Bureau of Forestry

Public Land Management Plan

District # 16

DMAP Unit # 45

I. Mission Statement

The mission of the Bureau of Forestry is to ensure the long-term health, viability and productivity of Pennsylvania's forests and to conserve native wild plants.

II. Problem Statement

a. Problem Statement:

This 27,018 acre unit has been enrolled in DMAP since its inception, and we have been seeing positive results within this unit the last few years since its enrollment. Most of this unit contains Northern Hardwood stands with a beech brush understory. However, the last few years we have been noticing desirable regeneration and wildflower establishment coming in under the competing beech brush in some areas of the unit. Recently, the deer population seems to be increasing, which the PGC agreed is happening across WMU 2G. We are starting to erect more fences and are noticing more browsing pressure within our timber sales and areas where desirable regeneration persists overall. However, we feel that in order to continue with this positive trend, DMAP is needed for this unit.

b. Length of Time Problem has Persisted:

As mentioned above, this unit has been enrolled in DMAP since the program began. Prior to DMAP, fencing was needed at a higher rate in order to successfully regenerate our recently harvested timber sales. Our fencing needs were reduced after DMAP began, but have started to rise again within the past couple years. There are certain areas within this unit that receive higher browsing pressure when compared to other areas. The majority of this area is observed within our herbicide blocks and recently harvested timber sales, where desirable regeneration persists in the highest amounts. As mentioned above, we have noticed areas with desirable regeneration being established in areas where beech brush is a problem. We feel that if population levels continue to rise in this unit, then we will start to see decreases in desirable regeneration, and we are already experiencing a need for more fencing.

c. How DMAP will assist in Solving Problem:

DMAP had benefited this unit since its beginning by stabilizing deer populations, contributing to less browsing pressure on the desirable seedlings, but in the past couple years, the deer population has started to increase, contributing to more browsing pressure on the desirable seedlings. The continued enrollment of this area into DMAP

will hopefully re-stabilize deer populations and lessen browsing pressure resulting in continued positive results. This area had a 23% success rate for the 2012 hunting season (% harvest (no. reported)), which is about average for this unit. The 2011 season brought a 23% success rate (% harvest (no. reported)).

d. Actions Taken to Date:

Mentioned previously, this area has been enrolled in DMAP since the program began. Approximately 3,300 acres of timber consisting of 28 timbersales have been either executed or are proposed to be executed since the beginning of the DMAP program. It should be noted the 3,300 acres are regeneration harvests, improvement acres were not taken into account here. In 2011-2012, approximately 1,800 acres are being harvested for salvage in response to a wind event that occurred in May 2011. In 2002-2003; 13 fences were erected to protect desirable regeneration within harvested areas. From 2003-2011 only five additional fences were erected, but since 2011 two fences were erected and five more are proposed. We requested 541 coupons in 2012 or 1 coupon per 50 acres, and all coupons were sold. The area receives moderate hunting pressure throughout the season. As mentioned above the unit received a 23% success rate (% harvest (no. reported)), stable with the 2011 season and about average when considering a longer trend. The unit is considered relatively easy to access in most areas; however the unit does also contain a few remote areas. Several gated haul roads exist within the unit, in which many are opened during the season to allow easier access.

III. Map of Area:

Attached

IV. Goals Specific to DMAP: The goals for the area are for DMAP to assist in promoting a diverse, healthy natural habitat that: a) Supports wildlife species diversity and healthy deer populations b) Provides additional hunting opportunities c) Has sufficient desirable regeneration to support sustainable forestry practices with minimal need for fencing d) Maintains a forest that will persist and function into the future with healthy, native wild plant species.

