculated" does x 0.5.
4. Now you are ready to add calculated bucks + calculated does + calculated fawns to get estimated population totals. When presenting population estimates, be sure to indicate which doe/buck ratio it is based upon (actual harvest, camera trapping, or a 2:1 ratio).
Because Central and South tracts have low harvest numbers, population estimates or deer density for those individual tracts are not reliable, so present only for illustration purposes. Better to assume that these tracts have similar density as North Tract where hunting is more intense and provides more data.

5. Where does a doe to buck ratio come from? It can be obtained from the year's harvest numbers, from camera trapping surveys (if done that year), or the generalized 2:1 doe to buck ratio. You can try all three for comparison purposes, but we will use the either harvest ratio or camera trap ratio for reporting purposes however. If you have a ratio from camera trapping surveys, that is the best one to use because it is least biased. If that’s not available, use the ratio obtained from the harvest data of the year. Keep in mind it too is biased because it derives from hunter choice. Finally there are generalized ratios based on national and regional demographic data. The general range-wide ratio for white tailed deer is 3:1, but there’s a lot of mortality in bucks. Also, if you have a hunt program that conserves bucks, like a 15” rule, that would mean more bucks out there. So the 2:1 might be a more realistic than 3:1. However, we will use the actual harvest ratio, or deer camera survey ratio.
The standard ratio for Maryland for fawn calculation is 0.5 of does.

6. Now that you have population estimates, you can calculate deer density in deer per square miles (of deer habitat) for the refuge. and for each tract if desired. This is obtained by dividing the population estimate by the square miles of deer habitat of the refuge to get deer/sq mi. We have already subtracted acres of roads, parking lots, buildings and open water (i.e. non-deer habitat) from refuge total acres to obtain total deer habitat acres and have converted them to square miles for you, presented in the table below. Acres are divided by 640 to convert to square miles.

Tract	Deer Habitat Acres	Square Miles (acres/640)
North	8040	12.56
Central	1872	2.93
South	2579	4.03
Refuge	12491	19.52

7. Once you have a refuge wide density factor, you can multiply that factor by the area (square miles) of any of the three tracts to get a per-tract population estimate. For example, assume refuge wide the deer density was 29.26/sq mile for the 2015-16 hunt season: and you want a population

estimate for North Tract: 29.26 x 12.56 = 364 deer.

Example calculation:
For 2015-2016 harvest at North Tract, where 109 bucks were taken, and using a doe to buck ratio of 0.49 (harvest data 81:164):
(109* 2)+ (218 * 0.494) + (106.82 * 0.5) =
218 + 106.82 + 53.41 = **378.23**
total population for North Tract
To get the density or deer per square mile, divide the total deer by the square mileage of the property: 378.23 divided by 12.56* = **30.11** deer per square mile.
*Based on 8040 acres of suitable deer acres, NT

To calculate the refugewide population estimate:

(164 * 2) + (328 * 0.494) + (162 * .5)
328 162 81 = 569.42 = **571**

Refugewide density estimate:

571/19.52 = 29.26