Rationale and relationship between goals and deer impacts

White-tailed deer (*Odocoileus virginianus*), as a wild, native ungulate, are an integral part of the evolutionary history of Pennsylvania's forest ecosystems. The recovery of deer populations from near extinction in the late 1800's to their present abundance provides opportunities for hunting and recreation. However, it has been well documented that deer cause damage to tree seedlings and herbaceous plants (Hough 1965, Anderson and Loucks 1979, Tilghman 1989, Alverson and Waller 1997, deCalesta 1997, Augustine and Jordan 1998) which can cause a shift in community composition from more to less palatable plant species (Rooney 2001, Knight et al. 2009). Deer can also cause, regeneration failure (Tilghman 1989), require fencing around recently timbered forest areas (Horsley et al. 2003),

and dramatically reduce overall plant biodiversity (Russell et al. 2001, Rooney and Waller 2003, Royo and Carson 2006, Knight et al. 2009). Studies have also indicted that overabundant deer populations reduce diversity of wildlife communities stemming from destruction of vegetative habitat by deer (DeGraaf et al. 1991, deCalesta 1994, 1997, McShea and Rappole 1992). Therefore, DMAP is a necessary tool to assist the Bureau of Forestry in providing additional hunting opportunities, which can help to work toward our goals of promoting a diverse, healthy natural habitat with native wild plants.

V. Objectives: The DMAP objectives include:

a. Increase the number of native plant species which can be indicators of a healthy forest with a deer population in balance with the habitat: This objective was chosen because evidence suggests deer browsing has altered plant and animal communities (DeGraaf et al. 1991, deCalesta 1994, 1997, McShea and Rappole 1992) and have caused reductions in plant species diversity (Russell et al. 2001, Rooney and Waller 2003, Royo and Carson 2006, Knight et al. 2009), and reduced sustainability in plant communities (Knight et al. 2009).

Therefore, a set of herbaceous species are monitored because these species respond more rapidly to lower deer populations than tree regeneration, which may take many years to recover (Latham et al. 2005). A core set of Indicator species have been determined for State Forest land, which include viburnums, elderberry, trillium spp., Indian cucumber, and jack in the pulpit (Anderson 1994, Rooney 1997, Augustine and Jordan 1998, Rooney 2001, Horsley et al. 2003, Rooney and Waller 2003, Sweetapple and Nugen 2004, Krueger and Peterson 2006, Diefenbach and Fritsky 2007, Knight et al. 2009, Susan Stout and Alex Royo USFS, personal communication). However, each forest district has the opportunity to add additional indicator species which may be more specific to the region. This will hopefully allow us to learn more quickly which indicators are effective and which may be dropped.

b. Increase the number of acceptable seedlings present: This objective indicates whether the seedlings present generally represent the forest overstory vegetation. This is an important consideration in the sustainable management of the state forest resource because there should not be any vast changes in the species composition of the forest.

c. Maintain good hunter participation: Although the Bureau of Forestry utilizes DMAP to assist in maintaining healthy forests and habitat, it also gives hunters extra antlerless hunting opportunities on state forest land. It is important to maintain hunter satisfaction so they remain a viable deer population management tool. To enhance hunter effectiveness and satisfaction, Forest Districts provide information on areas of recent timber sale areas, wildlife foot plots or openings, fenced areas, and other information to assist hunters in focusing hunting opportunities on areas with greater success probabilities. This information can be found on the DCNR website or by contacting the district of interest.

d. Reduce the need for fences in order to achieve successful forest regeneration: In some areas on State Forest land it is still necessary to fence an area after harvesting in

order for forest regeneration to be successful. Fencing is a good indicator of deer impacts. A fence would not need to be erected for other environmental impacts, such as soil resources or legacy impacts.

VI. Indicators/Measures: Currently, our district is in the process of changing to a new monitoring protocol, the Vegetation Impact Protocol (VIP). The VIP was developed after analyzing continuous forest inventory (CFI) data (forest wide data collected by the Bureau of Forestry's Inventory and Analysis section), which indicated that supplemental CFI sub-plot plots would add enough data to detect biological important changes in vegetation. The VIP was designed so that data could be integrated with data from the existing CFI but also collect additional information important to making DMAP decisions with the recently Decision Tool.

The VIP collects information on competing vegetation, site limitations, indicator species, and tree regeneration. The protocol focuses heavily on using indicator species to determine if the deer herd is in balance with the vegetation. Our current goal is to have measurements increasing for at least 3 years before making a change to our DMAP areas. Eventually, as more data is collected we will have threshold goals that will tell us when we are in a range of a healthy forest and should, therefore, start reducing DMAP tags or taking an area out of DMAP.

This is the second year of this protocol. Data in this section may be from two sources: CFI and VIP. This is in order to ascertain enough data to make a DMAP decision.

During the summer of 2012 our district collected data on 9 VIP plots across this management unit. This is the second year of three year data collection rotation. At the end of the three year period we will have collected data on 25 plots (125 mil-acre plots) in this management unit. These data will be compiled with plots collected by the CFI. Therefore, every three years we will have statistically robust data to detect changes in vegetation, including indicator species.

VII. The following are indicators/measures collected:

<u>Healthy, Diverse Natural Habitat Indicators:</u>

a. Presence of indicator species

Trend: (Circle one: increasing, decreasing, stable)

<u>Desirable Regeneration Indicators:</u>

b. % Plots with an acceptable seedling

Trend: (Circle one: increasing, decreasing, stable)

c. Need for Fencing

Trend: (Circle one: increasing, decreasing, stable)

<u>Hunter Satisfaction Indicator:</u>

d. Sale of Tags

Trend: (Circle one: increasing, decreasing, stable)

e. Harvest Success

Trend: (Circle one: increasing, decreasing, stable)

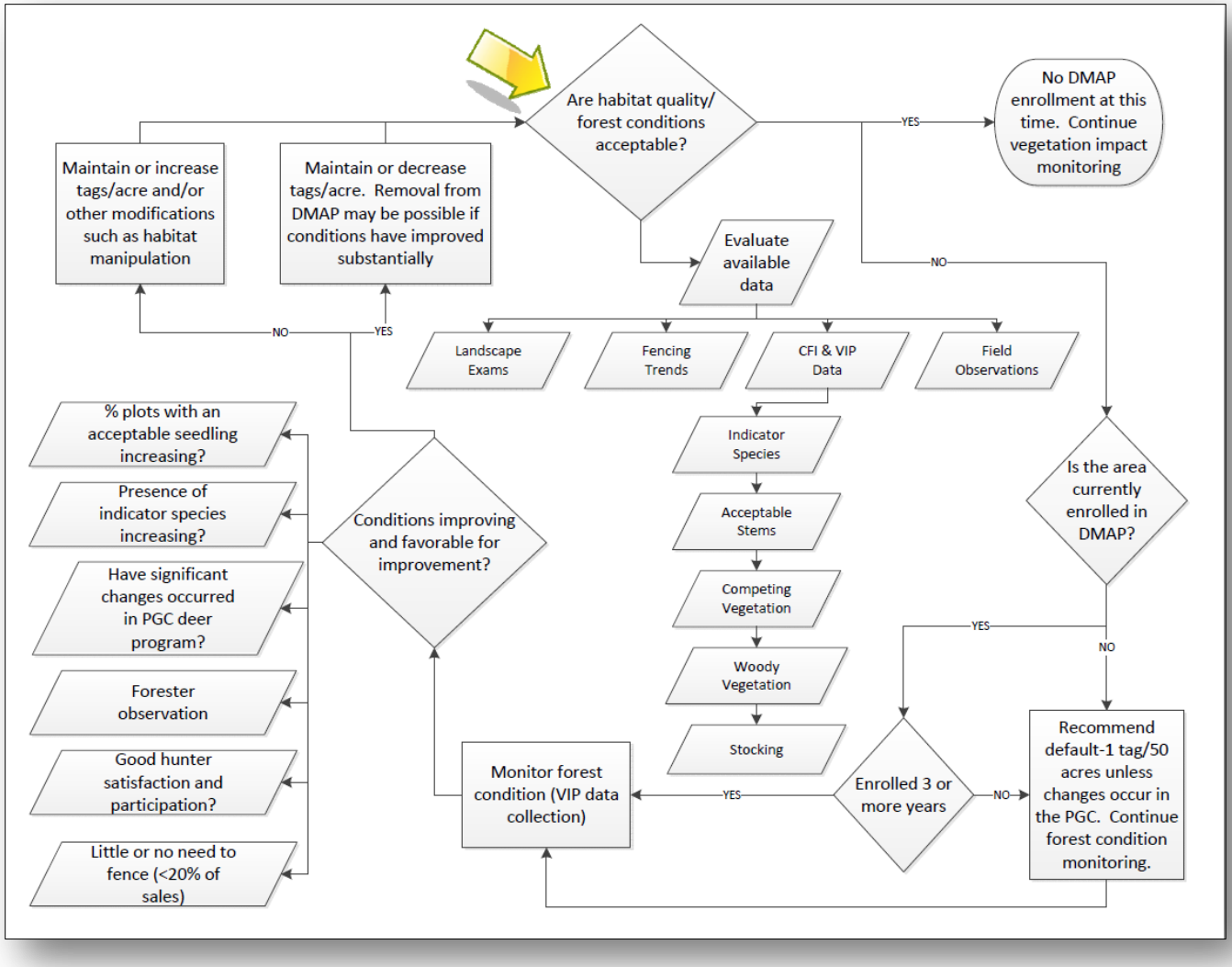
f. Outcome of Decision Tool

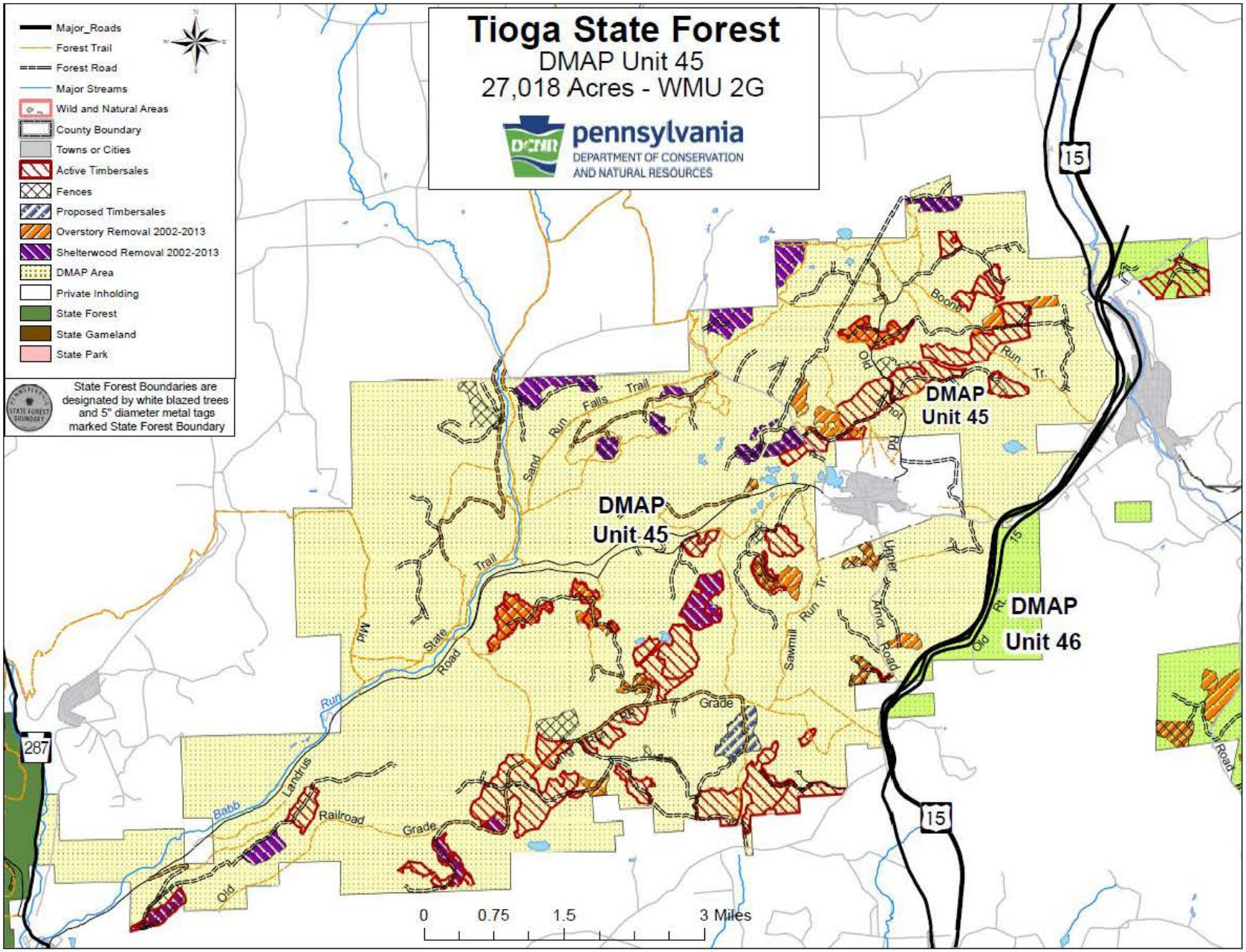
Maintain or increase tags/acre and/or other modifications such as habitat manipulation.

VIII. Non-Deer Related Factors:

A lack of regeneration can be caused by numerous, sometimes interacting, factors. Some of these factors include: interfering vegetation, understory light conditions, and soil quality (moisture and chemistry). Past deer impact may have permitted the establishment of competing vegetation but the deer herd may or may not still be a factor in these areas. For the purpose of considering deer impact, we do not consider areas where conditions are unsuitable and would prohibit establishment of desirable plant species in our analysis in determining whether an area should be enrolled in DMAP.

Figure 1. DMAP Decision Tool for Bureau of Forestry




Tioga State Forest
DMAP Unit 45
27,018 Acres - WMU 2G
pennsylvania
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
Major_Roads
Forest Trail
Forest Road
Major Streams
Wild and Natural Areas
County Boundary
Towns or Cities
Active Timbersales
Fences
Proposed Timbersales
Overstory Removal 2002-2013
Shelterwood Removal 2002-2013
DMAP Area
Private Inholding
State Forest
State Gameland
State Park
State Forest Boundaries are designated by white blazed trees and 5" diameter metal tags marked State Forest Boundary
DMAP Unit 45
DMAP Unit 45
DMAP Unit 46
15
287
Boone Run Tr.
Old Rt. 15
Sand Run Falls Trail
PW Trail
State Road
Sawmill Run Tr.
Upper Armot Road
Old Rt. 15
Babb Run
Landrus Railroad Grade
Old
Grade
Road
0 0.75 1.5 3 Miles

Comparison of the 3-day Antlerless Season and the 12-day Antlerless Season

Category	3-day Season	12-day Season	Sources
1. Years	1990-1999	2002-2012	
2. Deer population trends	Increasing	Decreased and currently stable	Pennsylvania Deer Statistics 1982-1999; PASAK results 2002 to 2012
3. Deer population objectives achieved	1 of 61	9 of 11	Pennsylvania Deer Statistics 1982-1999, 6 SRA counties not included; 2013 Antlerless Allocations and Supporting Information, 12 WMUs with 7-day season not included
4. Percent of hunters harvesting an antlered deer	18%	17%	Game Take Survey (1990-99 avg. = 958,000 deer hunters; 2002-12 avg. = 749,000 deer hunters); Harvest estimates (1990-99 avg. = 169,000 antlered deer; 2002-12 avg. = 128,000 antlered deer)
5. Percent of hunters harvesting an antlerless deer	29%	27%	Antlerless License Sales (1990-99 avg. = 752,000 licenses; 2002-12 avg. = 887,000 licenses); Harvest estimates (1990-99 avg. = 221,000 antlerless deer; 2002-12 avg. = 242,000 antlerless deer)
6. National ranking of deer harvested per square mile of land area	2nd	2nd	2001 Deer Hunters' Almanac; 2014 QDMA Whitetail Report,
7. Percent of hunters who said deer population "too low"	61%	66%	1995 PA Deer Hunter Survey, Question 6; 2011 PA Deer Hunter Survey, Question 29
8. Average annual variability of antlerless harvest success	14%	5%	Antlerless License Sales and Harvest Estimates
9. Change in hunting license sales	–127,000 (–11%)	–74,000 (–7%)	Hunting License Sales
10. Change in deer hunter numbers	–131,000 (–13%)	–49,000 (–6%)	Game Take Survey
11. Opportunity to hunt antlerless deer with firearm	3 days	12 days	
12. Percent of deer hunters who hunt during antlerless deer season	50%	80%, 70%, 65%	1995 PA Deer Hunter Survey, Question 5; 2011 PA Deer Hunter Survey Question 38 (% hunting 1st Monday, % hunting 1st Saturday, % hunting 2nd Saturday)
13. Common hunter complaints	1. Reduce antlerless season 2. Not seeing enough deer 3. Public v Private Lands		1995 Deer Management Meetings (9 held across state); 1999 Deer Management Open Houses (7 held across state); Public comments and current legislation
14. Change in antlerless allocations to achieve same objectives	40% Increase	0%	Prediction based on prior experience when changing antlerless season from 12 days to 7 days and from 3 days to 12 days

Notes

1. **Years**
   1990 to 1999 represent the final 10 years of the 3-day antlerless season. 2002 represent the most recent 11 years of the 12-day season with consistent regulations (i.e., 12-day antlerless season and antler restrictions).
2. **Deer population trends**
   From 1990 to 1999, deer populations increase across Pennsylvania. From 2002 to 2004, deer populations decreased. From 2005 to 2012, deer populations were generally stable.
3. **Deer population objectives achieved**
   In 1999, Cameron County did not meet the deer management objective. In 2013, WMUs 1A (increasing population with recommendation to stabilize) and 3D (stable population with recommendation to reduce) were not meeting objectives.
4. **Percent hunters harvesting an antlered deer**

5. **Percent hunters harvesting an antlerless deer**

6. **National ranking of deer harvested per square mile of land area**
   From 1994 to 1999, Pennsylvania harvested an average of 8.5 deer per square mile ranking second behind West Virginia with 8.7 deer per square mile. In 2012, Pennsylvania harvested 7.5 deer per square mile in 2012 ranking second behind Maryland with 8.9 deer per square mile.
7. **Percent of hunters who said deer populations "too low"**

8. **Average annual variability of antlerless harvest success**
   From 1990 to 1999, the average change in antlerless harvest success was 14%. From 2002 to 2012, the average change in antlerless harvest success was 5%. Less annual change leads to better predictions when recommending antlerless allocations to achieve a specific harvest.
9. **Change in hunting license sales**

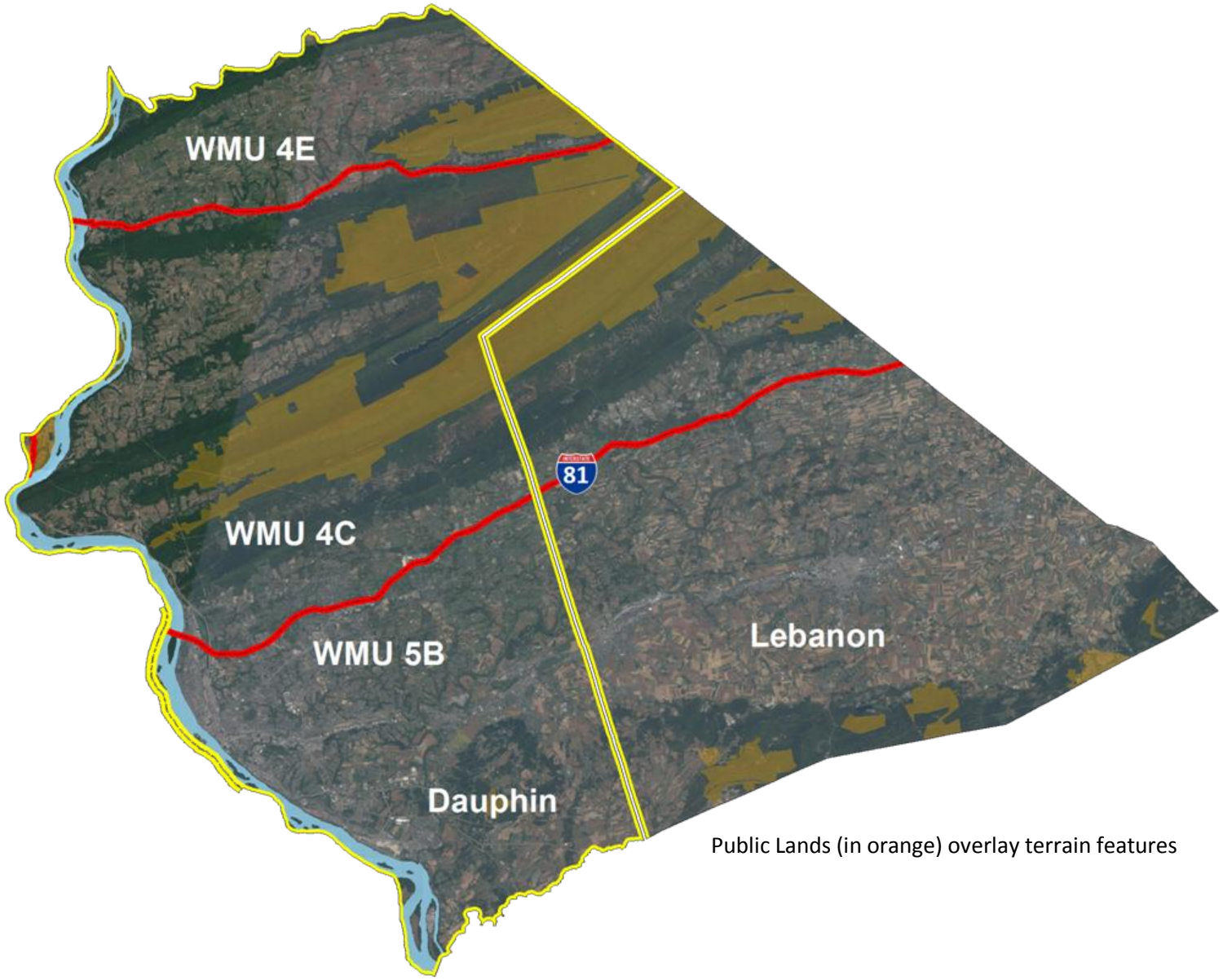
10. **Change in deer hunter numbers**

11. **Days available for antlerless deer hunting with a firearm**

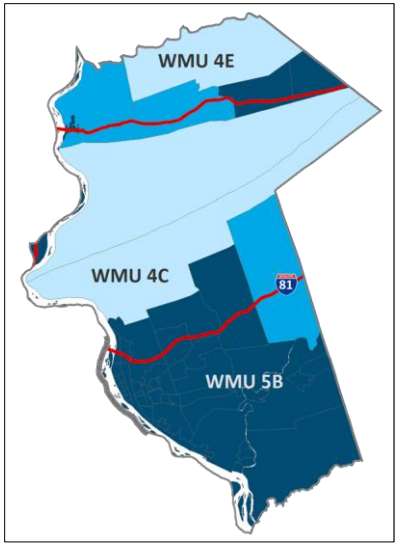
12. **Percent of deer hunters who hunt during antlerless deer season**
    From the 1995 PA Deer Hunter Survey, 50% of deer hunters participated in the 3-day antlerless firearms season. From the 2011 PA Deer Hunter Survey, 80% of deer hunters hunted the first Monday, 70% hunted the first Saturday, and 65% hunted the last Saturday. Antlerless deer could be hunted on each of these 3 days in 11 WMUs and on 2 of these days in 11 WMUs.
13. **Common hunter complaints**

14. **Change in antlerless allocation to achieve same objectives**

WMUs delineate Habitat, Landownership, and Human Characteristics

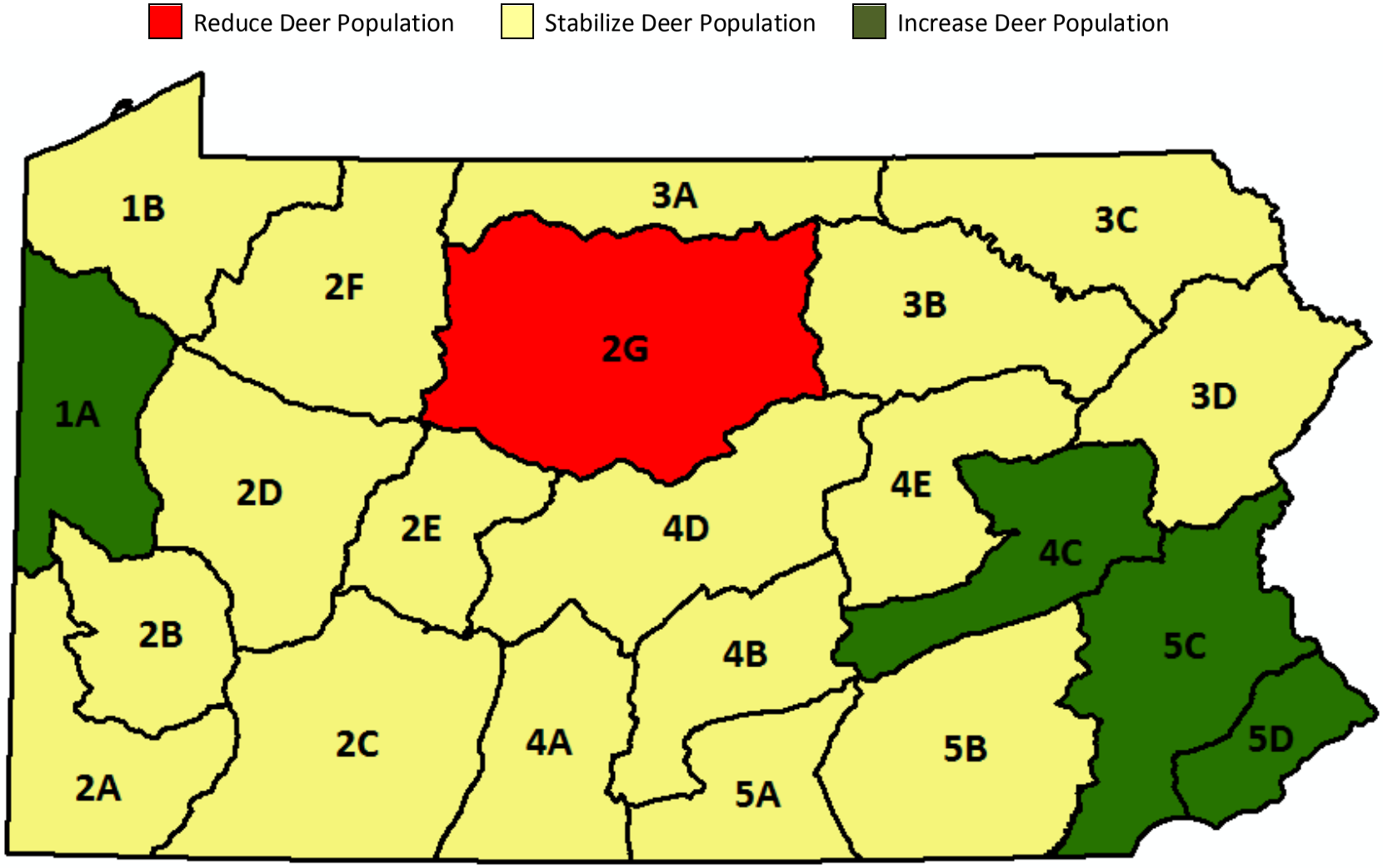


Public Lands (in orange) overlay terrain features



Darker colors = Higher human population density

Deer Management Actions to Achieve Maximum Sustained Yield (MSY)



Deer management actions based on assessment of deer population position relative to MSY using reproduction of 1 year old female deer, 2006 to 2010. MSY values were based on work by McCullough (1979; The George Reserve deer herd) and Downing and Guynn (1985; A generalized sustained yield table for white-tailed deer).